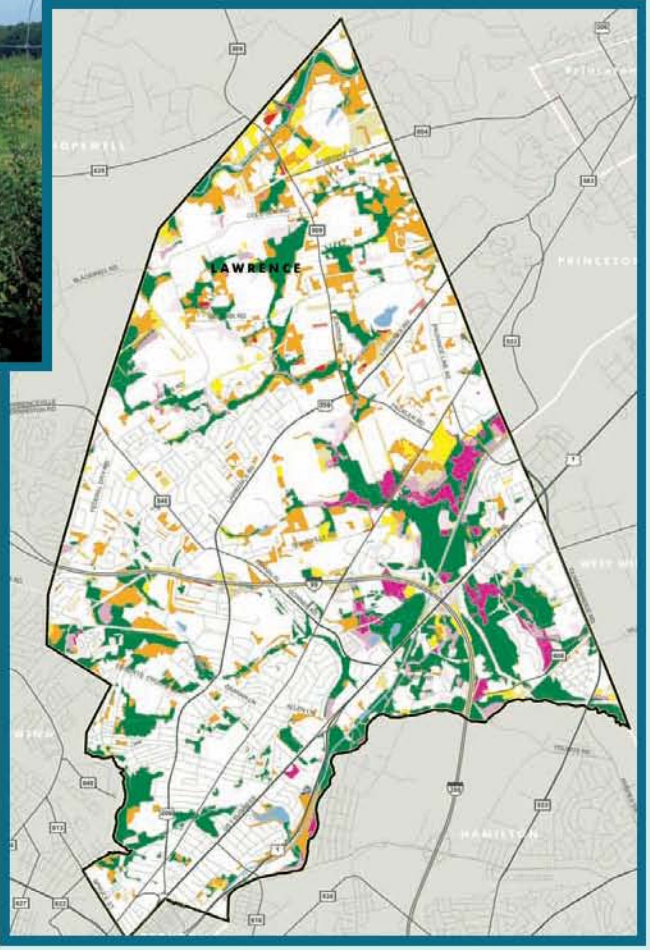
ENVIRONMENTAL RESOURCE INVENTORY

for the TOWNSHIP of

LAWRENCE

MERCER COUNTY, NEW JERSEY



prepared by:

Delaware Valley
Regional Planning
Commission

with:

The Environmental
Resources Committee
of Lawrence Township

MARCH 2008

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The impetus for the creation of this document, and its guidance and review, came from the Lawrence Township Environmental Resources Committee.

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LAWRENCE TOWNSHIP ENVIRONMENTAL RESOURCE INVENTORY

INTRODUCTION

The purpose of an Environmental Resource Inventory is to identify and describe the natural resources of a community. A community's natural resources—its soil, water, air, forests, fields, and waterways—are fundamental to its character. They are the foundation for its economic success and its quality of life. The protection and wise use of those resources is essential to the public health, safety, and welfare of current and future residents. The Environmental Resource Inventory provides the basis for the development of methods and steps to preserve, conserve, and utilize those resources.

Lawrence Township's natural resources have long shaped the lives of its inhabitants. The Lenape Indians, who inhabited the lands of the township for thousands of years before the arrival of Europeans, relied upon fish and game from the area's streams and upland forests. They also made good use of the region's rich agricultural soils. Lawrence's high-quality soils also played a major role in the township's settlement by Europeans. Almost immediately after their arrival, Quaker settlers began to clear the forest and work the land, cultivating grain, fruits, and vegetables.

In recent decades, significant areas of the township have experienced suburban growth. Developed areas now constitute approximately one-half of Lawrence. Despite past growth and continuing development pressure, the township has been very successful in preserving open space. Almost a quarter of the township is preserved open space, parkland or farmland. While Lawrence is unique in that the majority of the township is either developed, preserved or occupied by wetlands, which cannot generally be built upon, the character and natural resources of Lawrence continue to change and evolve. Documentation of the community's environmental resources is a necessity if Lawrence is to maintain its rural and agricultural areas, the integrity of its natural resources, its environmental quality, and its high quality of life.

Lawrence's surface waters and groundwater resources, and the terrestrial resources that sustain the area's hydrology, will become increasingly important to its population and to that of neighboring communities as continuing development places increasing pressure on diminishing natural resources. Lawrence's wetlands, upland forests, and grasslands, which provide significant habitat for a wide range of plants and animals, will be vital to the continued health of the community and the enjoyment of its citizenry. Knowledge of the environmental resources of the township will allow its citizens to make informed decisions as they strive to maintain Lawrence's identity and create a sustainable landscape.

Preparing an Environmental Resource Inventory requires gathering all the existing information that can be found about a township's resources and presenting it in a form that is useful to a broad audience. The inventory reflects a particular moment in time, and it is assumed that it will be updated as new data becomes available.

INTRODUCTION

Several documents and reports were utilized in preparing the *Environmental Resource Inventory for Lawrence Township*, including Lawrence Township's *Master Plan (1995)* and the *Open Space Plan (2000)*, as well as a number of reference works. These are listed at the end of this document. The maps and data relating to Lawrence's natural resources are principally derived from the New Jersey Department of Environmental Protection's (NJDEP's) Geographic Information System mapping and from *The Landscape Project* produced by the Endangered and Nongame Species Program of the New Jersey Fish and Wildlife Division.

Photo by Chris Linn

A Rural Scene in Northern Lawrence Township

BRIEF TOWNSHIP HISTORY

Lawrence Township is one of the oldest municipalities in New Jersey. Although the township was officially established in 1798, the human history of the region dates back thousands of years. The earliest inhabitants of the land area today known as Lawrence Township were the Lenape Indians (called by the English “the Delawares”). These migratory people ranged throughout New Jersey along the banks of the Delaware River and its tributaries, leaving a legacy of stream names throughout the area. For example, Assunpink Creek, which makes up Lawrence’s southern border, is Lenape for “rocky place that is watery.” Creeks such as this provided rich natural resources for hunting, fishing, pottery-making and simple farming.

Early Native American communities relied on the township’s natural resources until the arrival of Europeans. Towards the end of the seventeenth century, Quaker settlers began to come down into the township from New York by way of today’s Route 206, the main road between New York and Philadelphia. They came in search of religious freedom and to farm the rich soils of Lawrence. The land was gently rolling, very fertile, and watered by way of the Assunpink, Shabakunk, Little Shabakunk, Shipetauken and Stony Brook creeks.

Although the Lenape Indians were the original owners of the land, by 1801 (nearly a century after the arrival of the first settlers) they had sold virtually all of their land to the settlers and moved from the area. The first recorded purchases of lands in the township occurred in 1690 by Quaker settlers Mary Davis, Thomas Green and Richard Ridgeway. They purchased land north of the Assunpink Creek in what was then part of Burlington County and the colony of West Jersey.

In February of 1697, the Colonial Supreme Court at Burlington officially authorized the formation of the area north of the Assunpink Creek as the Township of Maidenhead. It was named for a suburb of London along the Thames River, which was later incorporated into the City of London. Maidenhead became the most important settlement in the area at that time because of its rich soils, easily cultivatable land, nearby stone quarries and central location between the Raritan and the Delaware rivers.

Maidenhead played an important role in the Revolutionary War. In December of 1776, Lord Cornwallis and some of his troops quartered on Main Street in what is now Lawrenceville. The following month, on January 2, 1777, the township was the site of a Revolutionary War engagement in which Colonel Edward Hand’s riflemen delayed General Cornwallis’s British troops at Shabakunk Creek. At this battle, Hand’s men stationed near Lawrence Road prevented the British from entering the city of Trenton and allowed General Washington and the Continental Army time to escape during the night. Modern day reenactments of this battle are held at this site each year.

Maidenhead was part of Burlington County and the colony of West Jersey until 1714, when the township became part of Hunterdon County. In 1798 the township was legally incorporated through an act of the New Jersey legislature. On January 24, 1816, the name of the township was changed to Lawrence. The municipality chose this name in honor of Captain James Lawrence, naval captain of the frigate *USS Chesapeake* during the War of 1812.

BRIEF TOWNSHIP HISTORY

Captain Lawrence was born in Burlington, New Jersey and is renowned for his final order, “Don’t Give up the Ship.”

In 1838, Lawrence became part of Mercer County, which was formed from part of Middlesex, Burlington and Hunterdon counties. In 1844, Lawrence annexed an area of land across the Shabakunk Creek known as East Trenton. This area remained part of the township until 1882, when it seceded and became known as Millham Township (Millham was eventually incorporated into Trenton).

Lawrence was a popular place to settle throughout the 1800s because of its excellent agricultural soils. The village of Maidenhead (now Lawrenceville) became the center of trade for the farming community. Many acres of forest were cleared for farming up through the early 1900s. Since the 1930s, the acreage used for farming has declined as more and more land has been converted to residential and commercial uses. Even so, a large portion of northern Lawrence remains in agricultural use today as a result of farmland preservation efforts. These farms now produce vegetables, fruits, poultry, and dairy products.

The development of railways in the late nineteenth and early twentieth centuries, an electric trolley line extending from Trenton in the 1920s, and the rise of the automobile from the 1920s onward hastened Lawrence’s growth. Lawrence’s proximity to Trenton and accessibility by highway and train made the township an attractive location for commuters, as well as large businesses and industries. By 1930, the population of Lawrence had swelled to 6,293 individuals. As a growing suburb of Trenton, Lawrence continued to grow rapidly following World War II. Between 1940 and 1950, the population grew from 6,522 to 8,449, an increase of almost 30 percent. By 1970 the total population reached 19,567, a 132 percent increase over the 1950 population. Nassau 1, Nassau 2, and Norgate, located between Princeton Pike and Route 206, were three of the major housing developments that sprang up in the township during the 1950s.

Photo by Chris Linn

Historic House in Lawrenceville

Although growth was relatively flat during the 1970s, Lawrence experienced a second housing and population boom during the 1980s and 1990s. The number of housing units increased by almost 53 percent, from 6,316 units in 1980 to 9,640 units in 1990, while total population increased by 30 percent during that decade. Between 1990 and 2000, the township's population increased by an additional 13 percent (from 25,787 to 29,159 residents), while the number of housing units increased by 16 percent, from 9,640 in 1990 to 11,180 in 2000. Lawrence's residential growth between 1980 and 2000 is indicative of the township's transformation into a suburban bedroom community. Because of its strategic location in the Mid-Atlantic region—only 54 miles from New York City and 33 miles from Philadelphia—the area is becoming part of the "commuter shed" for these two large cities. In fact, many new homebuyers in Lawrence are professionals who have taken jobs in Manhattan and commute into the city.

During the early 1900s, in addition to agriculture, Lawrence's economy was underpinned by industrial and manufacturing activities. The township was home to a flourmill, sawmill, and an ice-cutting factory. Access to railroads made these operations possible. In the 1950s and 1960s, Lawrence's economy underwent a transition to the research, development and knowledge industries with the arrival of the Educational Testing Service (ETS), Bristol Myers Squibb and a Shell Oil facility.

Despite the transition of Lawrence from a largely rural to a largely developed character, the town has been able to maintain much of it historic charm, as well as significant areas of open space. The township's historic center, Lawrenceville, has become a vibrant hub, despite the rise and growth of suburban shopping centers, such as the Quakerbridge Mall. Ten years ago, the Lawrenceville Main Street civic improvement organization formed to take the lead in revitalizing downtown Lawrenceville. In 1997, the organization became an official Main Street New Jersey Community. In 2005, Lawrenceville Main Street earned accreditation as a National Main Street Program under the National Trust for Historic Preservation. The Lawrenceville Main Street Program continues to use its annual budget to recruit new businesses and organize events, such as street fairs and free concerts. The organization also implements landscape and streetscape improvements, such as better parking and lighting, and has expanded the business district.

Today, Lawrence Township is renowned for its history, natural beauty, and cultural diversity. It boasts Revolutionary War-era homes, as well as modern residential, corporate, and commercial communities. Although the township is located near the wealthy town of Princeton and has many million-dollar homes, it still boasts many affordable housing units. In fact, Lawrence is one of only a few central New Jersey communities to exceed its state mandated quota for affordable housing.

Lawrence is still experiencing development with new condominiums, single-family homes, town houses, office complexes and shopping centers. While such growth poses challenges for the township, Lawrence has been successful at retaining much of its colonial charm, nurturing a productive agricultural industry, and protecting over 25 percent of its land area as open space.

Photo by Chris Linn

Terhune Orchards – Part of Lawrence's Productive Agricultural Industry

LAWRENCE TOWNSHIP LOCATION, SIZE, AND LAND USE

Lawrence is an incorporated township located in central Mercer County, north of the City of Trenton, which is the county seat and capital of New Jersey. The township is bounded by six Mercer County municipalities: Hopewell and Ewing townships to the west; Princeton and West Windsor townships to the north and east; and Trenton and Hamilton townships to the south. The Assunpink Creek forms part of the township's southern boundary. See **Map 1: Lawrence Township**.

Lawrence occupies 14,066 acres, or 22 square miles, and is situated on the Piedmont and Coastal Plain sections of New Jersey. Lawrence's land use reflects its natural setting, its agricultural past, and the successive waves of suburban residential development that have occurred since the end of World War II. The township remains mostly rural and agricultural to the north, yet is very developed near Route 206 in the center of the township and in the southeast near Trenton. Most land within central and southern Lawrence is occupied by residential, industrial or commercial facilities. This development arose, in part, because of Lawrence's proximity to the Philadelphia and New York City metropolitan areas and easy access to major highways. Indeed, the largest land classification in the township by far is developed land, which includes residential, commercial, industrial and civic land uses. Developed land occupies over 50 percent of the township.

Before European settlement, as much as 90 percent of the township was covered with a mostly mixed deciduous hardwood forest consisting of maple, oak, beech, walnut, and ash trees. Today, only 13 percent of Lawrence remains forested. An additional 12 percent of the township's land area is dedicated to agricultural uses. Currently, there are 15 active farms that grow and sell fruits and vegetables, as well as organic chicken and beef.

Almost 23 percent of Lawrence's total land area consists of wetlands and open water. Nearly all of these wetlands are freshwater palustrine, encompassing wooded wetlands, swamps, marshes, bogs and small ponds. The wetlands are concentrated along the Delaware and Raritan Canal, and the Assunpink and Shipetauken creeks. The remainder of Lawrence's land, just over one percent, is classified by NJDEP as barren land.[1]

Approximately one-quarter of the township's total land area is preserved as open space. These lands consist of state-, county-, or township-owned parklands, preserved farmland, and privately owned protected open space. See **Map 19: Existing Open Space.**

Table 1 shows Lawrence's land cover grouped into general categories based on the New Jersey Department of Environmental Protection's (NJDEP's) 2002 color infrared digital imagery.

Table 2 breaks down the 2002 general land cover categories into detailed land cover categories.

These categories are also depicted on **Map 3: NJDEP Land Cover (2002).**

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[1] Barren lands are characterized by thin soil, sand or rocks, and a lack of vegetative cover in a nonurban setting. Barren land is found in nature but can also result from human activities. Extraction mining operations, landfills and other disposal sites compose the majority of man-altered barren lands.

Table 1: Lawrence Township General Table Land Cover Classes (2002)

General Land Classes	Acres	Percent
Agriculture	1631	11.59%
Barren Land	195	1.39%
Forest	1825	12.98%
Urban	7190	51.12%
Water	169	1.20%
Wetlands	3056	21.72%
Total	**14066**	**100.00%**

Source: NJDEP, Bureau of Geographic Information System, 2002 data, released 2006

Table 2: Lawrence Township Detailed Land Cover (2002)

Land Use Categories	Acres	Percent
Agricultural Wetlands (Modified)	202.73	1.44%
Altered Lands	14.55	0.10%
Artificial Lakes	59.58	0.42%
Athletic Fields (Schools)	208.16	1.48%
Bridge Over Water	1.30	0.01%
Cemetery	5.48	0.04%
Commercial/Services	990.58	7.04%
Coniferous Brush/Shrubland	74.63	0.53%
Coniferous Forest (10-50% Crown Closure)	14.73	0.10%
Coniferous Forest (>50% Crown Closure)	8.02	0.06%
Coniferous Scrub/Shrub Wetlands	4.37	0.03%
Cropland and Pastureland	1434.44	10.19%
Deciduous Brush/Shrubland	126.98	0.90%
Deciduous Forest (10-50% Crown Closure)	214.00	1.52%
Deciduous Forest (>50% Crown Closure)	955.45	6.79%
Deciduous Scrub/Shrub Wetlands	99.30	0.71%
Deciduous Wooded Wetlands	2151.05	15.29%
Disturbed Wetlands (Modified)	46.69	0.33%
Former Agricultural Wetlands (Becoming Shrubby, not Built-Up)	13.07	0.09%
Herbaceous Wetlands	268.40	1.91%
Industrial	123.11	0.88%
Industrial/Commercial Complexes	7.55	0.05%
Major Roadway	229.22	1.63%
Managed Wetlands in Built-Up, Maintained Recreational Area	12.47	0.09%
Managed Wetlands in Maintained Lawn Greenspace	66.95	0.48%
Military Installations	26.15	0.19%
Mixed Coniferous/Deciduous Brush/Shrubland	230.18	1.64%
Mixed Forest (>50% Coniferous with 10-50% Crown Closure)	7.40	0.05%
Mixed Forest (>50% Coniferous with >50% Crown Closure)	14.42	0.1%
Mixed Forest (>50% Deciduous with 10-50% Crown Closure)	10.86	0.08%
Mixed Forest (>50% Deciduous with >50% Crown Closure)	4.49	0.03%
Mixed Scrub/Shrub Wetlands (Coniferous Dominant)	49.34	0.35%
Mixed Scrub/Shrub Wetlands (Deciduous Dominant)	62.33	0.44%

Land Use Categories	Acres	Percent
Mixed Urban or Built-Up Land	10.03	0.07%
Mixed Wooded Wetlands (Coniferous Dominant)	1.85	0.01%
Mixed Wooded Wetlands (Deciduous Dominant)	4.30	0.03%
Natural Lakes	14.57	0.10%
Old Field (<25% Brush Cover)	153.89	1.09%
Orchards/Vineyards/Nurseries/Horticultural Areas	152.51	1.08%
Other Agriculture	44.26	0.31%
Other Urban or Built-Up Land	922.69	6.56%
Phragmites Dominate Interior Wetlands	1.25	0.01%
Phragmites Dominate Old Field	0.37	0.00%
Plantation	9.79	0.07%
Recreational Land	362.39	2.58%
Residential, High Density, or Multiple Dwelling	446.24	3.17%
Residential, Rural, Single Unit	1346.92	9.58%
Residential, Single Unit, Low Density	602.42	4.28%
Residential, Single Unit, Medium Density	1614.48	11.48%
Stormwater Basin	119.56	0.85%
Streams and Canals	93.55	0.67%
Transitional Areas	178.15	1.27%
Transportation/Communication/Utilities	94.95	0.68%
Undifferentiated Barren Lands	2.48	0.02%
Upland Rights-of-Way Developed	22.79	0.16%
Upland Rights-of-Way Undeveloped	57.64	0.41%
Wetlands Rights-of-Way	71.57	0.51%
Total	**14066.09**	**100.00%**

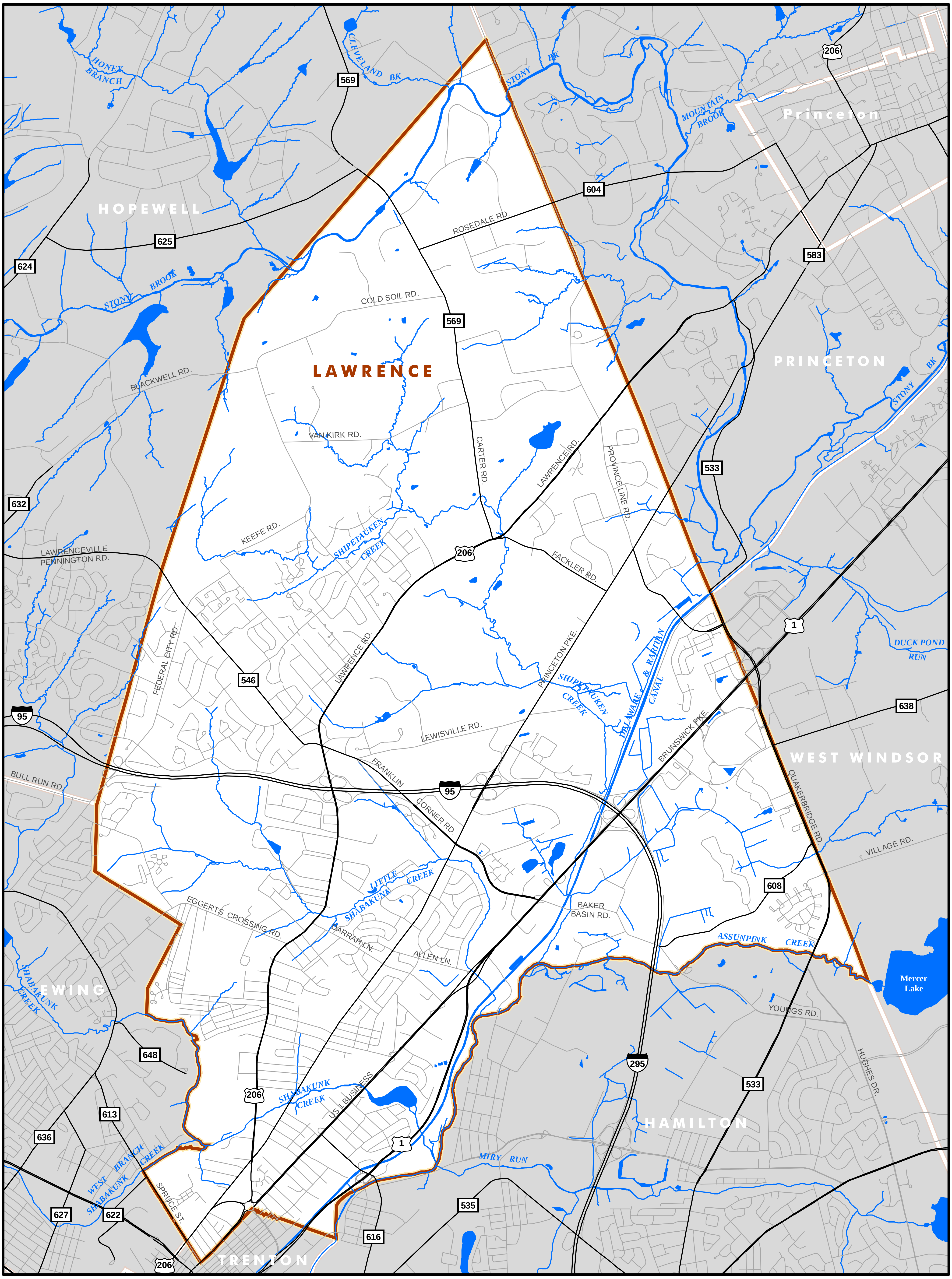
Source: NJDEP, Bureau of Geographic Information System, 2002 data, released 2006

Photo by Chris Linn

Old Field Vegetation in Carson Road Woods

LAWRENCE TOWNSHIP LOCATION, SIZE, AND LAND USE

Map 1: Lawrence Township



Sources : NJDEP,NJDOT,DVRPC.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

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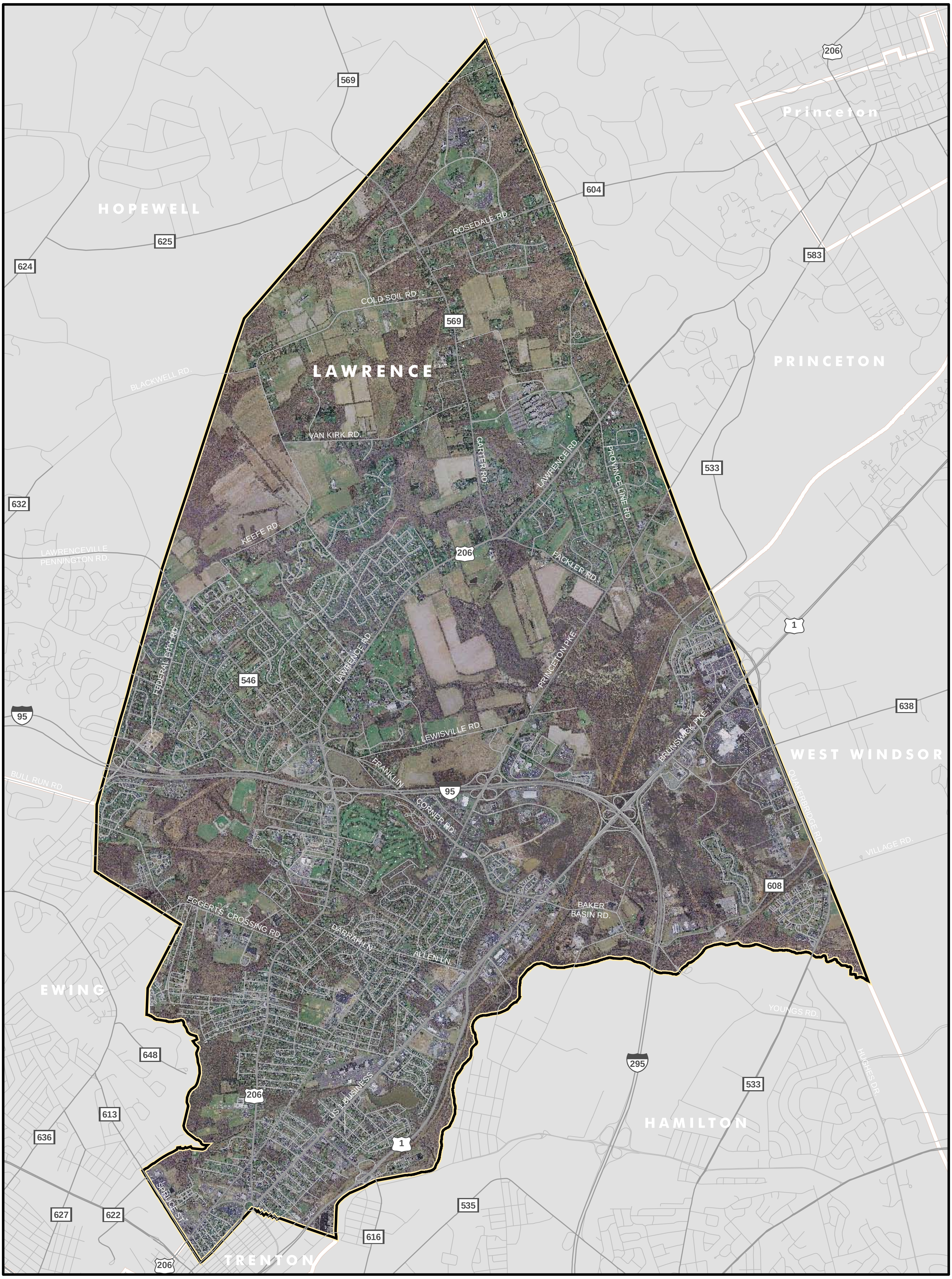
Map 2: Aerial Photograph (2005)



Sources : NJDEP,NJDOT,DVRPC.
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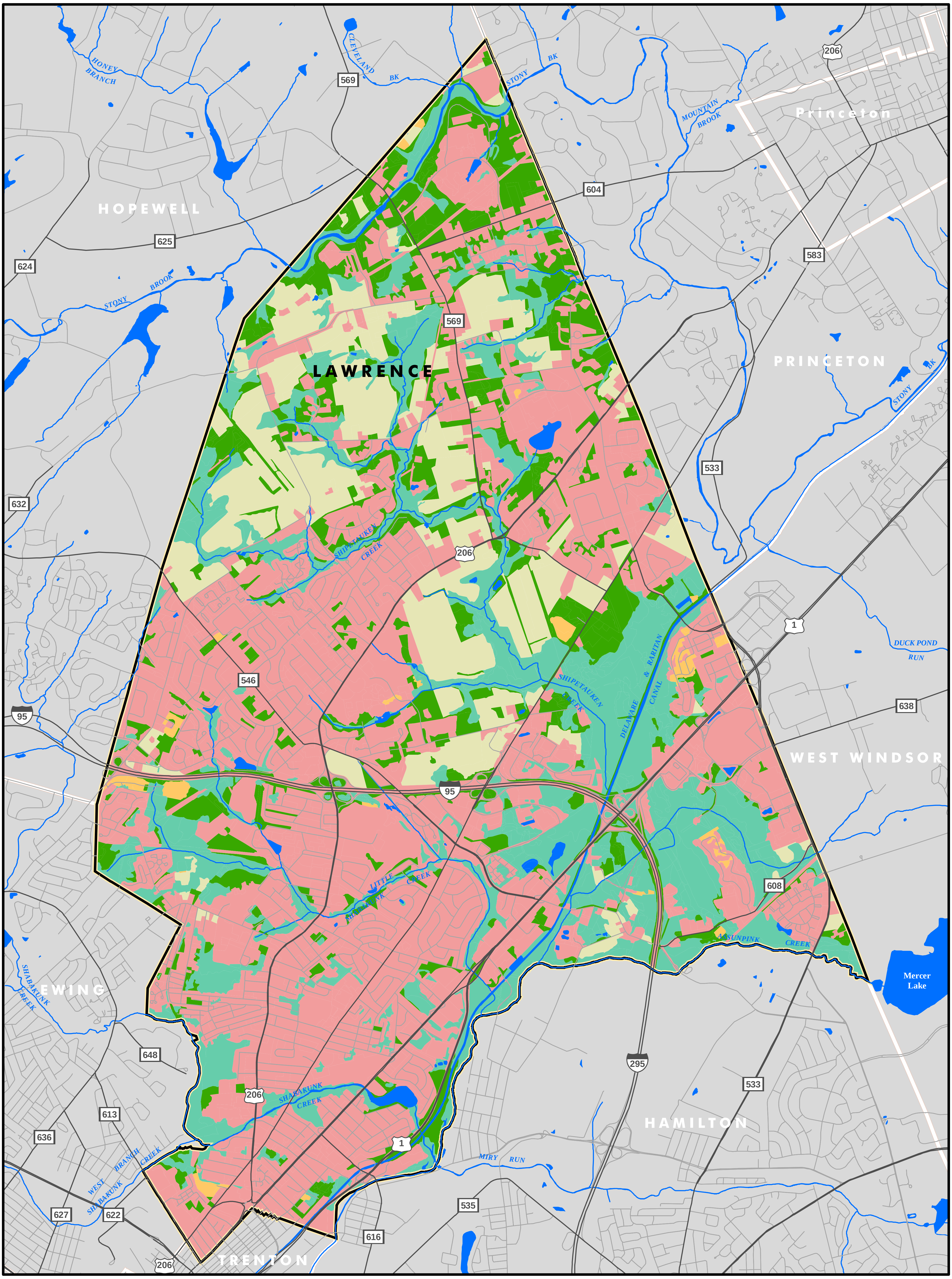
Lawrence Township

Map 3: NJDEP Land Cover (2002)



Sources : NJDEP, NJDOT, NRCS, DVRPC
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- 🟨 **Agriculture**
- 🟧 **Barren Land**
- 🟩 **Forest**
- 🟥 **Developed**
- 🟩 **Wetlands**
- 🟦 **Water**

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NATURAL RESOURCES

PHYSIOGRAPHY

Physiography is the study of a location in relation to its underlying geology. New Jersey is characterized by four physiographic provinces. These provinces include the Ridge and Valley Province, the Highlands Province, the Piedmont Plateau Province and the Coastal Plain Province. The Coastal Plain Province is further subdivided into the Inner Coastal Plain and the Outer Coastal Plain. The terrain of the four provinces is very diverse, with the rocky terrain of the northern provinces at one extreme and the sands of the coast at the other.

Lawrence spans two physiographic provinces. The northern part of the township lies in the Piedmont Plateau. The southern portion is located in the Inner Coastal Plain. The dividing line between the two provinces is the fall line, a drop in land level that separates the Piedmont Plateau from the Inner Coastal Plain. This line separates areas with considerable differences in geology, topography and hydrology.

Fig. 1. The Physiographic Regions of New Jersey

The fall line runs nearly parallel with U.S. Route 1 from Trenton to New York City and has numerous waterfalls marking its course. It is a boundary between older consolidated rock in the north and younger, less consolidated rock—mostly gravels and sands—in the south. U.S. Route 1 crosses through the southeast portion of Lawrence, marking the boundary between the Piedmont Plateau and the Inner Coastal Plain.

The Piedmont Plateau

The Piedmont Plateau extends from Massachusetts to Georgia and occupies nearly 1,500 square miles, or one-fifth of New Jersey's total land area. In New Jersey, the Piedmont formation is primarily composed of sandstone, shale and argillite. Generally, the rocks in this area are more susceptible to erosion than the rocks to the north in the Highlands physiographic province. The soils of the Piedmont Plateau are rich and well watered and the topography is gently rolling, with hills and valleys lying at elevations between 100 and 400 feet.

The Inner Coastal Plain

The Atlantic Coastal Plain landscape extends from Massachusetts to Texas and is divided into Inner and Outer sections. In New Jersey, the Inner Coastal Plain is made up of inter-bedded sand, gravel, silt and clay. Deposits originating in the breakdown of Appalachian and Catskill sedimentary, metamorphic and igneous rocks are interbedded with layers formed by oceanic (marine) deposition, which occurred as the ocean shoreline advanced and receded over geologic time. The Inner Coastal Plain layers date from the Cretaceous Period, 135 to 65 million years ago. Generally, soils of the Inner Coastal Plain are quite fertile and the topography of the area is flat and lowlying.

TOPOGRAPHY AND SURFACE LANDSCAPES

Lawrence Township is an average-sized municipality in Mercer County, with just over 14,000 acres. The topography of the township is relatively mild, with gentle slopes, flat areas, and occasional steep slopes. Lawrence contains many wetlands, most of which are located along the Shipetauken, Assunpink, and Shabakunk creeks and their tributaries. Upland forest is found scattered throughout the township, with the largest sections found to the north, along Stony Brook, and in the area bounded by Rosedale, Carter and Lawrence roads. The landscape in the northern part of the township supports gently rolling farmland. The landscape to the south consists of either urban lands, especially near the City of Trenton, or wetlands. The highest elevation in the township is found in the northwest, at 238 feet above sea level. The lowest elevations, which are around 60 feet, are found along the southern creeks.

Upland areas are characterized by rich soils that once supported deciduous forests of oak, maple, beech, hickory, walnut and ash trees. These soils now largely support agriculture or have been converted to developed uses.

Photo by Chris Linn

Level Meadow in Mercer County Park Northwest

Steep Slopes

Only a small percentage of Lawrence has slopes of over 10 percent (the ratio of vertical rise to horizontal distance). However, the steepest slopes are very steep, with gradients of 20 percent or more. The steepest slopes are found primarily along Stony Brook and its tributaries and along the Shipetauken Creek.

Most of the steep slopes in Lawrence are well vegetated, although farm fields and residential properties may extend to the edge of the plateau. In some locations, development has occurred on the edge of very steep slopes. In these instances, it is important that natural buffers and other storm water best management practices are used to separate the slope from development and to prevent runoff from eroding the slope.

In general, development of steep slope areas is inadvisable because it can result in soil instability, erosion, increased stormwater runoff, flooding, and sedimentation of the stream below. This results in degradation of water quality, habitat destruction, and potential damage to property. Erosion on steep slopes is especially prevalent where excessive tree removal has taken place.

Where steep slopes remain forested, some very old trees can be found in Lawrence. No detailed inventory of the trees in these naturally-forested areas exists at present, although some of Lawrence’s endangered plants listed in the Natural Heritage Database (see **Appendix F**) are found in these habitats. Some forested slopes have been negatively affected by fertilizers from adjoining farm fields, by runoff from development, or by recent flooding, but they are at present some of Lawrence’s healthiest forested areas. Lawrence’s steep slopes are depicted on **Map 4: Steep Slopes.**

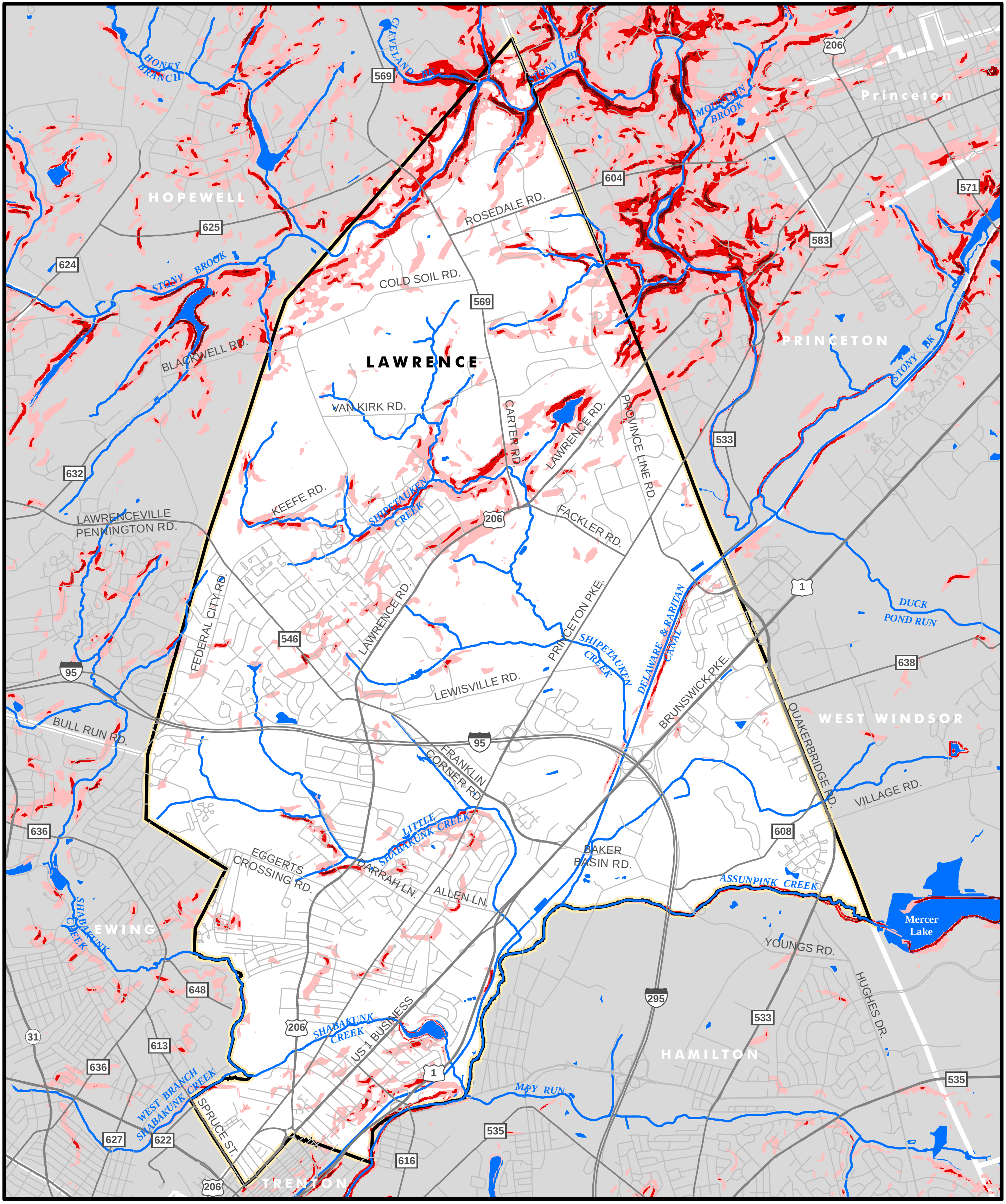
CLIMATE

Geographically situated midway between the North Pole and the equator, New Jersey’s climate is extremely variable. The state’s temperate, continental climate is influenced by both hot and cold, and dry and humid airstreams. From May through September, New Jersey is dominated by moist, tropical air that originates in the Gulf of Mexico and is swept in by prevailing winds from the southwest. In winter, winds generally prevail from the northwest, bringing cold, polar air masses from sub-arctic Canada.

Climate also varies within the physiographic provinces. Lawrence lies primarily in the Piedmont Province; however, the southern portion of the township extends into the Inner Coastal Plain. The soils in the Inner Coastal Plain are sandier and exhibit stronger radiational cooling after sunset than Piedmont soils. However, the Inner Coastal Plain is generally warmer in the autumn and winter and cooler in the spring and summer due to maritime influences (coinciding with ocean water temperatures).

Lawrence Township

Map 4: Steep Slopes



SLOPE

- ☐ 4.99% or Less
- 🟥 5% - 9.99%
- 🟥 10% - 19.99%
- 🟥 20% or Greater

Sources : NJDEP, NJDOT, DVRPC
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In addition, New Jersey is divided into five climate zones: the North, Central, Southwest, Pine Barrens and Coastal climate zone. Lawrence lies within the Central climate zone, which stretches from New York Harbor to the great bend of the Delaware River near Trenton. This region contains many urban areas, such as Trenton, whose paved surfaces and buildings affect local temperatures by retaining more heat. This causes nighttime temperatures to generally be warmer than surrounding rural areas. This is known as the “heat island effect.”

A number of weather and climate observation stations are located near Lawrence. The National Climate Data Center (NCDC) of the National Oceanic and Atmospheric Administration (NOAA) operates 13 cooperative stations in Mercer County. Data from seven of these stations is available online from the NCDC website: www.ncdc.noaa.gov.

There are five weather stations located near Lawrence. Three of these, one in Ewing Township, one in West Windsor, and one in Hamilton, are operated by the New Jersey Department of Environmental Protection. Another station in Trenton is operated by the Automated Surface Observing Systems (ASOS) network, a joint effort of the National Weather Service, the Federal Aviation Administration, and the Department of Defense. The fifth station is a State Climatologist station in Hightstown.

The region’s annual mean temperature as recorded by the State Climatologist station is 52.3°F, which is identical to the statewide mean temperature. Lawrence experiences an average temperature of 74.1°F in July and an average temperature of 30.1°F in January. In the summer, temperatures in Lawrence rarely exceed 100°F. In the winter, the temperature rarely falls below 10°F for long periods of time. Record temperatures for the region are a high of 102°F and a low of -12°F.

Precipitation and Storm Events

Average annual precipitation for the township is 47.68 inches, a fraction of an inch less than the statewide annual average of 47.87 inches. Monthly averages for the area show that precipitation is generally well distributed throughout the year. However, rainfall tends to be a bit heavier in the summer months. On average, the area receives the most precipitation in July – 4.95 inches, and the least precipitation in February – 2.75 inches. Severe thunderstorms can cause flash flooding along creeks in the township. In Mercer County, there are approximately 33 thunderstorms per year. During the past several decades, Lawrence has experienced numerous severe flooding events, such as those of August 1971, June 1996, and September 1999.

Snowfall typically occurs in New Jersey when moist air from the south converges with cold air from the north. Average annual snowfall in Mercer County is 22.6 inches. In Lawrence, snowfall may occur from mid-November to early April, but is most likely to occur from mid-December to mid-March.

Severe storm events, including thunderstorms, tropical storms, hurricanes, blizzards, ice storms, hail storms and tornadoes, all occur in Mercer County. Numerous hurricanes have impacted Lawrence. Some of these have been severe. For example, on August 28, 1971, Hurricane Doria dumped several inches of rain on the township, causing severe flooding along the major creeks.

On September 17, 1999, the remnants of Hurricane Floyd caused torrential rains, high winds, flooding and widespread devastation across New Jersey. Lawrence received over seven inches of rainfall on this date.

Tornadoes are infrequent, yet the ones that do strike the township have caused significant damage. The most serious tornadoes occurred on September 23, 2003, when atmospheric instability following Hurricane Isabel caused the formation of a series of F1 twisters. The tornadoes caused widespread damage to homes and structures, but did not result in any fatalities. The town of Lawrenceville sustained much damage from the twisters, largely due to fallen trees.

Growing Seasons

Lawrence is within the U.S. Department of Agriculture's (USDA's) Plant Hardiness Zone 6b, the area where annual minimum temperatures are typically between 0°F and 5°F. In Mercer County as a whole, the average length of the agricultural growing season is 173 days. The first frost usually occurs in mid-October and the last frost occurs at the end of April. Temperatures in the winter are usually not low enough to keep the soils frozen for the entire winter season.

SOILS

Soil is the foundation for all land uses. A region's soil defines what vegetation is possible, thereby influencing agricultural uses. It also determines how land can be developed for other purposes. Soil is also a natural resource that cannot be replenished on the human time scale.

Because Lawrence lies in both the Piedmont Province and the Coastal Plain Province, it contains a wide variety of soil series. The township's soils consist of 33 series types and 79 variations within those series (excluding water), as identified by the US Department of Agriculture's Natural Resource Conservation Service. These are listed in **Table 4: Lawrence Township Soils** and shown on **Map 5: Soils**.

Soils of the Piedmont Province are predominantly silty, shaley, or stony soils. Thus, the Piedmont region experiences large amounts of surface drainage, flooding and siltation. Piedmont soils are underlain by bedrock at depths ranging from two to twenty feet. Soils of the Coastal Plain Province, by contrast, range from sand to clay and were formed from materials that were deposited in water. The thickness of their beds ranges from several to hundreds of feet. These formations are typically good aquifers.

Soil Quality Classification

State and national agricultural agencies classify farmland soils into several categories. Lawrence contains Prime Farmland Soils, Soils of Statewide Importance, Soils of Local Importance and Soils Not Rated for Agricultural Use. Each category of farmland is explained below. See **Table 3: Agricultural Values for Lawrence Soils** for the acreage in each category and **Map 6: Agricultural Quality of Soils** for a depiction of these soils' spatial distribution.

Prime Farmland Soils

The most abundant of all soils in Lawrence are those classified as Prime Farmlands. Forty-seven percent of the soils in the township are considered Prime Farmlands (P-1). Prime Farmlands include all those soils in Land Capability Class I and selected soils from Land Capability Class II. Prime Farmlands are lands that have the best combination of physical and chemical characteristics for producing food, feed, forage, fiber and oilseed crops. They sustain high yields of crops when managed with correct farming methods. Prime Farmlands are not excessively erodible or saturated with water for long periods of time and do not flood frequently.

Soils of Statewide Importance

Almost 32 percent of Lawrence's soils are classified as Soils of Statewide Importance (S-1). These soils are close in quality to Prime Farmland and can sustain high yields of crops when correctly managed with favorable conditions. Under such favorable conditions, these yields may be as high as Prime Farmland yields.

Criteria for establishing Soils of Statewide Importance are determined by state agencies. In New Jersey, soils with a capacity class of II or III that do not meet Prime Farmland criteria are rated as Soils of Statewide Importance.

Photo by Chris Linn

Prime Farmland on Cold Soil Road

Soils of Local Importance

An additional six percent of Lawrence's soils are classified as Soils of Local Importance (L-1). Soils of Local Importance include those soils that are not of prime or statewide importance, but can support the production of high-value food, fiber and horticultural crops (fruits and vegetables), such as tomatoes, sweet corn, blueberries, strawberries, cranberries, peaches and nursery crops.[2]

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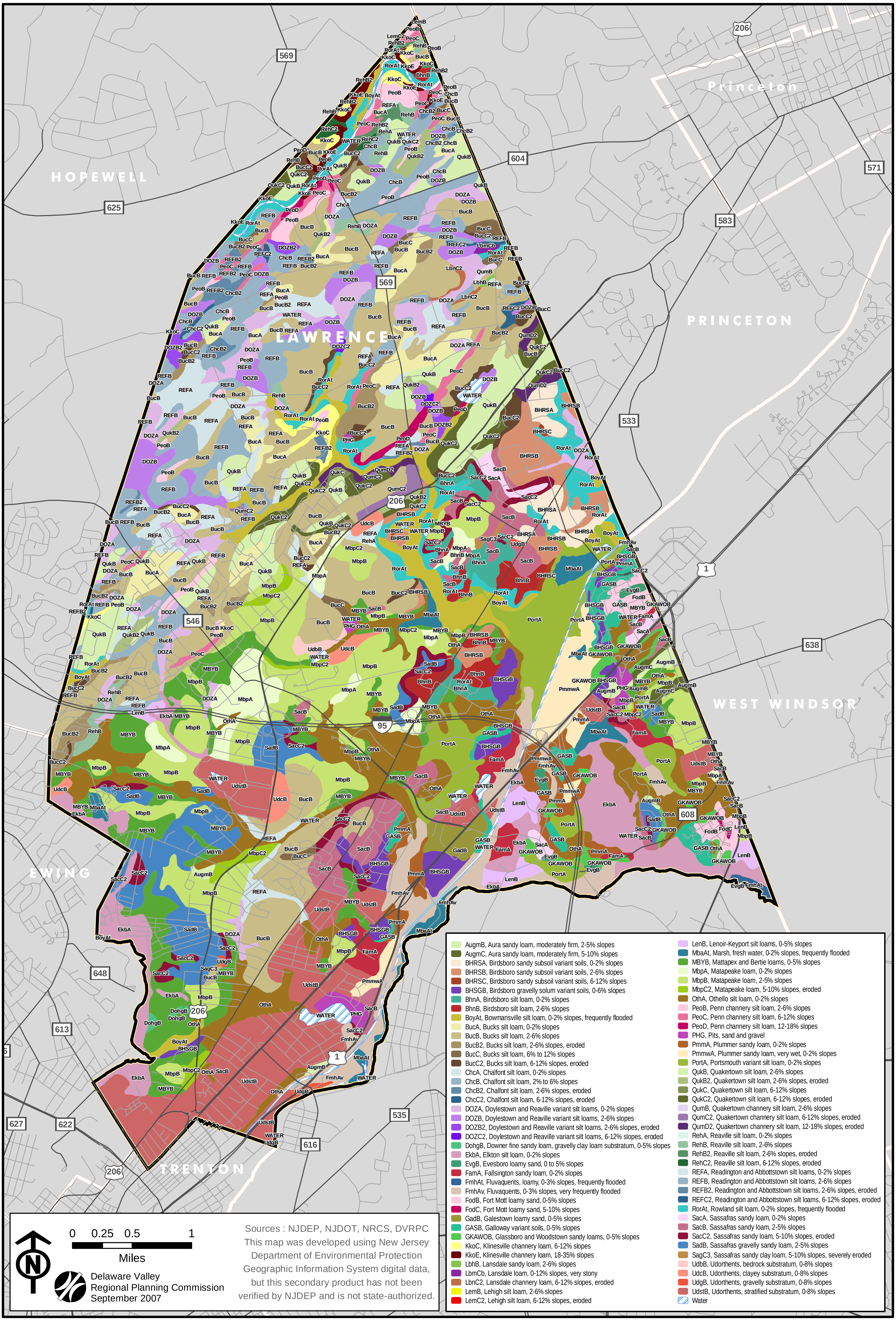
[2] See New Jersey Soils of Statewide Importance, New Jersey Natural Resources Conservation Service, September 24, 1990, available online at www.nj.nrcs.usda.gov/technical/soils/njfarmindex.html.

Lawrence Township

Map 5: Soils



- AugmB, Aura sandy loam, moderately firm, 2-5% slopes
- AugmC, Aura sandy loam, moderately firm, 5-10% slopes
- BHRSA, Birdsboro sandy subsoil variant soils, 0-2% slopes
- BHRSB, Birdsboro sandy subsoil variant soils, 2-6% slopes
- BHRSC, Birdsboro sandy subsoil variant soils, 6-12% slopes
- BHSGB, Birdsboro gravelly solum variant soils, 0-6% slopes
- BhnA, Birdsboro silt loam, 0-2% slopes
- BhnB, Birdsboro silt loam, 2-6% slopes
- BoyAt, Bowmansville silt loam, 0-2% slopes, frequently flooded
- BucA, Bucks silt loam, 0-2% slopes
- BucB, Bucks silt loam, 2-6% slopes
- BucB2, Bucks silt loam, 2-6% slopes, eroded
- BucC, Bucks silt loam, 6% to 12% slopes
- BucC2, Bucks silt loam, 6-12% slopes, eroded
- ChcA, Chalfont silt loam, 0-2% slopes
- ChcB, Chalfont silt loam, 2% to 6% slopes
- ChcB2, Chalfont silt loam, 2-6% slopes, eroded
- ChcC2, Chalfont silt loam, 6-12% slopes, eroded
- DOZA, Doylestown and Reaville variant silt loams, 0-2% slopes
- DOZB, Doylestown and Reaville variant silt loams, 2-6% slopes
- DOZB2, Doylestown and Reaville variant silt loams, 2-6% slopes, eroded
- DOZC2, Doylestown and Reaville variant silt loams, 6-12% slopes, eroded
- DohgB, Downer fine sandy loam, gravelly clay loam substratum, 0-5% slopes
- EkbA, Elkton silt loam, 0-2% slopes
- EvgB, Evesboro loamy sand, 0 to 5% slopes
- FamA, Fallsington sandy loam, 0-2% slopes
- FmhAt, Fluvaquents, loamy, 0-3% slopes, frequently flooded
- FmhAv, Fluvaquents, 0-3% slopes, very frequently flooded
- FodB, Fort Mott loamy sand, 0-5% slopes
- FodC, Fort Mott loamy sand, 5-10% slopes
- GadB, Galestown loamy sand, 0-5% slopes
- GASB, Galloway variant soils, 0-5% slopes
- GKAWOB, Glassboro and Woodstown sandy loams, 0-5% slopes
- KkoC, Klinesville channery loam, 6-12% slopes
- KkoE, Klinesville channery loam, 18-35% slopes
- LbhB, Lansdale sandy loam, 2-6% slopes
- LbmCb, Lansdale loam, 0-12% slopes, very stony
- LbnC2, Lansdale channery loam, 6-12% slopes, eroded
- LemB, Lehigh silt loam, 2-6% slopes
- LemC2, Lehigh silt loam, 6-12% slopes, eroded
- LenB, Lenoir-Keyport silt loams, 0-5% slopes
- MbaAt, Marsh, fresh water, 0-2% slopes, frequently flooded
- MBYB, Mattapex and Bertie loams, 0-5% slopes
- MbpA, Matapeake loam, 0-2% slopes
- MbpB, Matapeake loam, 2-5% slopes
- MbpC2, Matapeake loam, 5-10% slopes, eroded
- OthA, Othello silt loam, 0-2% slopes
- PeoB, Penn channery silt loam, 2-6% slopes
- PeoC, Penn channery silt loam, 6-12% slopes
- PeoD, Penn channery silt loam, 12-18% slopes
- PHG, Pits, sand and gravel
- PmmA, Plummer sandy loam, 0-2% slopes
- PmmwA, Plummer sandy loam, very wet, 0-2% slopes
- PortA, Portsmouth variant silt loam, 0-2% slopes
- QukB, Quakertown silt loam, 2-6% slopes
- QukB2, Quakertown silt loam, 2-6% slopes, eroded
- QukC, Quakertown silt loam, 6-12% slopes
- QukC2, Quakertown silt loam, 6-12% slopes, eroded
- QumB, Quakertown channery silt loam, 2-6% slopes
- QumC2, Quakertown channery silt loam, 6-12% slopes, eroded
- QumD2, Quakertown channery silt loam, 12-18% slopes, eroded
- RehA, Reaville silt loam, 0-2% slopes
- RehB, Reaville silt loam, 2-6% slopes
- RehB2, Reaville silt loam, 2-6% slopes, eroded
- RehC2, Reaville silt loam, 6-12% slopes, eroded
- REFA, Readington and Abbottstown silt loams, 0-2% slopes
- REFB, Readington and Abbottstown silt loams, 2-6% slopes
- REFB2, Readington and Abbottstown silt loams, 2-6% slopes, eroded
- REFC2, Readington and Abbottstown silt loams, 6-12% slopes, eroded
- RorAt, Rowland silt loam, 0-2% slopes, frequently flooded
- SacA, Sassafras sandy loam, 0-2% slopes
- SacB, Sassafras sandy loam, 2-5% slopes
- SacC2, Sassafras sandy loam, 5-10% slopes, eroded
- SadB, Sassafras gravelly sandy loam, 2-5% slopes
- SagC3, Sassafras sandy clay loam, 5-10% slopes, severely eroded
- UdbB, Udorthents, bedrock substratum, 0-8% slopes
- UdcB, Udorthents, clayey substratum, 0-8% slopes
- UdgB, Udorthents, gravelly substratum, 0-8% slopes
- UdstB, Udorthents, stratified substratum, 0-8% slopes
- Water

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Sources : NJDEP, NJDOT, NRCS, DVRPC
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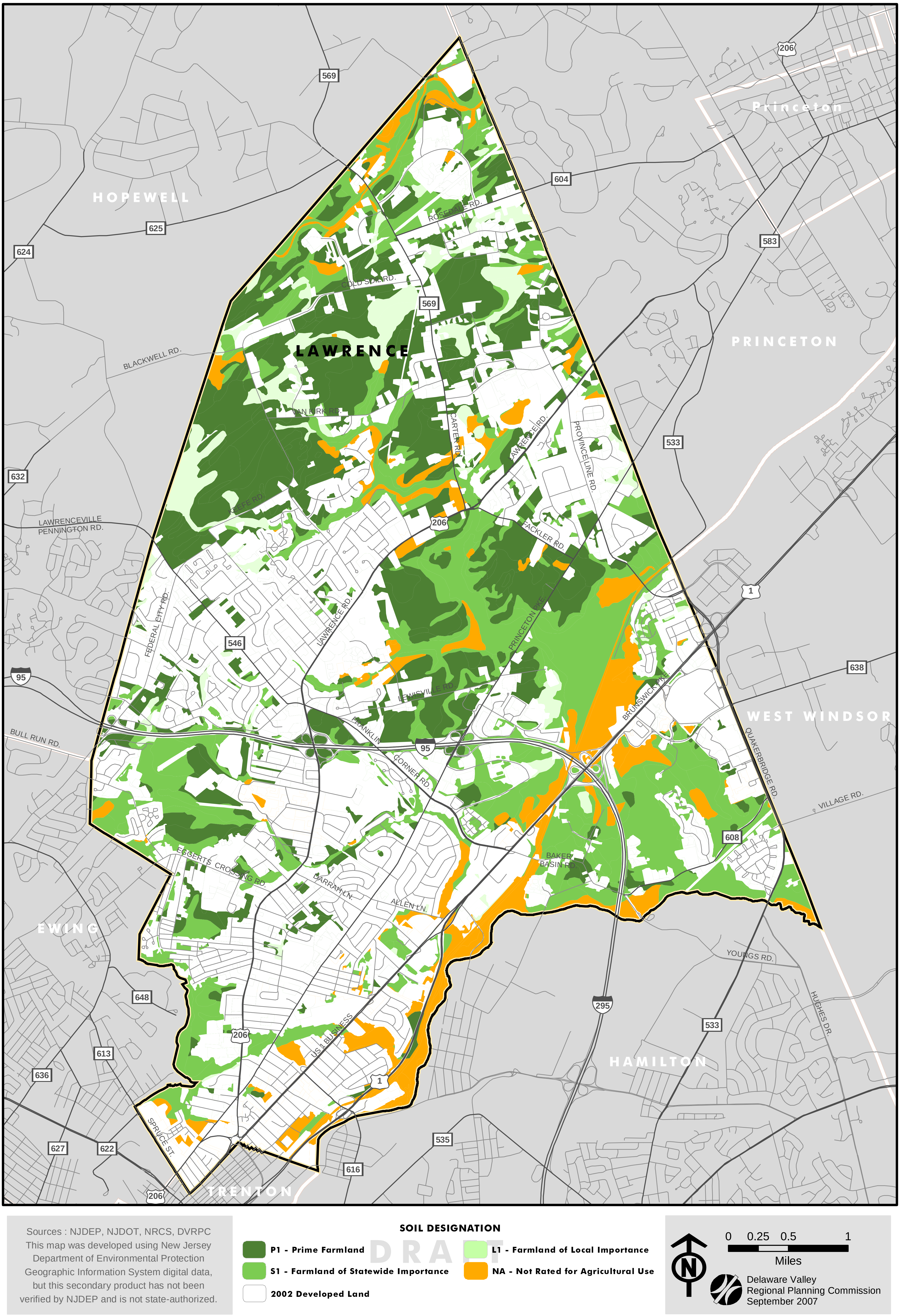
Lawrence Township Map 6: Agricultural Quality of Soils



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Soils Not Rated for Agricultural Use

Several of the soils that are present in Lawrence fall into the category "not rated for agricultural use" by the Natural Resources Conservation Service (NRCS). This category actually contains two distinct sub categories of soil. The first category includes soils not well suited for agricultural use, such as soils disturbed by heavy development, excessively wet soils, and steep slopes. The second category includes soils that have not yet been rated for agricultural use. These soils may or may not be good for agricultural use, but have yet to be assessed for quality by the NRCS.

Table 3: Agricultural Values for Lawrence Soils

Designation	Type	Area (In Acres)	Percent
P-1	Prime Farmland	6631	47.14%
S-1	Statewide Importance	4479	31.84%
L-1	Local Importance	818	5.82%
Soils Not Rated for Agricultural Use	Wet soils, pits, steep slopes, urban, etc.	1993	14.17%
Water	Water	145	1.03%
Totals		**14066**	**100%**

Source: NJ Farmlands Inventory, NJ Natural Resources Conservation Service

Hydric Soils

Almost 26 percent of Lawrence's soils are considered hydric soils. Most of these soils are "not rated for agricultural use," but some may be regarded as soils of local or statewide importance. Hydric soils, as defined by the National Technical Committee of Hydric Soils, are soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in their subsurface. They support the development of hydrophytic vegetation. Hydric soils have unique soil properties that distinguish them from nonhydric soils. They are an important element of wetland areas and naturally support wetland vegetation. If a soil is classified as "hydric," land use may be restricted due to the relationship of hydric soils to wetlands and wetland preservation. More detailed descriptions of Lawrence's wetland areas are found in the *Natural Resources* section, under "Wetlands" and "Agricultural Wetlands," and in the *Biological Resources* section, under "Wetlands," *page 70*.

Soil Series

Several soil series appear more frequently within Lawrence than others, and are briefly described as follows.[3]

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[3] Soil Conservation Service. *Soil Survey of Mercer County New Jersey*, USDA and New Jersey Agricultural Experiment Station, January 1972.

Birdsboro

Birdsboro soils are very deep and well to moderately well drained. These soils make up over five percent of the township. They are commonly found on sloping stream terraces, with slopes ranging from 0-15 percent. These soils, formed from alluvium and derived from weathered shale and sandstone, were laid down when streams were higher and the flow was greater. Their permeability is rapid to moderately rapid and their runoff is slow to rapid. Historically, a large percentage of this type of soil was used for agriculture, and almost all areas of these soils were cleared to grow corn, small grains, and soybeans. Today, the soils support both agriculture and mixed hardwood forests. Birdsboro soils generally present little or no constraints to development.

Bucks

Nearly 17 percent of Lawrence’s soils are in the Bucks series. Bucks soils are deep, well-drained soils, located on upland divides and rolling slopes. They are underlain by silt and gravel that lie above bedrock. Their surface runoff and permeability is moderate. Bucks soils have moderate to severe limitations for disposal of sewage from septic tanks. Much of this soil type has been cleared of mixed oaks, maples, yellow poplar, hickory and ash. Agriculturally, it is used mostly for growing corn, small grains, soybeans, hay, pasture, and, to a small extent, for vegetables, fruits, and nursery plants. Several of the subtypes found in the township are considered Prime Farmland.

Matapeake

Of Lawrence’s soils, nine percent are in the Matapeake series. These soils tend to be very deep and well drained, with slopes ranging from 0-10 percent. They have moderate to moderately slow permeability and moderate surface runoff. These soils were formed in a silty mantle and are underlain by sandy and gravelly material. Oaks dominate the native vegetation and some cutover areas have loblolly, Virginia, or shortleaf pine. Almost all Matapeake soil was once cultivated. Today, commonly grown crops include corn, soybeans, and small grains. The soil is considered Prime Farmland and offers few constraints to development.

Othello

The Othello series accounts for 5.8 percent of Lawrence’s soils. This very deep type of soil consists of a fine silt loam surface layer and silty clay loam subsurface underlain by sand and gravel. They generally occur in upland interfluves, lowlands, marine terraces and depressions on slopes of 0-5 percent. Their permeability is moderate and runoff is slow. The soil has a high water table, presenting serious constraints to development. Vegetation that grows on this soil includes wetland hardwoods such as sweetgum, red maple and wetland oaks. Some pines may grow in wooded areas.

Penn

Penn soils are shallow to moderately shallow, well-drained soils occurring on slopes ranging from 0-18 percent. They formed from weathered siltstone and red shale. Permeability is moderate to moderately slow. These soils can grow some crops but the soils cannot hold large amounts of plant nutrients. The depth to bedrock is less than forty inches. In Lawrence, Penn soils occupy almost two percent of the land and pose moderate to severe constraints to development depending on slope and depth to bedrock.

Quakertown

Quakertown series soils account for 5.6 percent of Lawrence's land area. These soils are moderately deep, well drained and located on uplands. They have an undulating topography and slopes ranging from 2-18 percent. Their surface runoff is moderate and their permeability is moderately rapid. Vegetation native to this soil includes oak, hickory, yellow poplar and ash. Most of this type of soil has been cleared for growing corn, small grain and grasses. Subseries with steeper slopes present severe limitations to development.

Readington and Abbottstown

Readington soils are deep or very deep, moderately well-drained soils that have slopes ranging from 0-15 percent. They are located on concave, nearly level to sloping lower hillsides, upland flats, drainageways and stream heads. Their permeability is moderate or moderately slow. At one time, approximately 85 percent of this series was used for cropland. Woodland areas have oak-hickory mixed hardwoods.

Abbottstown series are deep, somewhat poorly drained soils. They are also located on concave upland flats, depressions and drainageways. Slopes range from 0-15 percent and their permeability is slow. Runoff is moderate on nearly level slopes, high on gentle slopes, and very high on moderately steep or strongly sloping areas. Like Readington, approximately 85 percent of this series was, or continues to be, used for cropland and pasture. Wooded areas consist mostly of hardwoods, mainly hickory and oak.

Combined, this soil series makes up 7.3 percent of the township. Subseries with high water tables and coarse substratum present moderate to severe limitations for development.

Rowland

This series consists of very deep, moderately well-drained soils. These soils make up just over two percent of the township. They are formed on floodplains from alluvial sediments weathered from sandstone, conglomerate and red and brown shale that washes from nearby gently sloping uplands. These soils occur on slopes ranging from 0-3 percent. The permeability of the soil is moderate to moderately slow in the upper 40 inches of the soil, and moderately rapid in the soil's underlying stratified sand and gravel. This soil series presents severe limitations for septic systems because of a high water table and frequent flooding.

Sassafras

Over six percent of Lawrence is made up of Sassafras soils, which are usually found on gently sloping uplands. These soils are deep, well drained and moderately coarse in texture. Permeability is moderate to moderately rapid. Slopes can range from nearly level to very steep. These soils can support vegetation consisting of mixed oaks and scattered pines. They are considered farmland of statewide importance. Sassafras soils are easy to work, have a low natural fertility, and respond to fertilization. These soils present few constraints to development.

Udorthents

Udorthents make up 6.9 percent of the township's soils. This series consists of somewhat poorly drained to very poorly drained soils that have been altered mainly by filling. This type of soil is located mainly in low areas, such as depressions and drainage ways. On-site investigation is needed to determine the suitability of this unit for any use.

Table 4: Lawrence Township Soils

Mercer County Soil Code	SSURGO Soil Code	Soil Name	Acres	Percentage of all Acres	Desig-nation*
Ae	Fmht	Fluvaquents, loamy, frequently flooded	329.54	2.34%	NA
AfB	AugmB	Aura sandy loam, moderately firm, 2 to 5 percent slopes	40.10	0.29%	P-1
AfC	AugmC	Aura sandy loam, moderately firm, 5 to 10 percent slopes	26.40	0.19%	S-1
BdA	BhnA	Birdsboro silt loam, 0 to 2 percent slopes	100.41	0.71%	P-1
BdB	BhnB	Birdsboro silt loam, 2 to 6 percent slopes	117.19	0.83%	P-1
BnA	BhrsA	Birdsboro variant soils, sandy subsoil, 0 to 2 percent slopes	115.11	0.82%	P-1
BnB	BhrsB	Birdsboro variant soils, sandy subsoil, 2 to 6 percent slopes	205.34	1.46%	P-1
BnC	BhrsC	Birdsboro variant soils, sandy subsoil, 6 to 12 percent slopes	8.05	0.06%	S-1
BoB	BhsgB	Birdsboro variant soils, gravelly solum, 0 to 6 percent slopes	187.39	1.33%	L-1
Bt	BoyAt	Bowmansville silt loam, 0 to 2 percent slopes, frequently flooded	311.43	2.21%	S-1
BuA	BucA	Bucks silt loam, 0 to 2 percent slopes	259.36	1.84%	P-1
BuB	BucB	Bucks silt loam, 2 to 6 percent slopes	1711.56	12.17%	P-1
BuB2	BucB2	Bucks silt loam, 2 to 6 percent slopes, eroded	168.22	1.20%	P-1
BuC	BucC	Bucks silt loam, 6 to 12 percent slopes	50.70	0.36%	S-1
BuC2	BucC2	Bucks silt loam, 6 to 12 percent slopes, eroded	125.50	0.89%	S-1
CdA	ChcA	Chalfont silt loam, 0 to 2 percent slopes	3.36	0.02%	S-1
CdB	ChcB	Chalfont silt loam, 2 to 6 percent slopes	193.72	1.38%	S-1
CdB2	ChcB2	Chalfont silt loam, 2 to 6 percent slopes, eroded	33.62	0.24%	S-1
CdC2	ChcC2	Chalfont silt loam, 6 to 12 percent slopes, eroded	5.67	0.04%	S-1

Mercer County Soil Code	SSURGO Soil Code	Soil Name	Acres	Percentage of all Acres	Desig-nation*
	UdbB	Udorthents, bedrock substratum, 0 to 8 percent slopes	17.25	0.12%	NA
Cf	Udx, UdcB	Udorthents, clayey substratum, 0 to 8 percent slopes	68.26	0.49%	NA
Cg	Udu, UdgB	Udorthents, gravelly substratum, 0 to 8 percent slopes	17.52	0.12%	NA
Cu	UdstB	Udorthents, stratified substratum, 0 to 8 percent slopes	865.11	6.15%	NA
DgA	DOZA	Doylestown silt loam and Reaville Variant silt loam, 0 to 2 percent slopes	361.64	2.57%	L-1
DgB	DOZB	Doylestown silt loam and Reaville Variant silt loam, 2 to 6 percent slopes	249.62	1.77%	L-1
DgB2	DOZB2	Doylestown silt loam and Reaville Variant silt loam, 2 to 6 percent slopes, eroded	34.90	0.25%	NA
DgC2	DOZC2	Doylestown and Reaville variant silt loams, 6 to 12 percent slopes, eroded	7.67	0.05%	NA
	DohgB	Downer fine sandy loam, gravelly clay loam substratum, 0 to 5 percent	8.42	0.06%	P-1
Ek	EkbA	Elkton silt loam, 0 to 2 percent slopes	479.68	3.41%	S-1
EvB	EvgB	Evesboro sand, 0 to 5 percent slopes	19.68	0.14%	L-1
Fd	FamA	Fallsington sandy loam, 0 to 2 percent slopes	125.01	0.89%	S-1
Fm	MbaAt	Marsh, fresh water, 0 to 2 percent slopes, frequently flooded	135.46	0.96%	NA
FrB	FodB	Fort Mott loamy sand, 0 to 5 percent slopes	76.74	0.55%	S-1
FrC	FodC	Fort Mott loamy sand, 5 to 10 percent slopes	3.48	0.02	NA
GaB	GadB	Galestown loamy sand, 0 to 5 percent slopes	56.73	0.40%	NA
Km	GASB	Galloway variant soils, 0 to 5 percent slopes	139.24	0.99%	S-1
	GKAWOB	Glassboro and Woodstown sandy loams, 0 to 5 percent slopes	84.41	0.60%	P-1
KsC	KkoC	Klinesville channery loam, 6 to 12 percent slopes	73.88	0.53%	NA
KsE	KkoE	Klinesville channery loam, 6 to 12 percent slopes	40.09	0.29%	NA
	LbhB	Lansdale sandy loam, 2 to 6 percent slopes	2.39	0.02%	P-1
LcC2	LbnC2	Lansdale channery loam, 6 to 12 percent slopes, eroded	10.16	0.07%	S-1
LdC	LbmCb	Lansdale loam, 0 to 12 percent slopes, very stony	5.81	0.04%	NA
	LemB	Lehigh silt loam, 2 to 6 percent slopes	0.20	0.00%	S-1
	LemC2	Lehigh silt loam, 6 to 12 percent slopes, eroded	0.72	0.01%	S-1
Lk	LenB	Lenoir-Keyport silt loams, 0 to 5 percent slopes	91.00	0.65%	S-1
MoA	MbpA	Matapeake loam, 0 to 2 percent slopes	232.99	1.66%	P-1
MoB	MbpB	Matapeake loam, 2 to 5 percent slopes	986.47	7.01%	P-1
MoC2	MbpC2	Matapeake loam, 5 to 10 percent slopes, eroded	70.43	0.50%	S-1
Mq	MBYB	Mattapex and Bertie loams, 0 to 5 percent slopes	625.94	4.45%	S-1

Mercer County Soil Code	SSURGO Soil Code	Soil Name	Acres	Percentage of all Acres	Desig-nation*
Ot	OthA	Othello silt loam	815.70	5.80%	S-1
PeB	PeoB	Penn channery silt loam, 0 to 6 percent slopes	124.46	0.88%	P-1
PeC	PeoC	Penn channery silt loam, 6 to 12 percent slopes	109.11	0.78%	S-1
PeD	PeoD	Penn channery silt loam, 12 to 18 percent slopes	31.70	0.23%	NA
Pg	PHG	Pits, sand and gravel	50.50	0.36%	NA
Pu	PmmA	Plummer sandy loam, 0 to 2 percent slopes	157.11	1.12%	S-1
Pv	PmmwA	Plummer sandy loam, very wet, 0 to 2 percent slopes	174.57	1.24%	NA
Pw	PortA	Portsmouth variant silt loam, 0 to 2 percent slopes	437.44	3.11%	S-1
QkB	QukB	Quakertown silt loam, 2 to 6 percent slopes	505.63	3.59%	P-1
QkB2	QukB2	Quakertown silt loam, 2 to 6 percent slopes, eroded	64.59	0.46%	P-1
QkC	QukC	Quakertown silt loam, 6 to 12 percent slopes	6.28	0.04	S-1
QkC2	QukC2	Quakertown silt loam, 6 to 12 percent slopes, eroded	138.88	0.99%	S-1
QuB	QumB	Quakertown channery silt loam, 2 to 6 percent slopes	5.38	0.04%	P-1
QuC2	QumC2	Quakertown channery silt loam, 6 to 12 percent slopes, eroded	29.91	0.21%	NA
QuD2	QumD2	Quakertown channery silt loam, 12 to 18 percent slopes, eroded	42.89	0.30%	NA
RaA	REFA	Readington-Abbottstown silt loams, 0 to 2 percent slopes	406.26	2.89%	P-1
RaB	REFB	Readington-Abbottstown silt loams, 2 to 6 percent slopes	560.30	3.98%	P-1
RaB2	REFB2	Readington and Abbottstown silt loams, 2 to 6 percent slopes, eroded	38.07	0.27%	P-1
RaC2	REFC2	Readington and Abbottstown silt loams, 6 to 12 percent slopes, eroded	22.36	0.16%	S-1
ReA	RehA	Reaville silt loam, 0 to 2 percent slopes	6.20	0.04%	S-1
ReB	RehB	Reaville silt loam, 2 to 6 percent slopes	73.39	0.52%	S-1
ReB2	RehB2	Reaville silt loam, 2 to 6 percent slopes, eroded	21.81	0.16%	S-1
ReC2	RehC2	Reaville silt loam, 6 to 12 percent slopes, eroded	14.39	0.10%	S-1
Ro	RorAt	Rowland silt loam, 0 to 2 percent slopes, frequently flooded	298.61	2.12%	S-1
SrA	SacA	Sassafras sandy loam, 0 to 2 percent slopes	50.01	0.36%	P-1
SrB	SacB	Sassafras sandy loam, 2 to 5 percent slopes	304.83	2.17%	P-1
SrC2	SacC2	Sassafras sandy loam, 5 to 10 percent slopes, eroded	157.42	1.12%	S-1
SsB	SadB	Sassafras gravelly sandy loam, 2 to 5 percent slopes	382.05	2.72%	P-1
	SagC3	Sassafras sandy clay loam, 5 to 10 percent slopes, very eroded	7.68	0.05%	NA
W	Water	Water	144.94	1.03%	NA
		Total Acreage	**14066.09**	**100%**	

Source: NJDEP (based on Soil Survey of Mercer County)

***Explanation of Designations**

S-1	Statewide Importance
L-1	Local Importance
NA	Land not appropriate for farming, e.g., eroded, very steep slopes, pits permanently wet soils, water, etc.

Soil characteristics can severely restrict the use of sites for construction and development. **Table 5: Soil Constraints for Development** records the soils and their possible limitations for building foundations and septic systems. As indicated in the table, the township has some soils that are severely limited for on-site septic systems. Septic systems require soils that have a low water table, below five feet, and slow permeability to allow for proper drainage of wastewater. High water tables, five feet or less from the surface, create a potential for erosion, wet basements, alteration of plant life, and early frost for agricultural crops.

Table 5: Soil Constraints for Development

Mercer County Soil Code	SSURGO Soil Code	Soil Name	Acres	Building with Basement	Building without Basement	Septic Systems	Limitations
Ae	Fmht	Fluvaquents, loamy, frequently flooded	329.54	Severe	Severe	Severe	1
AfB	AugmB	Aura sandy loam, moderately firm, 2 to 5 percent slopes	40.1	Slight	Slight	Slight	N/A
AfC	AugmC	Aura sandy loam, moderately firm, 5 to 10 percent slopes	26.4	Moderate	Moderate	Slight	3
BdA	BhnA	Birdsboro silt loam, 0 to 3 percent slopes	100.41	Slight	Slight	Slight	N/A
BdB	BhnB	Birdsboro silt loam, 3 to 8 percent slopes	117.19	Slight	Slight	Slight	N/A
BnA	BhrsA	Birdsboro variant soils, sandy subsoil, 0 to 2 percent slopes	115.11	Slight	Moderate	Severe	1, 2, 4
BnB	BhrsB	Birdsboro variant soils, sandy subsoil, 2 to 6 percent slopes	205.34	Slight	Moderate	Severe	1, 2, 4
BnC	BhrsC	Birdsboro variant soils, sandy subsoil, 6 to 12 percent slopes	8.05	Moderate	Moderate	Severe	1, 2, 3
BoB	BhsgB	Birdsboro variant soils, gravelly solum, 0 to 6 percent slopes	187.39	Slight	Slight	Slight	N/A
Bt	BoyAt	Bowmansville silt loam, 0 to 2 percent slopes, frequently flooded	311.43	Severe	Severe	Severe	1
BuA	BucA	Bucks silt loam, 0 to 2 percent slopes	259.36	Slight	Slight	Severe	4
BuB	BucB	Bucks silt loam, 2 to 6 percent slopes	1711.56	Slight	Slight	Severe	4
BuB2	BucB2	Bucks silt loam, 2 to 6 percent slopes, eroded	168.22	Slight	Slight	Severe	4
BuC	BucC	Bucks silt loam, 6 to 12 percent slopes	50.7	Moderate	Moderate	Severe	3, 4
BuC2	BucC2	Bucks silt loam, 6 to 12 percent slopes, eroded	125.5	Moderate	Moderate	Severe	3, 4
CdA	ChcA	Chalfont silt loam, 0 to 2 percent slopes	3.36	Severe	Severe	Severe	1, 2
CdB	ChcB	Chalfont silt loam, 2 to 6 percent slopes	193.72	Severe	Severe	Severe	1, 4
CdB2	ChcB2	Chalfont silt loam, 2 to 6 percent slopes, eroded	33.62	Severe	Severe	Severe	1, 4

Mercer County Soil Code	SSURGO Soil Code	Soil Name	Acres	Building with Basement	Building without Basement	Septic Systems	Limitations
CdC2	ChcC2	Chalfont silt loam, 6 to 12 percent slopes, eroded	5.67	Severe	Severe	Severe	1, 2, 3
	UdbB	Udorthents, bedrock substratum, 0 to 8 percent slopes	17.25	Severe	Slight	Slight	1, 2
Cf	Udx, UdcB	Udorthents, clayey substratum	68.26	Severe	Severe	Severe	1, 4
Cg	Udu, UdgB	Udorthents, gravelly substratum	17.52	Slight	Slight	Slight	N/A
Cu	Udv, UdstB	Udorthents, stratified substratum	865.11	Slight	N/A	Slight	N/A
DgA	DOZA	Doylestown silt loam and Reaville Variant silt loam, 0 to 2 percent slopes	361.64	Severe	Severe	Severe	1, 4
DgB	DOZB	Doylestown silt loam and Reaville Variant silt loam, 2 to 6 percent slopes	249.62	Severe	Severe	Severe	1, 4
DgB2	DOZB2	Doylestown silt loam and Reaville Variant silt loam, 3 to 8 percent slopes, eroded	34.9	Severe	Severe	Severe	1, 4
DgC2	DOZC2	Doylestown and Reaville variant silt loams, 6 to 12 percent slopes, eroded	7.67	Severe	Severe	Severe	1, 3
	DohgB	Downer fine sandy loam, gravelly clay loam substratum, 0 to 5 percent	8.42	Slight	Slight	Severe	1
Ek	EkbA	Elkton silt loam, 0 to 2 percent slopes	479.68	Severe	Severe	Severe	1, 4
EvB	EvgB	Evesboro sand, 0 to 5 percent slopes	19.68	Slight	Slight	Slight	N/A
Fd	FamA	Fallsington sandy loam, 0 to 2 percent slopes	125.01	Severe	Severe	Severe	1
Fm	MbaAt	Marsh, fresh water, 0 to 2 percent slopes, frequently flooded	135.46	N/A	N/A	N/A	N/A
FrB	FodB	Fort Mott loamy sand, 0 to 5 percent slopes	76.74	Slight	Slight	Slight	N/A
FrC	FodC	Fort Mott loamy sand, 5 to 10 percent slopes	3.48	Moderate	Moderate	Severe	1, 3
GaB	GadB	Galestown loamy sand, 0 to 5 percent slopes	56.73	Slight	Slight	Slight	N/A
Km	GASB	Galloway variant soils, 0 to 5 percent slopes	139.24	Moderate	Severe	Severe	1
	GKAWOB	Glassboro and Woodstown sandy loams, 0 to 5 percent slopes	84.41	Severe	Severe	Severe	1
KsC	KkoC	Klinesville channery loam, 6 to 12 percent slopes	73.88	Moderate	Severe	Moderate	1, 2, 3, 4
KsE	KkoE	Klinesville channery loam, 6 to 12 percent slopes	40.09	Severe	Severe	Severe	1, 2, 3
	LbhB	Lansdale sandy loam, 2 to 6 percent slopes	2.39	Slight	Slight	Slight	N/A
LcC2	LbnC2	Lansdale channery loam, 6 to 12 percent slopes, eroded	10.16	Moderate	Moderate	Slight	3
LdC	LbmCb	Lansdale loam, 0 to 12 percent slopes, very stony	5.81	Slight	Slight	Severe	1

Mercer County Soil Code	SSURGO Soil Code	Soil Name	Acres	Building with Basement	Building without Basement	Septic Systems	Limitations
	LemB	Lehigh silt loam, 2 to 6 percent slopes	0.2	Severe	Severe	Severe	1, 2
	LemC2	Lehigh silt loam, 6 to 12 percent slopes, eroded	0.72	Severe	Severe	Severe	1, 2, 3
Lk	LenB	Lenoir-Keyport silt loams, 0 to 5 percent slopes	91	Moderate	Severe	Severe	1, 4
MoA	MbpA	Matapeake loam, 0 to 2 percent slopes	232.99	Slight	Slight	Slight	N/A
MoB	MbpB	Matapeake loam, 2 to 5 percent slopes	986.47	Slight	Slight	Slight	N/A
MoC2	MbpC2	Matapeake loam, 5 to 10 percent slopes, eroded	70.43	Moderate	Moderate	Slight	3
Mq	MBYB	Mattapex and Bertie loams, 0 to 5 percent slopes	625.94	Moderate	Severe	Severe	1
Ot	OthA	Othello silt loam	815.7	Severe	Severe	Severe	1
PeB	PeoB	Penn channery silt loam, 3 to 8 percent slopes	124.46	Severe	Moderate	Moderate	2, 4
PeC	PeoC	Penn channery silt loam, 6 to 12 percent slopes	109.11	Moderate	Moderate	Moderate	2, 3, 4
PeD	PeoD	Penn channery silt loam, 15 to 25 percent slopes	31.7	Severe	Severe	Moderate	2, 3, 4
Pg	PHG	Pits, sand and gravel	50.5	N/A	N/A	N/A	N/A
Pu	PmmA	Plummer sandy loam, 0 to 2 percent slopes	157.11	Severe	Severe	Severe	1
Pv	PmmwA	Plummer sandy loam, very wet, 0 to 2 percent slopes	174.57	Severe	Severe	Severe	1
Pw	PortA	Portsmouth variant silt loam, 0 to 2 percent slopes	437.44	Severe	Severe	Severe	1
QkB	QukB	Quakertown silt loam, 3 to 8 percent slopes	505.63	Slight	Slight	Moderate	4
QkB2	QukB2	Quakertown silt loam, 2 to 6 percent slopes, eroded	62.59	Slight	Slight	Moderate	4
	QukC	Quakertown silt laom, 6 to 12 percent slopes	6.28	Moderate	Moderate	Severe	2, 3, 4
QkC2	QukC2	Quakertown silt loam, 6 to 12 percent slopes, eroded	138.88	Moderate	Moderate	Moderate	3, 4
QuB	QumB	Quakertown channery silt loam, 2 to 6 percent slopes	5.38	Slight	Slight	Severe	2, 4
QuC2	QumC2	Quakertown channery silt loam, 6 to 12 percent slopes, eroded	29.91	Moderate	Moderate	Moderate	3, 4
QuD2	QumD2	Quakertown channery silt loam, 12 to 18 percent slopes, eroded	42.89	Severe	Severe	Moderate	3, 4
RaA	REFA	Readington-Abbottstown silt loams, 0 to 2 percent slopes	406.26	Moderate	Severe	Severe	1, 4
RaB	REFB	Readington-Abbottstown silt loams, 2 to 6 percent slopes	560.3	Moderate	Severe	Severe	1, 4
RaB2	REFB2	Readington and Abbottstown silt loams, 2 to 6 percent slopes, eroded	38.07	Moderate	Severe	Severe	1, 4

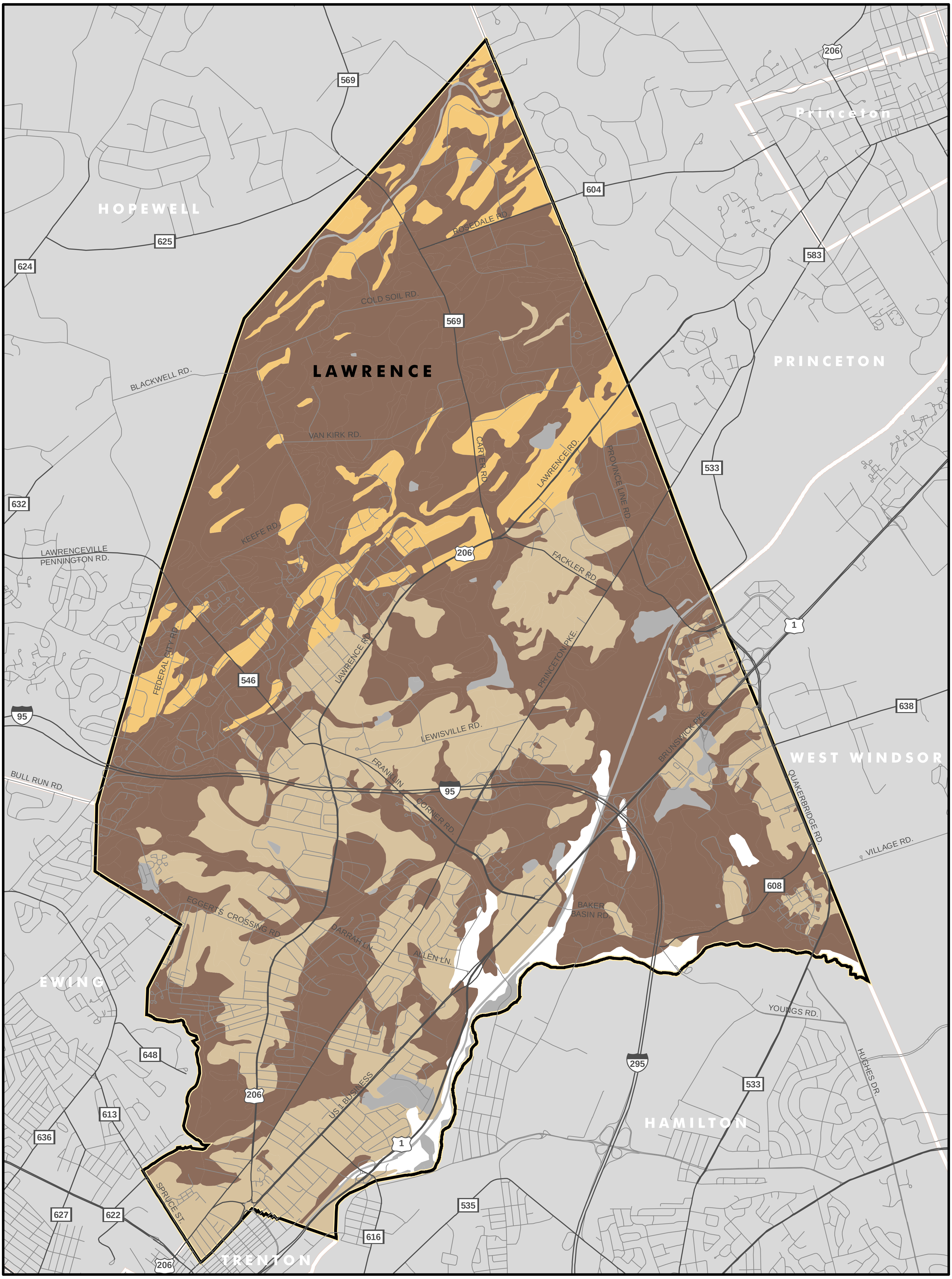
Mercer County Soil Code	SSURGO Soil Code	Soil Name	Acres	Building with Basement	Building without Basement	Septic Systems	Limitations
RaC2	REFC2	Readington and Abbottstown silt loams, 6 to 12 percent slopes, eroded	22.36	Moderate	Severe	Severe	1, 3, 4
ReA	RehA	Reaville silt loam, 0 to 2 percent slopes	6.2	Moderate	Severe	Severe	1, 2, 4
ReB	RehB	Reaville silt loam, 2 to 6 percent slopes	73.39	Moderate	Severe	Severe	1,2, 4
ReB2	RehB2	Reaville silt loam, 2 to 6 percent slopes, eroded	21.81	Moderate	Severe	Severe	1, 2, 4
ReC2	RehC2	Reaville silt loam, 6 to 12 percent slopes, eroded	14.39	Moderate	Severe	Severe	1, 2, 3
Ro	RorAt	Rowland silt loam	298.61	Severe	Severe	Severe	1
SrA	SacA	Sassafras sandy loam, 0-2 percent slopes	50.01	Slight	Slight	Slight	N/A
SrB	SacB	Sassafras sandy loam, 2 to 5 percent slopes	304.83	Slight	Slight	Slight	N/A
SrC2	SacC2	Sassafras sandy loam, 5 to 10 percent slopes, eroded	157.42	Moderate	Moderate	Slight	3
SsB	SadB	Sassafras gravelly sandy loam, 2 to 5 percent slopes	382.05	Slight	Slight	Slight	N/A
	SagC3	Sassafras sandy clay loam, 5 to 10 percent slopes, very eroded	7.68	Moderate	Moderate	Severe	3, 4
W	Water	Water	144.94	N/A	N/A	N/A	N/A

Key to Land Use Implications		*Key to Limitations*
Slight	Little or no limitation(s) or easily corrected by use of normal equipment and design techniques.	1: High water table (0 to 3 feet)
Moderate	Presence of some limitation, which normally can be overcome by careful design and management at somewhat greater cost.	2: Shallow depth to bedrock (less than 5 feet)
		3: Strongly sloping (15% or over)
Severe	Limitations that normally cannot be overcome without exceptional, complex, or costly measures.	4: Restrictive or Excessively Coarse Substratum

Sources: Soil Survey of Mercer County, NJ NRCS

Lawrence Township

Map 7: Septic Limitation of Soils



Sources : NJDEP, NJDOT, NRCS, DVRPC
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

SEPTIC SYSTEM LAND USE IMPLICATIONS

- ▨ Slight
- ▨ Moderate
- ▨ Severe
- ▨ N/A
- ☐ No Data

0 0.25 0.5 1
Miles

Delaware Valley
Regional Planning Commission
September 2007

NATURAL RESOURCES

SURFACE WATER RESOURCES

Most of Lawrence Township's land drains to the Delaware River by way of the Assunpink Creek system. The northern portion of the township drains to the Raritan Bay by way the Stony Brook system. The Assunpink Creek makes up the Southeast border of the township and Stony Brook is located in the northern tip of the township.

Watersheds

A watershed is all the land that drains to a particular waterway, such as a river, stream, lake, or wetland. The boundaries of a watershed are defined by the high points in the terrain, such as hills or ridges. A watershed includes not only the water body or waterway itself, but also the entire land area that drains to it. Large watersheds are made up of smaller ones, down to the catchment level of a local site. So, for example, the Delaware River watershed is made up of many smaller watersheds, such as the Assunpink watershed. The Assunpink watershed, in turn, is made up of several subwatersheds, consisting of the land that drains to a major tributary or branch of the creek. These subwatersheds can be further subdivided into smaller ones, each surrounding the smaller tributaries that flow to the larger channel, and so on down to the catchment level. Watersheds are natural ecological units, where soil, water, air, plants, and animals interact in a complex relationship.

Photo by Chris Linn

Stony Brook near Route 569

The Hydrologic Unit Code (HUC) is a numerical identification code given to every drainage system in the United States by the U.S. Geological Survey. Hydrologic Unit Codes begin with a number representing the largest drainage area. For example, the first level divides the entire country into 21 major drainage areas. From there, digits are added as the defined area becomes smaller. The numbers to the right represent the most local watershed. HUC-11 codes are 11-digit numbers applied to a drainage area that is approximately 40 square miles in size. Lawrence falls into three HUC-11 watersheds: the Stony Brook Watershed, the Assunpink Creek Watershed (above Shipetauken Creek), and the Assunpink Creek Watershed (below Shipetauken Creek). HUC-11 watersheds are further subdivided into HUC-14 subwatersheds, with the identification number for each one having 14 digits. There are eight HUC-14 watersheds in Lawrence, listed in **Table 6** and shown on **Map 8: Watersheds**.

Table 6: Watersheds in Lawrence Township

Watershed	USGS Watershed Code (HUC 11 Number)	Stream Classification	Acreage within Lawrence Township	% of Lawrence land	Subwatersheds (HUC 14 Numbers within Lawrence)
Stony Brook	02030105**090**	FW2-TP	2379	16.9%	02030105090**050** 02030105090**060** 02030105090**070**
Assunpink Creek (above Shipetauken Creek)	02040105**230**	FW2-NT	6731	47.9%	02040105230**050** 02040105230**060**
Assunpink Creek (below Shipetauken Creek)	02040105**240**	FW2-NT	4956	35.2%	02040105240**010** 02040105240**020** 02040105240**050**

Source: NJDEP, Bureau of Geographic Information Systems, 2006

Assunpink Creek Watershed

The Assunpink Creek Watershed (both above and below Shipetauken Creek) is located primarily in Mercer County, with a portion in Monmouth County. It covers an area of 91 square miles, 18 of which are located within Lawrence. The Shabakunk Creek and its watershed are located within the Assunpink Creek watershed. The Shabakunk has two branches, an east branch and a west branch. The east branch of the Shabakunk begins at two points. One point is located in Hopewell Township, near the Twin Pine Airport. The other point is located in Lawrence, near the intersection of Federal City Road and Keefe Road. The west branch begins at various points near the Trenton-Mercer Airport. The east and the west branches of the Shabakunk converge in Lawrence, near Notre Dame High School, on Lawrence Road. Ultimately, all tributaries to the Shabakunk Creek empty into the Assunpink Creek, located at the border of Lawrence and Hamilton townships. The entire Assunpink Creek is 25 miles long. It begins in the forested wetlands of Roosevelt Borough and travels west through the Assunpink Wildlife Management Area and rolling farmland until it is joined by the Shipetauken Creek. This area makes up the Assunpink Creek Watershed above the Shipetauken Creek. The Assunpink Creek watershed below the Shipetauken Creek is characterized by urban and suburban land through which the Assunpink Creek continues to flow southwest until it eventually drains into the Delaware River in the City of Trenton.

Stony Brook Watershed

The Stony Brook Watershed covers 55.37 square miles, 3.7 of which are within Lawrence, and encompasses all or part of seven New Jersey municipalities: East Amwell, West Amwell, Hopewell, Pennington, Lawrence, Princeton Borough, Princeton Township, and West Windsor Township. The watershed is drained by the Stony Brook, which is 21 miles long and flows eastward from East Amwell Township. It joins the Millstone River at Princeton. The Millstone then travels north until it empties into the Raritan Bay and the Atlantic Ocean. Tributaries to the Stony Brook River include Alexander Creek, Baldwins Creek, Cleveland Brook, Duck Pond Run, Honey Branch, Lewis Brook, Mountain Brook, Peters Brook, and Woodsville Brook.

Streams

In Lawrence, there are a total of 39.2 stream miles flowing across the land, 25.3 of which are first or second order, or headwater, streams. That is, they are the initial sections of stream channels with no contributing tributaries (first order streams), or they are stream channels formed from only one branching section of tributaries above them (second order streams). The headwaters are where a stream is “born” and actually begins to flow.

Headwaters are of particular importance because they tend to contain a diversity of aquatic species and the headwaters’ condition affects the water quality found downstream. They drain only a small area of land, usually no larger than one square mile (640 acres). Because of their small size, they are highly susceptible to impairment by human activities on the land. Headwaters are important sites for aquatic life at the base of the food chain and often serve as spawning or nursery areas for fish. First and second order streams are narrow and often shallow, and are characterized by relatively small base flows. This makes them subject to greater temperature fluctuations, especially when forested buffers on their banks are removed. They are also easily over-silted by sediment-laden runoff and their water quality can be rapidly degraded. In addition, first order streams are greatly affected by changes in the local water table because they are fed by groundwater sources.

Lawrence’s primary streams include the Stony Brook, Shabakunk, Little Shabakunk, Assunpink and Shipetauken creeks. The Stony Brook flows from west to east through the northern portion of the township. The Shabakunk has an east and a west branch, which converge in Lawrence near Notre Dame High School. The Little Shabakunk Creek begins in the southeast corner of Lawrence near Bunkerhill Road and travels eastward 3.5 miles before draining into the Assunpink Creek north of East Trenton Heights. The Shipetauken Creek begins near Lawrence’s border with Hopewell Township and travels 5.5 miles southeast until it joins the Assunpink Creek at Whitehead Mills Pond.

The Shipetauken and Shabakunk Creeks are monitored by NJDEP for only one water quality parameter—aquatic life. The previous two rounds of sampling, in 1998 and 2003, showed that both the Shipetauken and Shabakunk creeks were moderately impaired in their ability to support healthy populations of aquatic life (see the *Surface Water Quality* section that follows on page 46 for more information).

Table 7: Lawrence Township Streams

Stream Order	Miles
First Order Streams (smallest)	16.8
Second Order Streams	8.5
Third Order Streams	8.6
Fourth Order Streams	0.2
Fifth Order Streams	5.1
Total Stream miles	**39.2**

Source: NJDEP

Lakes and Ponds

There are five named waterbodies and several other small, unnamed ponds and water impoundments in Lawrence. The township's named waterbodies include Colonial Lake, Whitehead Mill Pond, Centennial Lake, Toms Lake, and the Lawrenceville School Pond. Colonial Lake covers 25 acres and Whitehead Mill Pond covers approximately 12 acres. Colonial Lake, part of Colonial Lake Park, is a publicly owned lake used for passive recreational activities, such as fishing. See **Map 9: Surface Water, Wetlands, and Vernal Pools.**

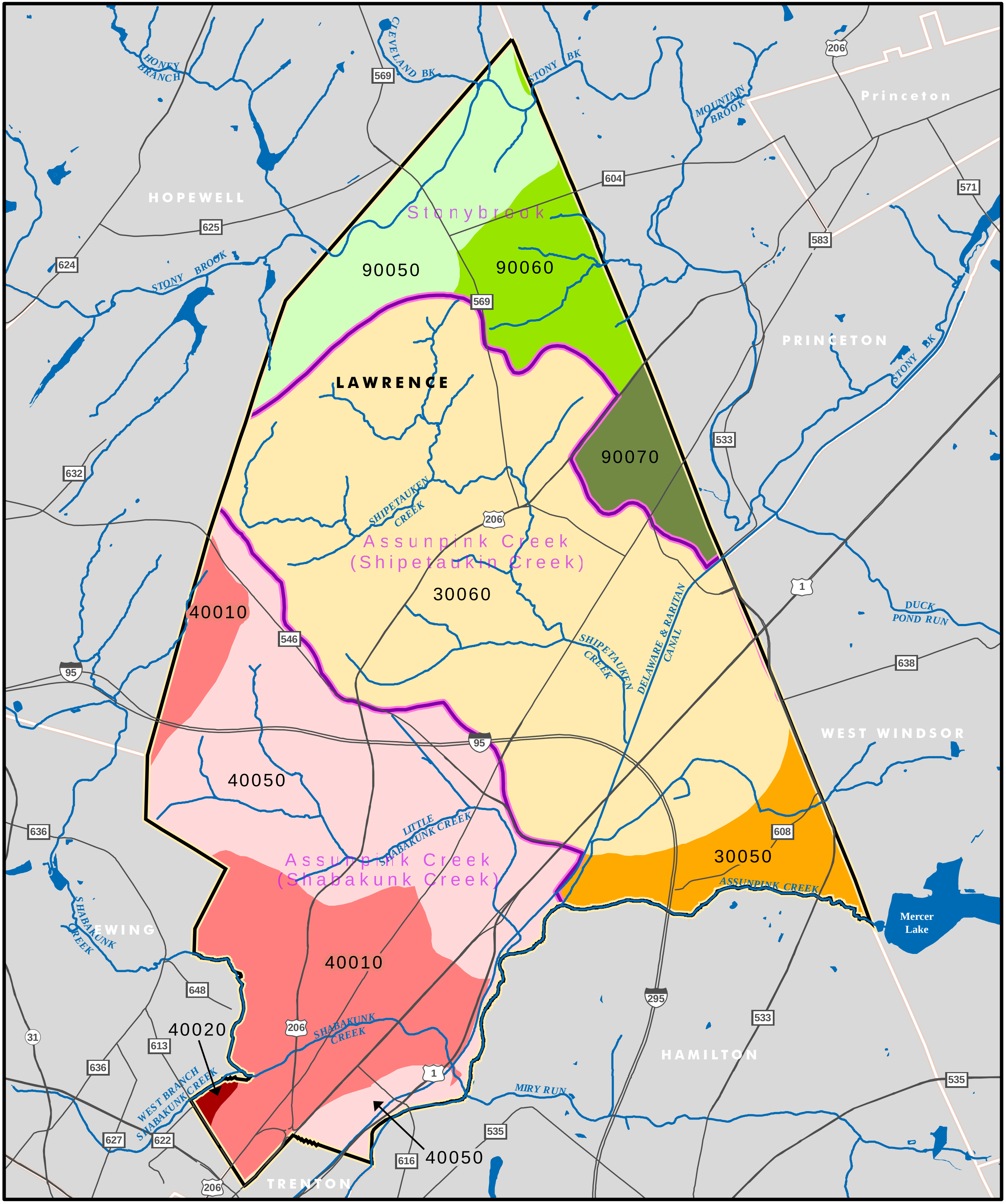
Wetlands

Wetlands support unique communities that serve as natural filters and as incubators for many beneficial species. The term "wetland" is applied to areas where water meets the soil surface and supports a particular biological community. The source of water for a wetland can be surface water, such as an estuary, river, stream, or lake edge, or groundwater that intersects with a depression in land surface. Under normal conditions, wetlands are those areas that support a prevalence of defined wetland plants on a wetland soil. The U.S. Fish and Wildlife Service designates all large vascular plants as wetland (hydric), non wetland (non hydric), or in-between (facultative). Wetland soils, also known as hydric soils, are areas where the land is saturated for at least seven consecutive days during the growing season. Wetlands are classified as either tidal or nontidal. Tidal wetlands can be either saline or freshwater. There are also special wetland categories to denote saturated areas that have been altered by human activities.

New Jersey protects freshwater (interior) wetlands under the New Jersey Freshwater Wetlands Protection Act Rules: *N.J.A.C. A 7:7A.* The law also protects transitional areas, or "buffers," around freshwater wetlands. The New Jersey freshwater wetlands maps provide guidance on where wetlands are found in New Jersey, but they are not the final word. Only an official determination from DEP, called a "letter of interpretation" (LOI), can determine for sure if there are freshwater wetlands on a property. An LOI verifies the presence, absence, or boundaries of freshwater wetlands and transition areas on a site. Activities permitted to occur within wetlands are very limited and most require permits. Additional information on wetlands rules and permits is available through NJDEP and on their website under "landuse." See *Sources of Information, page 114.*

Lawrence Township

Map 8: Watersheds



Sources : NJDEP, NJDOT, DVRPC
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

▢ **Watershed (HUC 11) Containing Sub-Watershed (HUC 14)**

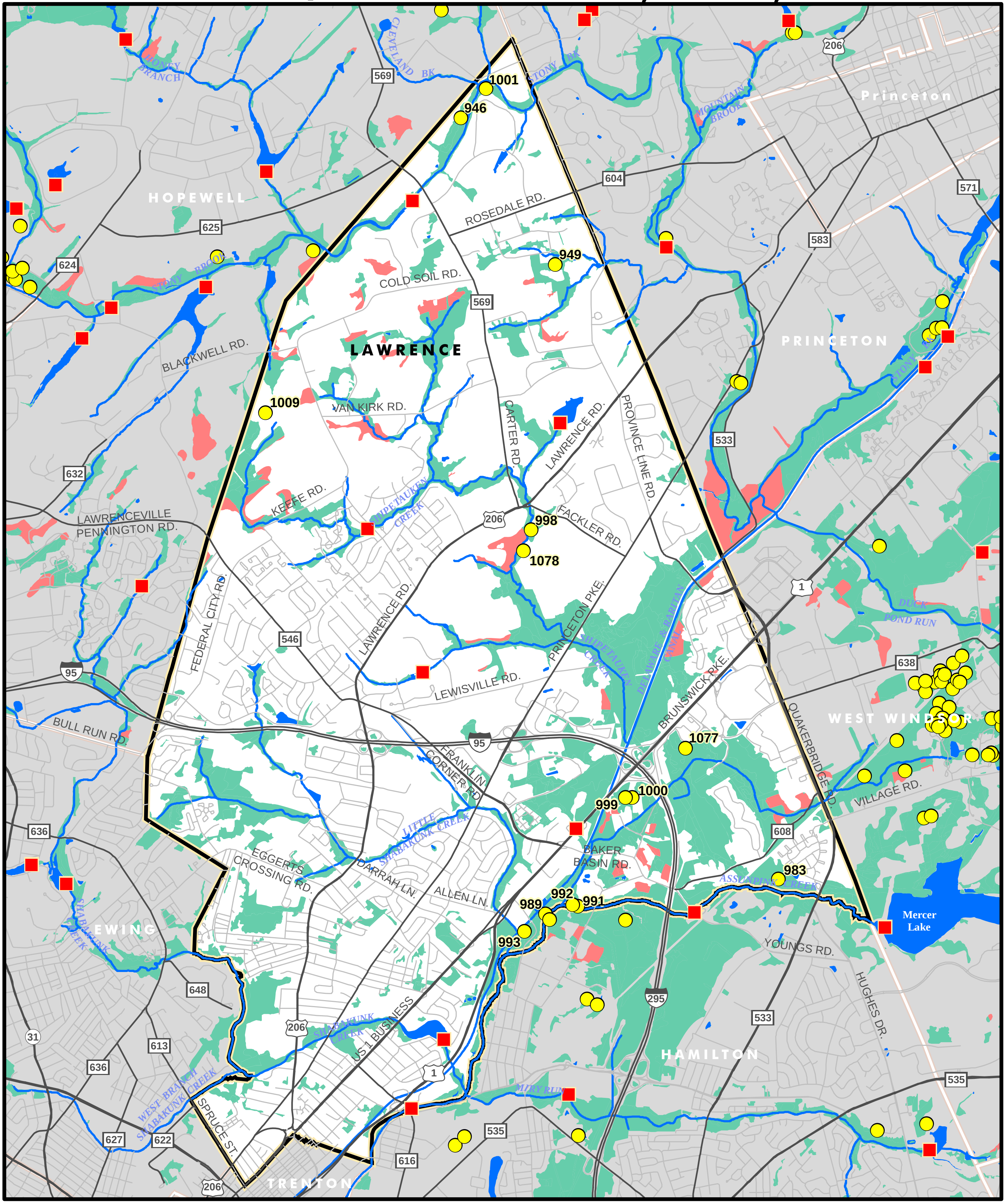
N

0 0.25 0.5 1
Miles

Delaware Valley
Regional Planning Commission
September 2007

Lawrence Township

Map 9:
Surface Water, Wetlands, and Vernal Pools



Sources : NJDEP,NJDOT,DVRPC
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

● Vernal Pool Location
🟥 Dam
🟩 Wetlands
🟥 Agricultural Wetlands

DRAFT

0 0.25 0.5 1
Miles

Delaware Valley
Regional Planning Commission
September 2007

All of Lawrence's wetlands are freshwater. Total wetland acreage in the township is 3,056 acres, of which 2,714 are naturally-occurring wetlands and 342 are wetlands modified by human activities. Of Lawrence's naturally-occurring wetlands, 2,158 acres are classified as forested wetlands, 268 acres are herbaceous wetlands, 215 acres are scrub/shrub wetlands, 72 acres are wetland rights-of-way, and 1 acre is an interior wetland dominated by Phragmites. See **Map 9: Surface Water, Wetlands, and Vernal Pools**.

Lawrence also includes 342 acres of wetland areas that have been altered by human activities. Collectively, these will be referred to as *modified* wetlands in this document.[4] Although they do not typically support natural wetland vegetation, modified wetlands do show obvious signs of soil saturation and exist in areas shown to have hydric soils on U.S. Soil Conservation Service soil surveys. Lawrence's modified wetlands fall into the following categories as defined by the *Anderson Land Use Classification* system: 204 acres of agricultural wetlands, 47 acres of disturbed wetlands, 13 acres of former agricultural wetlands, and 78 acres of wetlands found in maintained greenspace, recreational areas, or lawns. A more detailed description of all of Lawrence's wetland areas is found in the *Biological Resources* section, under "Wetlands," *page 70*.

Photo by Chris Linn

Forested Wetland

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[4] Like interior wetlands, Lawrence Township's modified wetlands are also nontidal.

Agricultural Wetlands

Agricultural wetlands occupy 204 acres of Lawrence Township. These “quasi-wetlands” are found scattered as small sites, primarily in the southeastern and northwestern portions of the township. Agricultural wetlands are modified former wetlands currently under cultivation. These areas still exhibit evidence of soil saturation in aerial infrared photos, but they do not support natural wetlands vegetation. See **Map 9: Surface Water, Wetlands, and Vernal Pools.**

As long as agricultural wetland areas remain in agricultural use, they are exempt from New Jersey Freshwater Wetlands Rules *N.J.A.C. 7:7A*. However, if an agricultural area is removed from agricultural production for more than five years, any wetlands located within that area lose their exempt status. Also, according to *N.J.A.C. 7:7A-2.8(B)2*, “the exemptions apply only as long as the area is used for the exempted activity.” Therefore, if the area is used for anything other than farming, the exemption no longer applies.

The Natural Resource Conservation Service sponsors the Wetlands Reserve Program, a voluntary program that offers landowners an opportunity to receive payments for restoring and protecting wetlands on their property, including agricultural wetlands. Restoring agricultural wetlands requires removing them from agricultural use and restoring them to their natural state. This program provides technical and financial assistance to eligible landowners, who can enroll eligible lands through permanent easements, 30-year easements, or restoration cost-share agreements. (See **Appendix B**)

Vernal Pools

Vernal pools are bodies of water that appear following snow melt and during spring rains, but which disappear or are dry during most other times of the year. They are highly important sites for certain rare species of frogs and salamanders, called obligate breeders. Obligate breeders will only breed in vernal pools because the pool’s impermanence prevents residence by predators who would consume the eggs and young.

Vernal pools are so intermittent that their existence as wetlands has frequently not been recognized. Consequently, many of them have disappeared from the landscape, or have been substantially damaged. This, in turn, is a principal cause of the decline of obligate amphibian species.[5]

The New Jersey Division of Fish and Wildlife has been conducting a Vernal Pool Survey project since 2001, to identify, map, and certify vernal ponds throughout the state. Regulations promulgated at that time prohibited the issuance of a Statewide General Permit (SGP) 6 in certified vernal habitats and required that a 75-foot buffer be maintained around the pools. However, a ruling by the New Jersey Supreme Court in July 2004 struck down the vernal habitat rule. Currently, even though NJDEP cannot deny a SGP-6 permit due to the presence of a vernal pool, it still has the authority to require and deny any of the other 25 general permits in vernal

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[5] Calhoun, A. J. K. and M. W. Klemens. *Conserving Poll-Breeding Amphibians in Residential and Commercial Developments in the Northeastern United Statess*. MCA Technical Paper Series: No. 5, Metropolitan Conservation Alliance, Wildlife Conservation Society. Bronx, New York, 2002. pp. 2-5.

habitats. In addition, a SGP-6 can be denied in exceptional resource value wetlands, as established through a Letter of Interpretation issued by the DEP. Local municipalities and citizens can assist in designating vernal pools as exceptional resource value wetlands by identifying occurrences of threatened and endangered species in vernal habitats and submitting supporting information to DEP. Municipalities can also provide additional protection by instituting restrictive zoning or negotiating conservation easements on the land surrounding vernal pools.

The state has identified fourteen vernal pools in Lawrence. Surveys of each pool are planned to determine what species are present and if the pool is still in existence as a natural habitat. None of these sites had been surveyed as of August 2007. See **Map 9: Surface Water, Wetlands, and Vernal Pools**.

Floodplains

Areas naturally subject to flooding are called floodplains, or flood hazard areas. Floodplains encompass a floodway, which is the portion of a floodplain subject to high velocities of moving water, and the adjacent flood fringe, which helps to hold and carry excess water during overflow of the normal stream channel (Figure 2). The 100-year floodplain is defined as the land area that will be inundated by the overflow of water resulting from a 100-year flood (a flood that has a 1 percent chance of occurring in any given year).

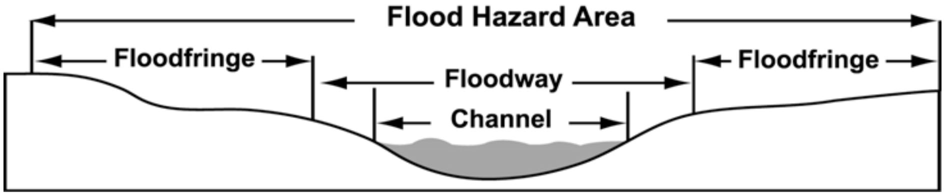

Fig. 2: Parts of a Flood Hazard Area

Although the term “flood hazard area” and “100-year floodplain” denote similar concepts, NJDEP defines them in slightly different ways. New Jersey’s regulations define the flood hazard area as the area inundated by a flood resulting from the 100-year discharge increased by 25 percent. This type of flood is called the “flood hazard area design flood” and it is the flood regulated by NJDEP.

Floodplains require protection in order to prevent loss to residents, especially within the boundaries of the floodway. Equally important is the preservation of the environmentally sensitive aquatic communities that exist in floodplains. These communities are often the first link in the food chain of the aquatic ecosystem. In addition, floodplains serve the function of removing and mitigating various pollutants, through the uptake by floodplain vegetation of excess chemical loads in the water and by the filtering of sediments generally. All efforts to keep development out of floodplains will help to preserve the flood-carrying capacity of streams and their water quality.

In New Jersey and throughout the country, building in areas subject to flooding is regulated to protect lives, property, and the environment. New Jersey regulates construction in the flood hazard area under the Flood Hazard Area Control Act, *N.J.S.A. 58:16A-50* et seq., and its implementing rules at *N.J.A.C. 7:13*. NOTE: The Department proposed a new Flood Hazard Area Control Act in Fall 2006. The Act and the rules are currently in the process of being updated. Activities that are proposed to occur in a flood hazard area will require issuance of a stream encroachment permit or a letter of non applicability from NJDEP. Additional information on floodplain activities is available from NJDEP and from its website under "land use." See *Sources of Information, page 114.*

In addition, Lawrence's floodplain ordinance protects floodplains with a stream buffer requirement. The ordinance states that no grading can occur or no buildings can be placed within 100 feet of the 100-year floodplain of all streams, with only two exceptions: for the installation of necessary stormwater outfall structures and piping, or for up to 500 square feet of encroachment per lot under single and separate ownership.

New Jersey's flood hazard area maps are not available in digital form. Consequently, it is only possible to approximate the spatial extent of the flood hazard area in Lawrence by using digitized coverages of the Federal Emergency Management Agency's (FEMA's) 100-year floodplain maps. FEMA's maps show that 1,918 acres, or almost 14 percent of the township's land area, falls within the 100-year floodplain. Presumably, the flood hazard area would be slightly larger.[6] Most of Lawrence's floodplain areas are located in the southeastern quadrant of the township along and immediately to the east of the Delaware and Raritan Canal. This area is also extensively occupied by wetlands. The majority of the township's remaining floodplain areas are found along the Shabakunk, Little Shabakunk, Shipetauken, and Assunpink creeks, and Stony Brook. See **Map 10: Flood Hazard Areas (1996)**.

Table 8: Flood Hazard Area Acreage

Category	Acres
100-year floodplain	1,918
500-year floodplain	247

Source: Federal Emergency Management Agency

Surface Water Quality

Water quality standards are established by federal and state governments to ensure that water is suitable for its intended use. The federal Clean Water Act (P.L. 95-217) requires that, wherever possible, water-quality standards provide water suitable for fish, shellfish and wildlife to thrive and reproduce and for people to swim and boat.

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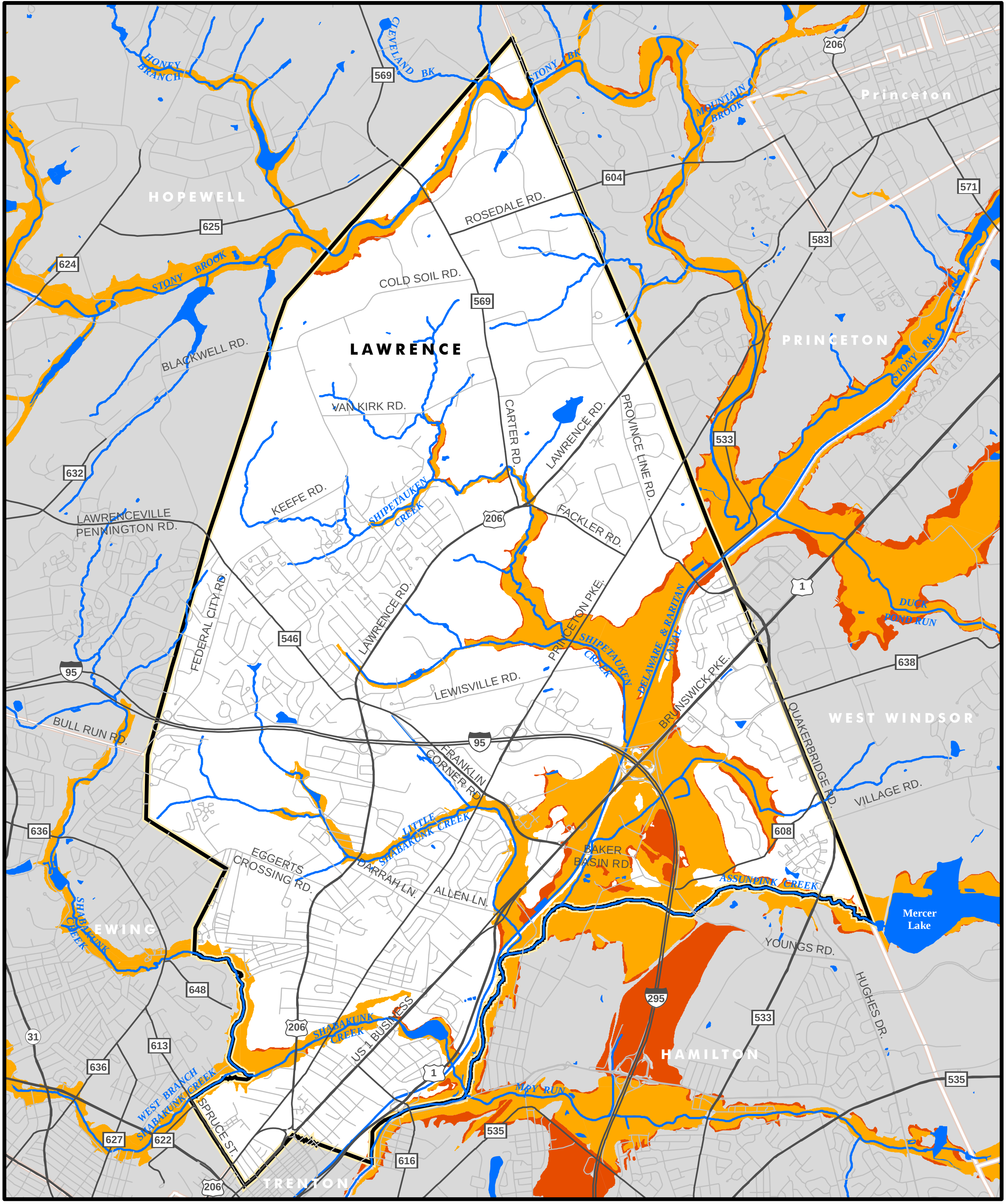
[6] Site plan and subdivision applications require detailed engineering studies that depict the boundaries of the flood hazard area, as defined by New Jersey, at a large scale.

Lawrence Township

Map 10: Flood Hazard Areas (1996)



Sources : FEMA,NJDEP,NJDOT,DVRPC
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

FLOOD ZONE

🟧 **100-Year Floodplain**

🟥 **500-Year Floodplain**

0 0.25 0.5 1
Miles

Delaware Valley
Regional Planning Commission
September 2007

All waterbodies in New Jersey are classified by NJDEP as either freshwater (FW), pinelands water (PL), saline estuarine water (SE), or saline coastal water (SC). Freshwater is further broken down into freshwater that originates and is wholly within federal or state parks, forests, or fish and wildlife lands (FW1), and all other freshwater (FW2). The water quality for each of these groups must be able to support designated uses that are assigned to each waterbody classification (see *Surface Water Quality Standards N.J.A.C 7:9B-1.12*). In addition to being classified as FW1 and FW2, fresh waterbodies are classified as trout-producing (TP), trout-maintaining (TM) or nontrout waters (NT). Each of these classifications may also be subject to different water quality standards.

Of Lawrence's streams, the Shabakunk Creek, the Little Shabakunk Creek, the Assunpink Creek and the Shipetauken Creek are all classified as FW2–NT, which means that they are both freshwater and not trout producing or trout maintaining waters. The Stony Brook is classified as FW2-TP, meaning that it is a freshwater, trout producing stream. See **Table 9: Water Quality Classifications of Streams in Lawrence Township**.

Table 9: Water Quality Classifications of Streams in Lawrence Township

Streams	Classification
Assunpink Creek	FW2-NT
Little Shabakunk	FW2-NT
Shabakunk	FW2-NT
Shipetauken	FW2-NT
Stony Brook	FW2-TP

Source: NJDEP, Surface Water Quality Standards, N.J.A.C. 7:9B

According to NJDEP rules, all FW2 waters must provide for (1) the maintenance, migration and propagation of the natural and established biota; (2) primary and secondary contact recreation (i.e., swimming and fishing); (3) industrial and agricultural water supply; (4) public potable water supply after conventional filtration and disinfection; and (5) any other reasonable uses.

The determination of whether or not water quality is sufficient to meet a water body's designated use(s) is based on numerous surface water quality parameters. Some examples of surface water quality parameters include fecal coliform, dissolved oxygen, pH, phosphorous, and toxic substances (see *N.J.A.C. 7:9B-1.14*). NJDEP also evaluates water quality by examining the health of aquatic life in a stream.

New Jersey's Integrated Water Quality Monitoring and Assessment Report

The Federal Clean Water Act (Act) mandates that states submit biennial reports to the Environmental Protection Agency (EPA) describing the quality of their waters. States must submit two reports: the *Water Quality Inventory Report*, or "305(b) Report," documenting the status of principal waters in terms of overall water quality and support of designated uses, and a list of waterbodies that are not attaining water quality standards – the "303(d) List." States must also prioritize 303(d)-listed waterbodies for Total Maximum Daily Load (TMDL) analyses and identify those high-priority waterbodies for which they anticipate establishing TMDLs in the next two years.

In 2002, 2004, and again in 2006, NJDEP integrated the 303(d) List and the 305(b) Report into a single report according to EPA's guidance. The 2006 *New Jersey Integrated Water Quality Monitoring and Assessment Report* (www.state.nj.us/dep/wmm/sgwqt), released in early 2007, places the state's waters on one of five "sublists." Sublists 1 and 2 contain waters that are attaining standards. Sublist 3 contains waters for which there is insufficient data to determine their status. Sublist 4 contains waters that do not attain water quality standards, but that meet one of the following three conditions: (1) a TMDL has been completed for the pollutant causing non attainment; (2) other enforceable pollution control requirements are reasonably expected to result in conformance with the applicable water quality standards; or (3) non attainment is caused by something other than a pollutant. Sublist 5 contains waters that do not attain their designated use and for which a TMDL is required. Sublist 5 is equivalent to the 303(d) List.

In the 2002 and 2004 Integrated Reports, NJDEP placed each of the state's water quality monitoring stations on a sublist. Stations that tested for more than one water quality parameter, i.e., pH, phosphorous, fecal coliform, dissolved oxygen, temperature, etc., could be placed on different sublists for different parameters. For example, a station could be on Sublist 5 (non attaining) for phosphorous and Sublist 1 (attaining) for temperature. Individual stream segments (also referred to as waterbodies) were then associated with water quality sampling stations using a methodology established by NJDEP. However, the ability of a waterbody to meet its designated uses was not explicitly stated in the 2002 and 2004 Integrated Reports.

In 2006, NJDEP revised its methodology so as to report the attainment of water quality standards required for achieving designated uses on a subwatershed basis. Rather than placing water quality monitoring stations and their associated stream segments on a sublist for an individual parameter, NJDEP identified the designated uses applicable to each HUC-14 watershed (assessment unit) and assessed the status of use attainment for each applicable designated use. Designated uses include:

- Aquatic life (general)
- Aquatic life (trout)
- Primary contact recreation
- Secondary contact recreation
- Drinking water supply
- Industrial water supply
- Agricultural water supply
- Shellfish harvesting
- Fish consumption

The assessment unit was then placed on the appropriate sublist for each use. (Note: not all designated uses are applicable for all HUC-14 watersheds).

NJDEP based the assessment of entire HUC-14 watersheds on the results of one or more monitoring site(s) within the watershed. The results from monitoring site(s) located within the HUC-14 subwatershed were extrapolated to represent all the waters within the entire HUC boundary. In practice, the HUC-14 approach provides a more conservative assessment, since any impairment of any waterbody (stream, river, etc.) in a given HUC-14 watershed will result in that entire watershed being listed as impaired for that use/parameter. In addition, where a HUC-14 watershed contains waters of different classification, the more stringent classification was used to assess impairment, and that impairment was then applied to the entire watershed. Because of the extent of extrapolation required for this approach, NJDEP will perform more detailed testing to determine the actual cause, source, and extent of impairment in the HUC-14 watershed before developing a TMDL or taking other regulatory action to address the impairment.

See **Table 10: New Jersey Integrated Water Quality Monitoring and Assessment Report (2006)** for the status of each of Lawrence's HUC-14 watersheds.

Table 10: New Jersey Integrated Water Quality Monitoring and Assessment Report (2006)

Assessment Unit ID	Assessment Unit Name	Aquatic Life General	Primary Contact Rec.	Secondary Contact Rec.	Drinking Water Supply	Agric. Water Supply	Indus. Water Supply	Fish Consumption
02030105090050-01	Stony Bk (Province Line Rd to 74d46m dam)	Sublist 5	Sublist 4A	Sublist 3	Sublist 5	Sublist 2	Sublist 5	Sublist 3
02030105090060-01	Stony Bk (Rt 206 to Province Line Rd)	Sublist 5	Sublist 4A	Sublist 3	Sublist 5	Sublist 2	Sublist 5	Sublist 3
02030105090070-01	Stony Bk (Harrison St to Rt 206)	Sublist 5	Sublist 4A	Sublist 3	Sublist 5	Sublist 2	Sublist 5	Sublist 3
02040105230050-01	Assunpink Ck (Shipetaukin to Trenton Rd)	Sublist 5	Sublist 2	Sublist 2	Sublist 5	Sublist 2	Sublist 2	Sublist 5
02040105230060-01	Shipetaukin Creek	Sublist 5	Sublist 3	Sublist 3	Sublist 3	Sublist 3	Sublist 3	Sublist 3
02040105240010-01	Shabakunk Creek	Sublist 5	Sublist 4A	Sublist 3	Sublist 3	Sublist 3	Sublist 3	Sublist 5
02040105240020-01	Shabakunk Creek WB	Sublist 3	Sublist 4A	Sublist 3	Sublist 3	Sublist 3	Sublist 3	Sublist 3
02040105240050-01	Assunpink Ck (below Shipetaukin Ck)	Sublist 5	Sublist 4A	Sublist 4A	Sublist 5	Sublist 2	Sublist 2	Sublist 5

Source: NJDEP, Water Monitoring and Standards, 2006

Note: The designated uses, "Aquatic Life (trout)" and "Shellfish Harvesting," are not applicable for any of the HUC-14 watersheds/assessment units in Lawrence Township, and are therefore not included in the above table.

Key to Integrated Report Sublists

Sublist	Placement Conditions
Sublist 1	The designated use is assessed and attained AND all other designated uses in the assessment unit area are assessed and attained. (Fish consumption use is not factored into this determination based on EPA guidance)
Sublist 2	The designated use is assessed and attained BUT one or more designated uses in the assessment unit is not attained and/or there is insufficient data to make a determination.
Sublist 3	Insufficient data is available to determine if the designated use is attained.
Sublist 4	The designated use is not attained or is threatened; however, development of a TMDL is not required for one of the following reasons: A. A TMDL has been completed for the pollutant causing non attainment B. Other enforceable pollution control requirements are reasonably expected to result in the conformance with the applicable water quality standard(s) in the near future and the designated use will be attained through these means C. Non attainment is caused by something other than a pollutant
Sublist 5	The designated use is not attained or is threatened by a pollutant or pollutants and a TMDL is required.

As shown in **Table 10** above, an assessment unit may be listed on one or more sublists (i.e., on Sublist 2 for drinking water, Sublist 3 for aquatic life, etc.). Only if all uses for an individual HUC-14 are assessed and attained can the assessment unit be placed on Sublist 1. In order to determine whether or not an assessment unit supports a designated use, NJDEP identified a suite of parameters that serve as the minimum data set associated with each designated use.

If one or more designated uses are assessed as “non attainment” (Sublist 5), the pollutant(s) causing the non attainment status is identified on the “303(d) List of Impaired Waters with Priority Ranking.” When the pollutant causing non attainment is not known, the pollutant is listed as “pollutant unknown” or “toxic unknown.” The ranking refers to the priority given an assessment unit when determining the schedule for a TMDL. **Table 11: New Jersey’s 303(d) List of Impaired Waterbodies with Priority Ranking** lists the non attaining assessment units and their pollutants in Lawrence Township.

Table 11: New Jersey’s 303(d) List of Impaired Waterbodies with Priority Ranking

Assessment Unit ID	Assessment Unit Name	Parameter	Ranking
02030105090050-01	Stony Bk (Province Line Rd to 74d46m dam)	Arsenic	Medium
		Phosphorous	High
		Total Suspended Solids	High
02030105090060-01	Stony Bk (Rt 206 to Province Line Rd)	Arsenic	Medium
		Phosphorous	High
		Total Suspended Solids	High
02030105090070-01	Stony Bk (Harrison St to Rt 206)	Arsenic	Medium
		Phosphorous	High
		Total Suspended Solids	High
02040105230050-01	Assunpink Ck (Shipetaukin to Trenton Rd)	Arsenic	Medium
		Mercury	Medium
		Pollutant Unknown	Low
02040105230060-01	Shipetaukin Creek	Pollutant Unknown	Low

Assessment Unit ID	Assessment Unit Name	Parameter	Ranking
02040105240010-01	Shabakunk Creek	Mercury	Medium
		Pollutant Unknown	Low
02040105240050-01	Assunpink Ck (below Shipetaukin Ck)	Phosphorous	Medium
		Arsenic	Medium
		Mercury	Medium
		Lead	Medium

Source: NJDEP, Water Monitoring and Standards, 2006

Water Quality Monitoring Networks

The determination of whether or not water quality is sufficient to meet an assessment unit's designated use(s) is based on testing results from various water quality monitoring networks. Across the state, NJDEP primarily relies on two water quality monitoring networks: the ***Ambient Stream Monitoring Network (ASMN)*** and the ***Ambient Biomonitoring Network (AMNET).*** NJDEP runs the ASMN network in cooperation with the U.S. Geological Survey (USGS). This network contains 115 stations that monitor for nutrients (i.e., phosphorous and nitrogen), bacteria, dissolved oxygen, metals, sediments, chemical, and other parameters. AMNET, which is administered solely by NJDEP, evaluates the health of aquatic life as a biological indicator of water quality. This network includes 820 monitoring stations located throughout the state. Each station is sampled once every five years. The first round of sampling for all stations took place between 1992 and 1996 and a second round occurred between 1997 and 2001. A third round of sampling took place between 2002 and 2006. The locations of ASMN and AMNET stations are depicted on **Map 11: Water Quality Sampling Locations**.

Ambient Stream Monitoring Network

There is one site in Lawrence that is part of the USGS/NJDEP ASMN, located in Lawrenceville near where the Shipetauken Creek crosses Route 206. This site is tested for dissolved oxygen, pH, ammonia, nitrogen, phosphorous, metals, and a wide range of organic and inorganic chemicals.

Ambient Biomonitoring Network

Currently, there are eight AMNET sites that assess aquatic life within Lawrence's streams (Note: Three of these eight sampling locations are located beyond Lawrence's boundaries). The location of one sampling station, AN0112, was switched between the first and second rounds of sampling. The first location is now referred to as AN0112X. NJDEP sampled each of the eight AMNET sites in March 1992, in March 1998, and again in June 2003. Each AMNET site was tested for only one water quality parameter – the diversity of aquatic life. In testing this water quality parameter, NJDEP samples streams for benthic (bottom-dwelling) macroinvertebrates (insects, clams, mussels, snails, worms and crustaceans that are large enough to be seen by the naked eye). Macroinvertebrates are studied because if pollution impacts a stream, their populations are adversely affected. NJDEP determines the number of aquatic organisms present and their diversity. The greater the number of organisms and the greater their diversity, the better the surface water quality.

In the 1992 (first round) sampling:

Site AN0114 on the Shabakunk Creek, site AN0115 on Miry Run, and sites AN0393B and AN0392 on Stony Brook were rated as "moderately impaired" for aquatic life support. The other sites were rated as "severely impaired," meaning the streams are not able to maintain diverse populations of aquatic organisms.

In the 1998 (second round) sampling:

All of the sites were rated as "moderately impaired." The impairment score of one of the "moderately impaired" sites (AN0393B) from the first round of sampling declined slightly in the second round of sampling, but was not enough to be classified as "severely impaired." The impairment score of the other "moderately impaired" site (AN0114) from the first round of sampling improved slightly, but not enough to be considered "non impaired."

In the 2003 (third round) sampling:

The Shabakunk Creek site (AN0114) was rated as "severely impaired," while the other sites remained "moderately impaired."

Lawrence's AMNET stations are listed in **Table 12: New Jersey AMNET Sampling Locations for Lawrence Township** and are depicted on **Map 11: Water Quality Sampling Locations.**

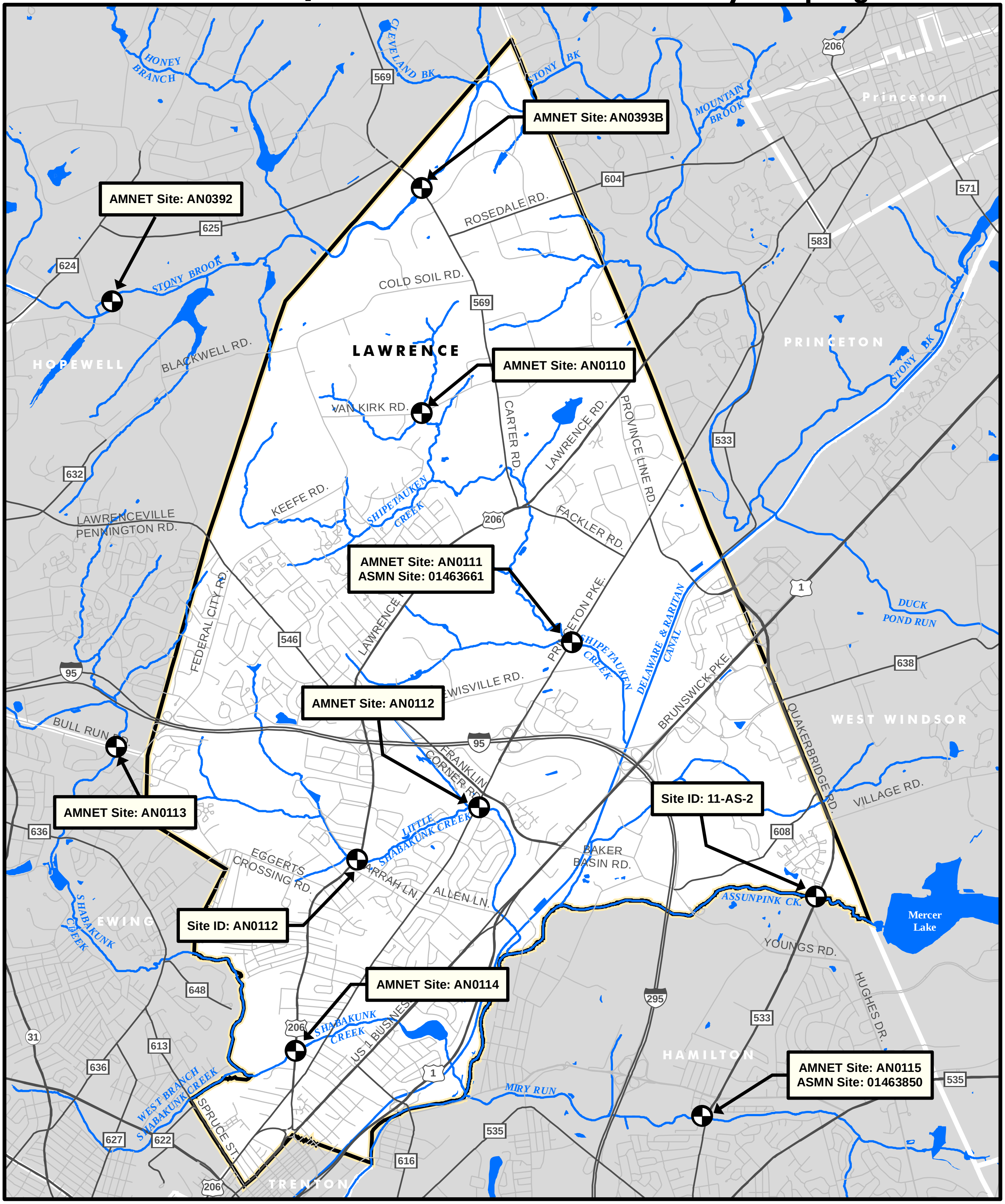
Knowing the actual condition of streams and stream banks, and planning for their improvement requires more extensive surveys and more frequent monitoring than the state can provide. The state primarily monitors main channels in nontidal areas and only does biological assessments on a five-year cycle. Stream surveys by local organizations are much needed, along with regular monitoring of water quality on all of a community's waterways.

Fish Consumption

Certain fish may contain toxic chemicals, such as PCBs, dioxins, or mercury, which accumulate in water and aquatic life. Chemical contaminants such as dioxin and PCBs are classified by EPA as probably cancer-causing substances in humans. Elevated levels of mercury can pose health risks to the human nervous system. Infants, children, pregnant women, nursing mothers, and women of childbearing age are considered to be at higher risk from contaminants in fish than other members of the general public. Since 1982, NJDEP has been catching fish at numerous sampling stations throughout the state and testing for contaminant levels of PCBs, dioxins, and mercury, and adopting advisories to guide residents on safe consumption practices. For the general population, NJDEP recommends one meal per month of largemouth bass, one meal per week of the black crappie, and no restrictions on either the chain pickerel or yellow perch. For high-risk individuals, such as infants, children and pregnant or nursing women, NJDEP recommends they do not eat largemouth bass and consume no more than one meal per month of black crappie and chain pickerel, and no more than one meal per week of yellow perch.

Lawrence Township

Map 11:
Water Quality Sampling Locations



● Monitoring Site

Sources : NJDEP,NJDOT,DVRPC
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

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September 2007

Table 12: New Jersey AMNET Sampling Locations for Lawrence Township

Site ID	Water Body	Location	Municipality	1992 NJ Impairment Score	1998 NJ Impairment Score	2003 NJ Impairment Score
AN0110	Unknown Tributary to Shipetauken Ck	Van Kirk Rd	Lawrence	6	12	15
AN0111	Shipetauken Ck	Rt 583 (Princeton Pike)	Lawrence	6	12	15
AN0112	Little Shabakunk Ck	Rt 583 (Princeton Pike)	Lawrence	NA	12	9
AN0112X	Little Shabakunk Ck	Rt 206	Lawrence	6	NA	NA
AN0114	Shabakunk Ck	Rt 206 north of Notre Dame HS	Lawrence	15	18	6
AN0393B	Stony Brook	Carter Road	Lawrence/ Princeton	15	12	21
AN0113	Shabakunk Ck	Bull Run Rd	Hopewell	3	15	18
AN0115	Miry Run	Rt 533	Hamilton	12	15	12
AN0392	Stony Brook	Old Mill Rd	Hopewell	12	21	24

Source: NJDEP, Bureau of Freshwater and Biological Monitoring

Key to Impairment Scores

NJ Impairment Score	Biological Assessment
0-6	Severely Impaired
9-21	Moderately Impaired
24-30	Non-impaired

Total Maximum Daily Loads

For impaired waters (waters on Sublist 5), the state is required by EPA to establish a Total Maximum Daily Load (TMDL). A TMDL quantifies the amount of a pollutant a waterbody can assimilate (its loading capacity) without violating water quality standards. A TMDL's purpose is to initiate a management approach or restoration plan based on the sources of pollutants and the percentage reductions of each pollutant that must be achieved to attain water quality standards. These sources can be point sources, such as sewage treatment plants, or non point sources, such as runoff from various types of residential, commercial or agricultural lands.

According to the 2006 Water Quality Monitoring and Assessment Report, three waterbodies (HUC-14 watersheds) are on NJDEP's "two-year TMDL schedule:" Stony Brook (Province Lin Rd to 74d46m dam), Stony Brook (Rt 206 to Province Line Rd), and Stony Brook (Harrison Street to Rt 206). All three watersheds are on the two-year schedule for Phosphorous and Total Suspended Solids. The schedule indicates that TMDLs for these watersheds should be completed by December 2008.

Implementation of the TMDLs will involve substantial reductions in the amount of these pollutants from each known source. In general, implementation of a TMDL relies on actions mandated by the Municipal Stormwater Management program, including the ordinances required to be adopted by municipalities under that permit (see *Figure 3*, *page 59* for details of the Statewide Basic Requirements of this program) and on voluntary improvements to land and runoff management in agricultural areas. A list of U.S. Department of Agriculture and New Jersey programs that provide funding and technical assistance on relevant projects for farm landowners is included in **Appendix B: Federal and State Conservation Programs for Farmers**.

Causes of Water Quality Impairments

Stormwater Runoff and Impervious Cover

Stormwater runoff and other nonpoint source pollution (pollution coming from a wide variety of sources rather than from a single point, such as a discharge pipe) have the largest effect on the water quality and channel health of streams in Lawrence Township. These sources are also the most difficult to identify and remediate because they are diffuse, widespread and cumulative in their effect. Most nonpoint source pollution in the watersheds in Lawrence is known to derive from stormwater drainage off paved surfaces such as streets, commercial/industrial areas, and residential sites (with and without detention basins), and from agricultural fields that lack adequate vegetative buffers. Some of this runoff comes to the waterways from similar sources in upstream townships and some of it derives from Lawrence land uses.

In March 2003, NJDEP issued a new Stormwater Management Rule, as required by EPA's Phase II Stormwater Management Program for Municipal Separate Stormwater Sewer Systems (MS4). The rule lays out guidance and requirements for management of and education about stormwater at the local level. It applies to all towns in New Jersey, all county road departments, and all public institutional facilities on large sites (such as hospitals and colleges). Beginning in 2004, municipalities were required to obtain a New Jersey Pollution Discharge Elimination System (NJPDES) general permit for the stormwater system and its discharges, within their borders. The stormwater system is considered to be owned and "operated" by the township.

Under the 2004 NJPDES permit, a town must meet certain specific requirements in planning, ordinance adoption, education, management of township facilities, and investigation of parts of the stormwater system. Fulfillment of these Statewide Basic Requirements is scheduled to occur over the course of five years.

The volume of runoff that is carried to a stream also impacts stream channel condition. Increased volume usually results from increased impervious surface within a subwatershed. As an area becomes developed, more stormwater is directed to the streams from neighborhood storm drains, residential and commercial stormwater facilities, and road drainage. In general, studies have found that levels of impervious cover of 10 percent or more within a subwatershed are directly linked to increased stormwater runoff, enlargement of stream channels, increased streambank erosion, lower dry-weather flows, high-stream temperatures, lower water quality, and declines in aquatic wildlife diversity. When impervious cover reaches 25 to 30 percent, streams are found to be severely degraded.[7]

Table 13: Acreage of Impervious Surface in Lawrence Township

Impervious Surface	Acres	% of Total
Less Than 5%	11,699	83.20%
5-10%	109	0.77%
10-25%	301	2.13%
Greater Than 25%	1,957	13.90%
Total	**14,066**	**100.00%**

Source: NJDEP

Inadequate Stream Buffers

A stream buffer is the region immediately beyond the banks of a stream, which serves to limit the entrance of sediment, pollutants, and nutrients into the stream itself. Stream buffers are quite effective at filtering substances washing off the land. The vegetation of the buffer traps sediment and can actually utilize (uptake) a percentage of the nutrients flowing from lawns and farm fields. When forested, a stream buffer promotes bank stability and serves as a major control of water temperature. The buffer region also serves as a green corridor for wildlife to move between larger forested habitat areas. This greenway can be utilized for recreation by residents as well, through trails, bikeways, and access points to the water for fishing and canoe/kayak launching.

The importance of a healthy, intact buffer zone (also referred to as a “riparian corridor”) has been well documented scientifically over the past 20 years, especially for headwater streams. There is less agreement and much continuing research on the appropriate minimum width of a buffer. In literature on this issue, a recommended minimum buffer width of 100 feet is most common. Buffers of up to 300 feet are recommended for wildlife corridors and potential passive recreational use, such as walking trails.

The New Jersey Freshwater Wetlands Protection Act incorporates buffer requirements into its wetland protection regulations. The width of the “transition zone” extending beyond a wetland is determined by the value of the wetland, based on its current use and on the documented presence/absence of threatened or endangered species. Municipalities may not establish

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[7] Center for Watershed Protection**.** *Rapid Watershed Planning Handbook: A Comprehensive Guide for Managing Urbanizing Watersheds*. Produced for the U.S. EPA, Office of Wetlands, Oceans and Watersheds. Ellicott City, MD: Center for Watershed Protection, Inc., 1998. pp. 1.21–1.25.

wetlands buffers that exceed those required by the state statute. However, municipalities can monitor the use of the land within the transition area and take action against encroachments.

Restoration of stream buffers on agricultural lands is supported by various programs of the US Department of Agriculture (USDA) and the New Jersey Department of Agriculture, such as the Conservation Reserve Program (CRP), administered by the USDA's Farm Service Agency (FSA). This program compensates farming landowners for the loss of land being converted to a buffer or other habitat. It also funds or directly creates new buffers where they are absent. Programs such as the Environmental Quality Incentive Program (EQIP), administered by the Natural Resources Conservation Service (NRCS) of USDA, encourage the "due care" management of agricultural lands, involving the proper levels of fertilizer and pesticide applications to farmland. It funds up to 75 percent of the costs of eligible conservation practices. These are all programs in which individual landowners volunteer to take part.

Point Sources of Pollution

Point sources of pollution, which come from a single source or "point," such as an industrial pipe discharge, are regulated by NJDEP through the New Jersey Pollution Discharge Elimination System (NJPDES). New Jersey created NJPDES in response to the Federal Clean Water Act of 1972, which mandated that each state develop water quality standards and regulate the amount of pollution entering water bodies. The Act classified all water pollution into one of two categories: “point source” pollution and “non point source” pollution, but only required states to regulate point sources.

NJDEP, through the Division of Water Quality and the Bureau of Point Source Permitting, administers the NJPDES program (*N.J.A.C. 7:14A*). Under NJPDES, any facility discharging domestic or industrial wastewater directly into surface or ground water must apply for and obtain a permit for discharging. Rather than creating individually-tailored permits for each and every facility, the Division of Water Quality uses scientific standards to create and issue general permits for different categories of dischargers. Permits are available and required for surface water, ground water, storm water, combined sewer overflow, and residual discharges. NJDEP enforces the terms of NJPDES permits by visiting discharging facilities and conducting water quality, biological, and toxicological analyses and thermal impact and cooling water assessments.

Under the Open Public Records Act (OPRA) of 2002, a list of active NJPDES permits is available. As of September 30, 2004, 12 NJPDES permits were issued to individual facilities in Lawrence. These are shown in **Table 14: Lawrence Township NJPDES Permits**.

Stormwater Management Statewide Basic Requirements
Towns, Highway Agencies, and Institutions

1. Control post construction stormwater management in new development and redevelopment through:
    - Adoption of a stormwater management plan in accordance with N.J.A.C. 7:8.
    - Adoption and implementation of a stormwater control ordinance in accordance with N.J.A.C. 7:8. This ordinance requires retention on site of 100% of preconstruction recharge and use of low-impact design in stormwater facilities, among other features.
    - Ensuring compliance with Residential Site Improvement Standards for stormwater management. The RSIS is currently being revised to incorporate the low-impact design and other requirements of the stormwater control ordinance.
    - Ensuring long-term operation and maintenance of Best Management Practices on municipal property.
    - Requiring that new storm drain inlets meet new design standards.
2. Conduct local public education:
    - Distribute educational information (about stormwater requirements, nonpoint source pollution, and stewardship) annually to residents and businesses and conduct a yearly “event” (such as a booth with these messages at a community day).
    - Have all municipal storm drain inlets labeled with some type of “don’t dump” message.
    - Distribute information annually regarding fertilizer/pesticide application, storage, disposal, and landscaping alternatives.
    - Distribute information annually regarding proper identification, handling, and disposal of wastes, including pet waste and litter.
3. Control improper disposal of waste through improved yard waste collection and through adoption of ordinances (pet waste, litter, improper dumping, and wildlife feeding).
4. Control solids and floatables through increased street sweeping, retrofitting storm drain inlets during road repairs, and instituting programs for stormwater facility management, for roadside erosion control, and for outfall pipe scouring/erosion.
5. Improve maintenance yard operations, specifically for de-icing material storage, fueling operations, vehicle maintenance, and housekeeping operations.
6. Increase employee training about all of the above.

Fig. 3: Stormwater Management Basic Requirements

Since the adoption of the Federal Clean Water Act in 1972 and the implementation of NJPDES in subsequent years, water pollution from point sources has decreased drastically. However, as development has continued to spread throughout New Jersey, non point source pollution has increased substantially in recent decades. NJDEP’s new Stormwater Management Rules, described above, focus on reducing and controlling non point sources of water pollution.

Table 14: Lawrence Township NJPDES Permits

NJPDES Permit Number	Facility Name	Effective Start Date	Expiration Date	Discharge Category Description	Street Address
NJ0027618	Bristol-Myers Squibb*	7/1/2001	2/28/2006	Industrial Wastewater	Rt. 206 & Province Line Road
NJG0135836	Britton Industries, Inc.	4/1/2007	9/30/2008	Concrete Products Manufacturing (GP)	100 Bakers Basin Road
NJ0128635	Chapin School	8/1/2005	5/31/2008	Sanitary Subsurface Disposal (GP)	4101 Princeton Pike
NJ0024759	Ewing-Lawrence SA WTP*	7/1/2006	7/31/2006	Sanitary Wastewater	600 Whitehead Road
NJG0156183	Ewing-Lawrence SA WTP	6/1/2007	5/31/2012	Basic Industrial Stormwater GP – NJ0088315 (5G2)	600 Whitehead Road
NJG0166111	Ewing-Lawrence SA WTP	10/1/2006	5/31/2011	Wastewater Beneficial Reuse (GP)	600 Whitehead Road
NJ0032913	Headwaters Technology Innovation Group (HTIG)	4/1/2004	3/31/2009	Industrial Wastewater	1501 New York Ave
NJG0149560	Lawrence Twp	6/1/2005	2/28/2009	Tier A Municipal Stormwater General Permit	2207 Lawrenceville Road
NJG0075132	Lehigh Gas Corp	12/01/2003	11/30/2008	General Permit Groundwater Petroleum Product Cleanup	2551 Brunswick Pike

Source: NJDEP, NJPDES Active Permit List

** Expired permits are still listed on OPRA because the NJPDES sites may still be active, despite not having updated the permit.*

GROUNDWATER

Aquifers and Geological Formations

Principal aquifers in New Jersey are classified into two groups: Coastal Plain aquifers south of the Fall Line, and non-Coastal Plain aquifers north of the Fall Line. Lawrence Township is crossed by the Fall Line, which is the boundary between the Piedmont Plateau and the Atlantic Coastal Plain physiographic provinces. The two provinces contain different types of geologic outcrops, which affect groundwater supplies and recharge. Permeability of Piedmont Plateau soils is generally slow or moderate and runoff is more rapid. Coastal Plain soils are generally sandy or gravelly and permeability is moderate to rapid.

About two-thirds of the township lies in the Newark Basin, a part of the Piedmont Plateau that extends from the Hudson River Valley to the divide between the Schuylkill and Susquehanna river basins in Pennsylvania. The geology of the Newark Basin is composed of four sedimentary rock formations, three igneous rock formations, and diabase intrusives. The deposits form low ridges and valleys in the region that trend from northeast to southwest. The predominate aquifers within the basin are called, collectively, the Newark Group. They consist of the Passaic Formation, the Stockton Formation, and the Lockatong Formation. Together, these three bedrock aquifers provide 95 percent of the Newark Basin's water. The Lockatong Formation and the Stockton Formation make up the majority of Lawrence's geology.

Water from bedrock aquifers is drawn from joints and fractures, or networks of fractures, in the rock. The number and size of these joints and fractures decrease with increasing depth below the ground surface. Shallow parts of bedrock aquifers are generally unconfined, meaning they are not bounded by confining layers made of less permeable materials, while deeper sections may be semi confined or fully confined. Confining beds help slow the entry of any surface contaminants into the groundwater.

Most water in the Newark Group is found within 200 to 300 feet of the land surface. Sixty-five percent of all water is drawn from within 200 feet of the land surface and 85 percent of all water is drawn from within 300 feet of the land surface. Below 500 feet, there are fewer and smaller fractures in the rock, thus storing less groundwater.

The water quality of the Newark Basin aquifers tends to be satisfactory. Large portions of the aquifers are unconfined, or close to the surface of the land. Therefore, they are susceptible to local contamination. The groundwater is generally hard, containing more minerals than are found in surface water.

Stockton Formation

The Stockton Formation extends as a thin belt from Mercer County northward to Rockland County, New York. In Lawrence, it underlies 8,556 acres, or 61 percent of Lawrence, and runs across the width of the township, primarily to the south of Route 206. It is composed of very old sediments, which are highly erodible. The bottom half of the formation is composed of mostly fluvial deposits containing medium-to-coarse grained sandstones, siltstone, and conglomerates, while the upper half of the formation contains fine-grained sandstone and shale. Most water in the Stockton Formation is found within 500 feet of the land's surface in weathered and interconnected fractures. The water is frequently located in unconfined places, although locally it may be found in semi confined areas, depending on the layers of shale. The Stockton Formation is one of the most productive aquifers in this region. It can yield as much as 1,500 gallons of water per minute. The soils associated with this formation also are the best in the township for agricultural uses, septic filter fields and water retention.

Lockatong Formation

The Lockatong Formation lies between the Stockton and Passaic formations and is composed of less erodible rocks, such as gray and black shale and siltstone, as well as subordinate purple and red mudstone. The rock has both low permeability and porosity, and the fractures are widely spaced and tight, allowing little infiltration. Of the three formations, it is the poorest for storing water and is one of the lowest yielding aquifers in New Jersey. Soils associated with this formation are generally poorly drained and have a high water table. In Lawrence, the Lockatong Formation underlies 3,465 acres (25 percent of Lawrence) in the northern part of the township.

Passaic Formation

Of the three Newark Group formations, the Passaic Formation underlies the smallest portion of Lawrence, only 1,323 acres (9 percent of Lawrence). The Passaic Formation is the second-best water-bearing geologic formation in the township. The zone of water-storing joints and fractures in the Passaic Formation is estimated to be 200 to 600 feet thick. It has an extensive system of rock fractures, which enable it to store and move groundwater. The Passaic Formation is composed mostly of red mudstone, as well as subordinate gray, purple and black mudstone. The formation also is composed of sandstone and conglomerate containing glauberite and gypsum.

In addition to these major formations, igneous and metamorphic rock formations underlying small portions of Lawrence include the Gabbro and Wissahickon formations, as well as Gneiss Granofels and Migmatite. These bed outcrop formations occur only in the southern tips of the township (See **Map 12: Aquifers and Bedrock Geology**).

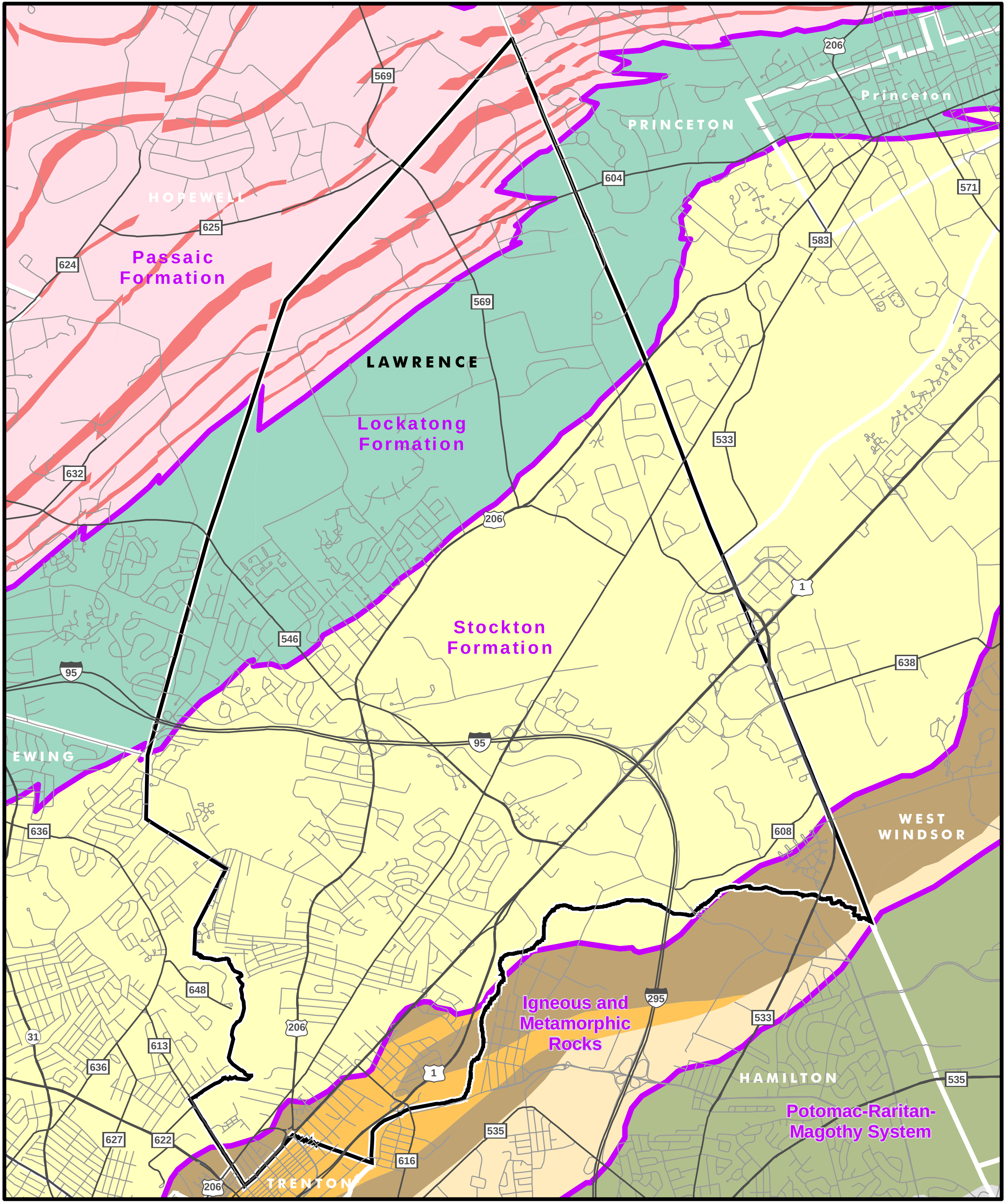
Drinking Water Supply

Most of Lawrence Township receives its drinking water from the Trenton Water Works (which obtains its water from the Delaware River) or the New Jersey American Water Company (which draws water from the Stockton Formation), but there are public water supply wells and private wells that draw on groundwater. Farmland irrigation also taps the aquifers.

There are seven public community water supply wells, as listed in **Table 15: Public Water Supply Wells** and shown on **Map 13: Public Water Supply Wells**. A public community water supply well is a well that has at least 15 service connections used by year-round residents, or regularly serves at least 25 year-round residents. An example of a public community water supply well is a municipal system that services single-family, residential homes. In Lawrence,

Lawrence Township

Map 12: Aquifers and Bedrock Geology



Sources : NJDEP, NJGS, NJDOT, DVRPC
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

▭ BEDROCK AQUIFERS

BED OUTCROP FORMATIONS

- 🟨 Wissahickon
- 🟧 Gabbro
- 🟫 Gneiss Granofels & Migmatite
- 🟥 Passaic - Gray Bed
- 🟪 Passaic
- 🟩 Potomac
- 🟩 Lockatong
- 🟨 Stockton

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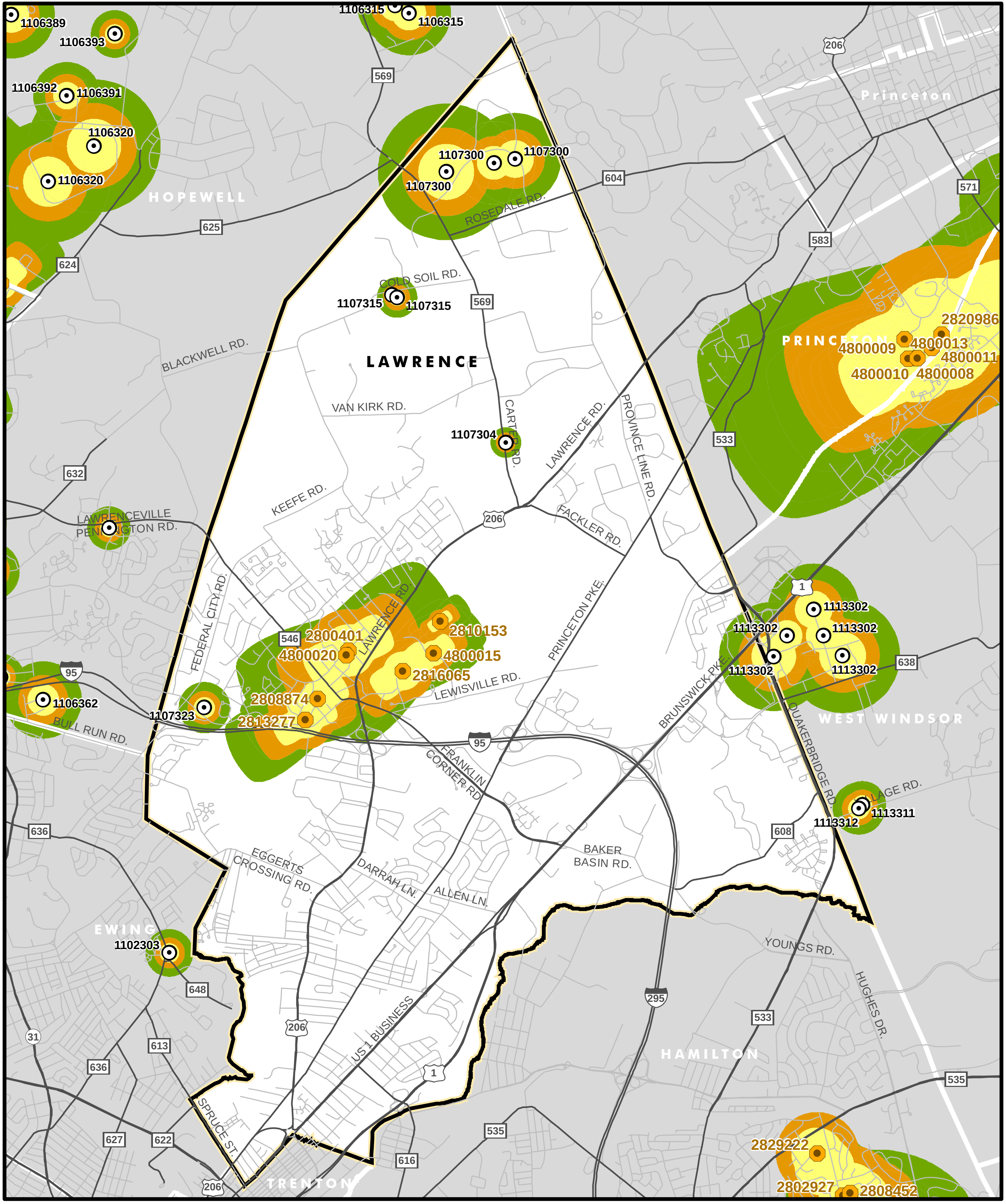
September 2007

Lawrence Township

Map 13: Public Water Supply Wells



Sources : NJDEP, NJGS, NJDOT, DVRPC
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

NJ Wells

⊙ Public Non-Community Water Supply Well (2004)

● Public Community Water Supply Well (2005)

Well Head Protection Areas
(Public Community, 2006
Public Non-Community, 2004)
Time of Travel

🟨 2 Years 🟧 5 Years 🟩 12 Years

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public community water supply wells are clustered around the junction of Routes 546 and 206 and tap into the Stockton Formation.

There are also seven public non community water supply wells in Lawrence, as shown on **Map 13: Public Water Supply Wells**. A Public Non Community Water Supply Well is a public water supply well used by institutions and businesses, as opposed to year-round residents, for at least 60 days of the year. These can include wells serving schools, factories, office buildings, rest stops, restaurants, motels, etc. The public non community water supply wells in Lawrence tap into almost all of the aquifers in the township and are located in the northern portion of the township, as well as along I-95, and Carter and Cold Soil roads.

Most private wells in Lawrence also probably drawn from the Stockton Formation, but since there is no comprehensive inventory of private wells available to municipalities, it is difficult to know for sure. Permits for private wells are held by the county health department, but there are many gaps in the records due to various factors, including well age. The 2002 Private Well Testing Act requires state-certified laboratory water testing in order to sell a residential property. Such testing will not identify what aquifers are being drawn upon by private wells, but will eventually provide better documentation of the quality of drinking water from private wells in an area.

Wellhead Protection Areas and Water Supply Wells

Because an outcrop is the area where an aquifer emerges on the land surface, preventing contamination of the land in aquifer outcrop areas is extremely important in order to maintain a safe drinking water supply. To protect aquifer outcrop areas, NJDEP established the Well Head Protection Program Plan in 1991. The program delineates Well Head Protection Areas (WHPAs) around public community and non community public water supply wells. A WHPA is the area from which a well draws its water within a specified time frame. Once delineated, these areas become a priority for efforts to prevent and clean up groundwater contamination. Other components of the Well Head Protection Plan include implementing best management practices to protect groundwater, land use planning, and education to promote public awareness of groundwater resources.

Delineating a Wellhead Protection Area (WHPA)

A WHPA consists of three tiers, each based on time of travel to the well:

Tier 1 = two years
Tier 2 = five years
Tier 3 = twelve years

Calculation of the tier boundaries is based on findings of how long specific contaminants can survive in groundwater, how much time would be required for specific remedies to be undertaken, and on the likelihood of natural dilution over distance. The tiers are shown as rings around a well, with the groundwater direction of travel factored in to create plume–like shapes.

Once WHPAs are delineated, potential pollution sources may be managed by owners or municipalities, in relation to the tier locations. Protection of land and restrictions on activities within wellhead zones relating to uses that generate contaminants, and to the storage, disposal, or handling of hazardous materials, is important for maintaining the quality of water in wellhead areas.

Table 15: Public Water Supply Wells

Well ID #	Original Owner	Aquifer	Depth to Top of Well Screen (feet)	Depth to Bottom of Well Screen (feet)
2800401	Lawrenceville Water Co	Stockton Formation	23.5	154
2808874	Lawrenceville Water Co	Stockton Formation	50	500
2810153	Lawrenceville School	Stockton Formation	50	310
2813277	Lawrenceville Water Co	Stockton Formation	59	510
2816065	Lawrenceville School	Stockton Formation	52	350
4800015	Lawrenceville School	Stockton Formation	50	257
4800020	Lawrenceville Water Co	Stockton Formation	unknown	unknown

Source: NJDEP

Groundwater Recharge

Recharge of groundwater is an important issue because of the dependence on aquifers for drinking water supply and agricultural use. The amount of rainwater that actually enters an aquifer and reaches the saturated zone to become groundwater is a function of many factors, including the nature and structure of the aquifer itself, climatic conditions, the nature of the soil, land use, and the vegetation of an area.

The New Jersey Geological Survey has developed a methodology for evaluating land areas for their ability to transmit water to the subsurface, using precipitation records, soil surveys, and land use/land cover data. NJDEP has used this methodology to map and rank land areas throughout the state as to groundwater recharge potential. Recharge is equivalent to the amount of precipitation per year that will reach the water table in an area with a particular combination of soils and land use. It is expressed as inches per year.

In Lawrence, lands with recharge rates between 13 and 16 inches per year, the highest in the township, are found in scattered patches, with the largest areas found in the northern part of the township and near the Little Shabakunk and Shipetaukin creeks. See **Map 14: Groundwater Recharge**. Often, areas with high recharge rates are located in the Coastal Plain province or along the border between the Coastal Plain and the Piedmont provinces, where the recharge of groundwater is high because the area is underlain by permeable, alluvial sediments. Some of these highly permeable soil series in Lawrence include Sassafras, Birdsboro, Evesboro and Galestown soils. Paving and other impervious cover has the greatest detrimental impact on high-recharge lands. Unfortunately, high-recharge lands are also usually the places most suitable for building because they have well-drained soils.

High-recharge areas are regions where the dilution of substances from septic systems, such as nitrates, may require a larger land area because the soils are more “porous.” In these areas, septic fields that are too closely spaced pose a threat of groundwater contamination because they do not provide adequate filters for pollutants. Minimum average lot sizes of two to four acres are often needed for proper nitrate dilution from septic systems in areas having ten or more inches per year of groundwater recharge.

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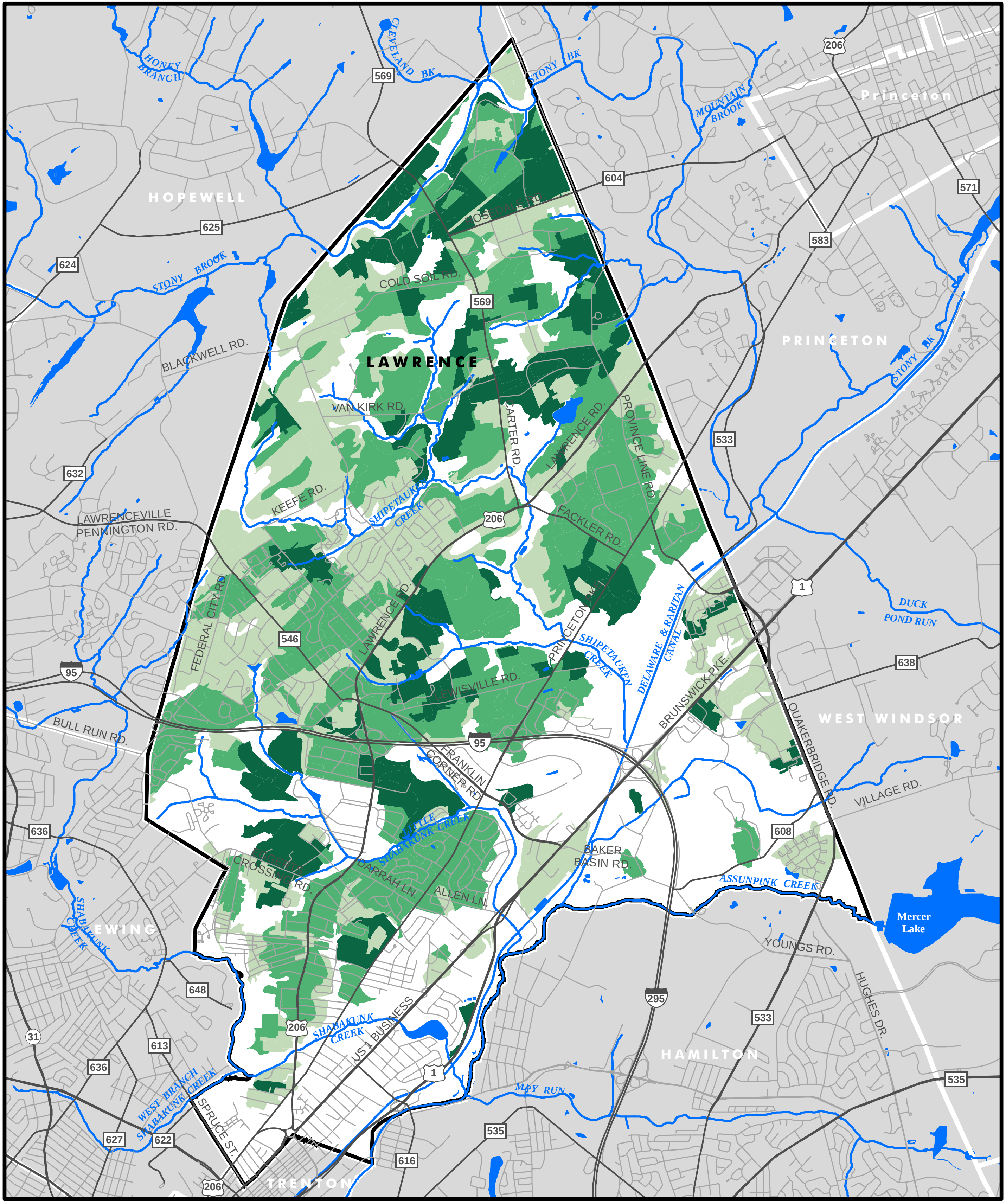
Map 14: Groundwater Recharge



INCHES PER YEAR

- ☐ 0 - 1
- 🟩 2 - 10
- 🟩 11 - 12
- 🟩 13 - 16

Sources : NJDEP, NJGS, NJDOT, DVRPC
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

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In addition, about 40 percent of the township's land experiences zero inches of groundwater recharge, primarily due to development and urbanization. Most of this land is located in the southern part of the township.

BIOLOGICAL RESOURCES

When a community protects wildlife and habitat, it is also protecting biodiversity, which is important for the health and productivity of the ecosystem and its inhabitants, including humans. Biodiversity refers to the variety of genetic material within a species population, the variety of species (plants, animals, microorganisms) within a community, and the variety of natural communities within a given region. Biodiversity facilitates adaptation and evolution, improving a species' chance of survival as the environment changes. A diversity of plant and animal species is also necessary to maintain healthy human environments, working landscapes and productive ecosystems. Lower organisms, many not well known, contribute to nutrient cycling, decomposition of organic matter, soil rehabilitation, pest and disease regulation, pollination and water filtering. Once biodiversity declines, it is extremely hard for an ecosystem to recover or replace species.

Scientists have discovered and named somewhere between 1.5 and 1.8 million plant and animal species in the world. Far more species, possibly 10 to 20 times the number of known species, are unknown to science. Alarmingly, this great diversity of species is now diminishing at an unprecedented rate. Researchers generally agree that the extinction rate is now catastrophically high, somewhere between 1,000 and 10,000 times the rate before human beings began to exert significant pressure on the environment. Given these trends, and barring significant increases in conservation efforts, approximately one-half of the world's species will be gone by the end of this century.[8]

While the decline of biodiversity appears to be a global problem, conservation needs to occur on both global and local levels if it is to succeed. Lawrence Township contains numerous types of habitats, all of which are important for maintaining biodiversity. Forested wetlands are the most common ecosystem type in Lawrence. Lawrence also contains significant acreages of herbaceous and scrub/shrub wetlands. Upland forests, which were once the most abundant type of natural habitat in Lawrence, are scattered throughout the township where land is dry and undeveloped. The following sections will identify and describe in more detail the plant and animal communities that inhabit these unique ecosystems within Lawrence.

NATURAL VEGETATION

A region's vegetation is dependent on many factors, the most important of which are climate and soils. Lawrence's climate is temperate, with rainfall ranging from 46 to 48 inches per year.[9] A sizable portion of Lawrence's soils are generally well drained, supporting a large diversity of trees and crops. Lawrence also contains a substantial amount of poorly drained soils that exhibit ponding and sustain wetland plants. For a detailed description of Lawrence's soils see *Soils* on *page 21.*

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[8] Wilson, Edward O. *The Future of Life.* New York: Vintage Books, 2002. pp. 14 99-102.

[9] United States Department of Agriculture. Natural Resource Conservation Center. New Jersey Precipitation Data/Maps. ftp://ftp.ftw.nrcs.usda.gov/pub/ams/prism/maps/nj.pdf

Lawrence's natural vegetation types, along with human-influenced types of land cover, have been tabulated and mapped by NJDEP's 2002 land cover analysis. These data, based on infrared aerial photography, are the most recent available. The designation of a particular land cover as a vegetation type is based on definitions provided by the Anderson Land Use Classification System, created by the US Geologic Survey. See **Map 15: Natural Vegetation (2002)**.

Table 16: Lawrence Township Natural Vegetation

Natural Vegetation Type	Acres	% of Total Land Area
Upland Deciduous Forest	1,169	8.31%
Upland Coniferous Forest	23	0.16%
Upland Mixed Forest	37	0.26%
Brushland/Shrubland	432	3.07%
Lakes	74	0.53%
Wetlands	2,714	19.29
Modified Wetlands	342	2.43%
Old Field	154	1.09%
Total	**4,945**	**35.16%**

Source: NJDEP (2002 Land Cover)

Wetlands

Wetlands are defined as areas that are inundated or saturated by surface or ground waters at a frequency to support vegetation suited for life in saturated soils.[10] New Jersey's wetlands are located around the numerous interior stream systems and along coastal rivers and bays. NJDEP, which employs USGS guidelines, classifies wetlands with naturally occurring vegetation into two major categories: (1) *tidal wetlands*, which are wetlands associated with tidal portions of the Delaware River system and waterways draining into the Atlantic Ocean; and (2) *interior wetlands*, which are wetlands found in nontidal lowlands associated with waterways, and isolated wetlands surrounded by uplands. NJDEP also identifies *modified wetlands*, which are areas that have been altered by human activities and do not support typical natural wetlands vegetation, but which do show signs of soil saturation on aerial infrared surveys.

Wetlands are a critical ecological resource, supporting both terrestrial and aquatic animals and boasting biological productivities far greater than those found on dry land. Wetlands play a vital role in maintaining water quality by cleaning surface and ground waters. The ecological importance of wetlands, however, has not always been appreciated. For over three centuries, people drained, dredged, filled, and leveled wetlands to make room for development and agriculture. Although the pace of wetland destruction has slowed markedly in the past three decades, human activities destroyed approximately 115 million of the original 221 million acres

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[10] NJDEP. "Anderson Land Use Classification System." Originally derived from "A Land Use and Land Cover Classification System for Use with Remote Sensor Data" U.S. Geological Survey Professional Paper 964, 1976.

of wetlands in the United States from the beginning of European settlement through to the late 1980s.[11]

The location and type of vegetation are key features for classifying wetlands. Virtually all wetlands in Lawrence are found in association with the major streams and their tributaries. Being inland, Lawrence contains no tidal wetlands. Freshwater, deciduous wooded wetlands, particularly along the Shipetauken Creek, the Assunpink Creek, and the Delaware and Raritan Canal, are the dominant category of wetlands in the township. These wetlands are "palustrine" wetlands (stream-associated, versus "lacustrine" or lake-associated) and are usually covered with deciduous trees or shrubs, although some evergreen trees or shrubs may be present. Shrubs are also the dominant plants where wetlands are recovering from past impacts. See **Map 9: Surface Water, Wetlands, and Vernal Pools.**

Interior wetlands provide high-quality animal and plant habitat, purify the township's surface and ground water, and create picturesque landscapes that add immeasurably to the quality of life for township residents. Lawrence has three major types of interior wetlands: (1) wooded wetlands dominated by deciduous trees; (2) scrub/shrub wetlands; and (3) herbaceous wetlands. See **Map 15: Natural Vegetation (2002)**.

Wooded wetlands (primarily deciduous) occupy about 2,158 acres of Lawrence and support mixed hardwoods that flourish in lowlands. All of the creeks in the township and their tributaries support some wooded wetlands. Closely associated with deciduous wooded wetlands are scrub/shrub wetlands, occupying about 215 acres. Most scrub/shrub wetlands are found along the Shipetaukin Creek and its tributaries.

Herbaceous wetlands occupy 268 acres. These wetlands generally occur along lake edges, in open floodplains, and in former agricultural fields. Herbaceous wetlands are found in close proximity to scrub/shrub and wooded wetlands along the Shipetaukin Creek and its tributaries. Herbaceous wetland plants include rice cutgrass, reed cutgrass, reed canary grass, pond lily, tearthumb, arrow-leafed tearthumb, broadleaf cattail, and the common reed (*Phragmites*).

Lawrence's modified wetlands encompass agricultural wetlands, former agricultural wetlands, disturbed wetlands and wetlands that occur in maintained greenspaces, such as lawns, golf courses and stormwater swales. Modified wetlands differ from non modified wetlands in that they do not support the typical natural wetlands vegetation found in analogous unaltered natural areas, although they do exhibit evidence of soil saturation. In total, modified wetlands occupy 342 acres.

Table 17: Wetlands in Lawrence Township

Wetlands	Acreage
Agricultural Wetlands (Modified)	202.74
Coniferous Scrub/Shrub Wetlands	4.37
Deciduous Scrub/Shrub Wetlands	99.30
Deciduous Wooded Wetlands	2,151.05

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[11] Dahl, T.E. *Wetlands losses in the United States 1780s to 1980s*. Washington, D.C.: Department of the Interior, U.S. Fish and Wildlife Service, 1990.

Wetlands	Acreage
Disturbed Wetlands (Modified)	46.69
Former Agricultural Wetland (Becoming Shrubby, Not Built-Up)	13.07
Herbaceous Wetlands	268.40
Managed Wetlands in Built-Up Maintained Rec. Area	12.47
Managed Wetland in Maintained Lawn Greenspace	66.95
Mixed Scrub/Shrub Wetlands (Coniferous Dom.)	49.34
Mixed Scrub/Shrub Wetlands (Deciduous Dom.)	62.33
Mixed Wooded Wetlands (Coniferous Dom.)	1.85
Mixed Wooded Wetlands (Deciduous Dom.)	4.30
Phragmites Dominate Interior Wetlands	1.25
Wetland Rights-of-Way	71.57
Total	**3,055.66**

Source: NJDEP (2002 Land Cover)

Upland Forests

Upland areas are those locations without water at or near the soil surface. Most of Lawrence's original upland forests have been cleared and converted to farms or residential or commercial development. Today's upland forests are second or third growth and tend to be located near stream corridors, on steep slopes, or on less desirable soils. Approximately 1,229 acres, or nine percent of Lawrence's land area, is upland forest. See **Map 15: Natural Vegetation (2002)**.

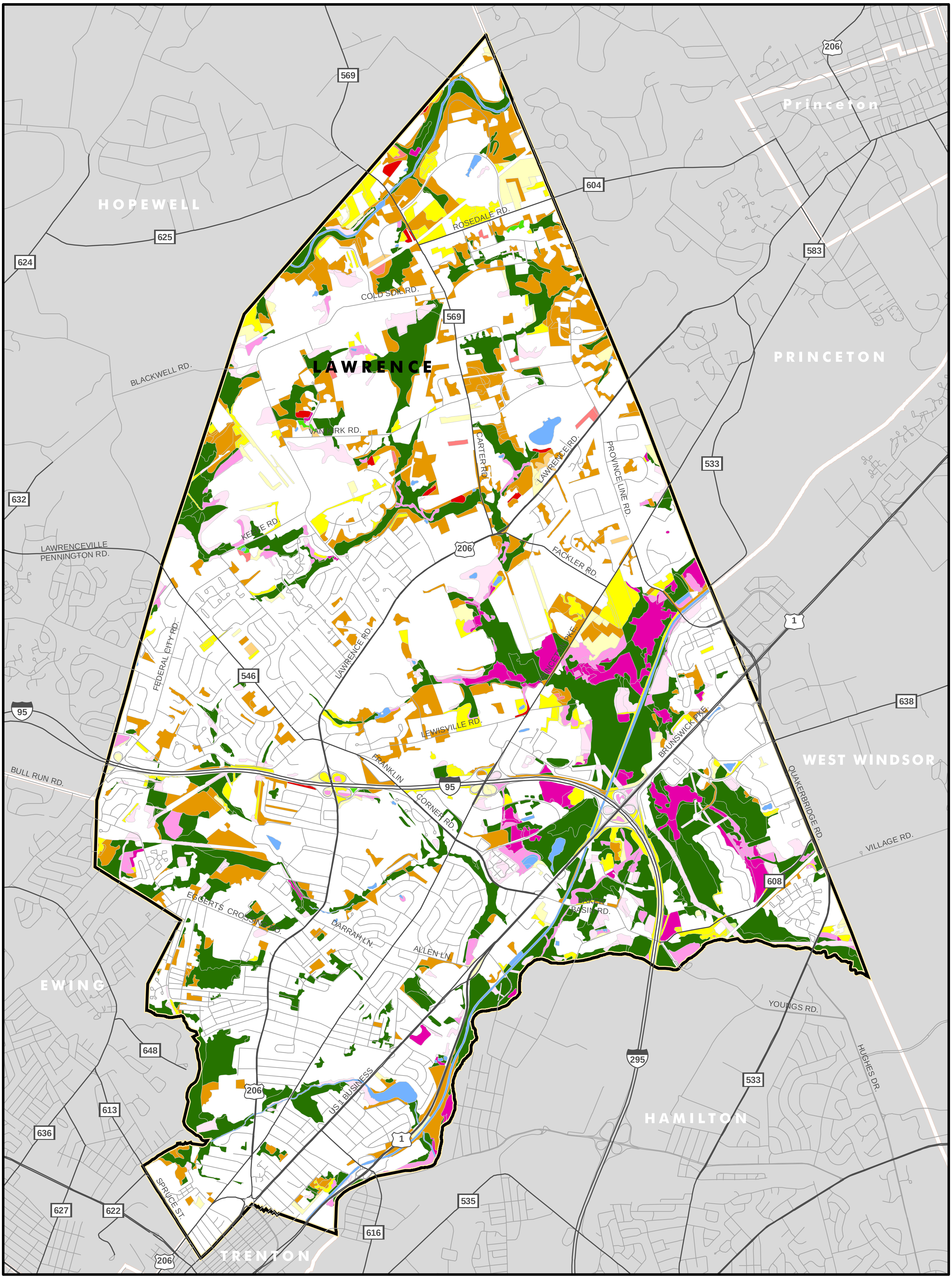
The majority of Lawrence's upland forest is deciduous forest (1,169 acres). Some of this upland forest has been preserved by the creation of parks, such as Drexel Woods, Tiffany Woods, and Carson Road Woods. The composition of Lawrence's upland deciduous forests is largely one of mixed oaks—black, red, pin, and white oaks—joined by other hardwoods, such as ash, birch, maple, beech, hickory, locust, poplar, and sweetgum. The understory is dominated by flowering dogwood, black cherry, ironwood, and sassafras. Vines, such as wild grapes, Virginia creeper, Japanese honeysuckle, and poison ivy, greenbriar, and Asiatic bittersweet are common. Winterberry, holly, elderberry, spicebush, arrowwood viburnum, swamp azalea, honeysuckle, sweet pepperbush, and black haw are common shrubs in moister locations.

Coniferous forests cover only about 23 acres of Lawrence. These forests are mostly made up of successional, or pioneer, plants, like Eastern red cedar, Virginia pine, scrub pine, and pitch pine, which will eventually be overgrown by dominant deciduous trees, such as oak, ash, birch, and hickory.

Grasslands and Agricultural Lands

Grasslands are considered to be one of the most endangered ecosystems globally. They are threatened by human development, new agricultural technology, grazing, desertification, soil erosion, and invasive species.

Lawrence Township — Map 15: Natural Vegetation (2002)



Sources : NJDEP,NJDOT,DVRPC.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

VEGETATION

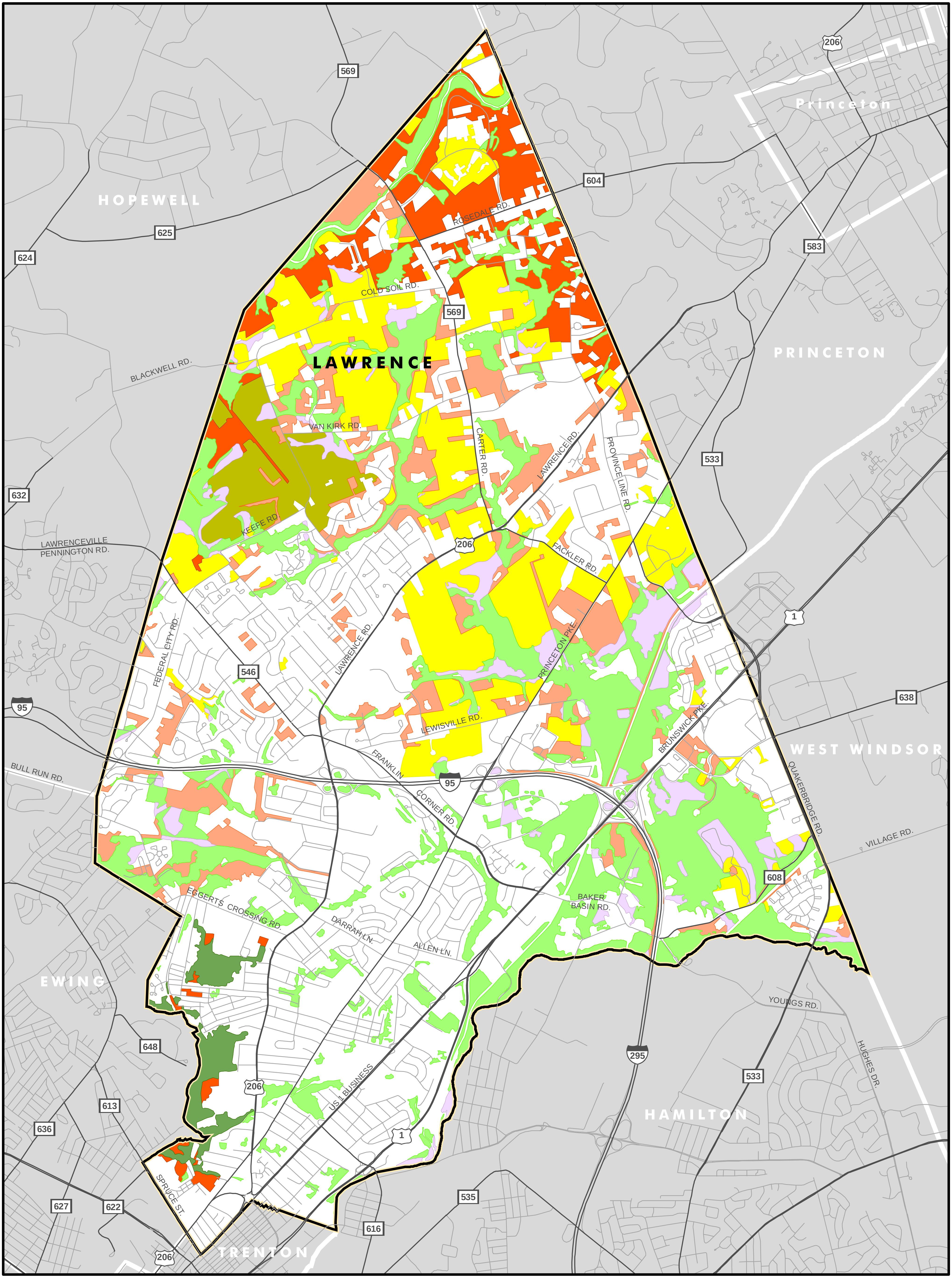
- ■ Brush/Shrubland
- ■ Brush/Shrubland - Oldfield
- ■ Lake or Stream
- ■ Upland Forest - Coniferous
- ■ Upland Forest - Mixed (Conif. dom.)
- ■ Upland Forest - Deciduous
- ■ Upland Forest - Mixed (Decid. dom.)
- ■ Wetlands - Modified
- ■ Wetlands - Scrub/Shrub
- ■ Wetlands - Herbaceous
- ■ Wetlands - Wooded - Decid.
- ■ Wetlands - Wooded Mixed
- ■ Wetlands - Phragmites dom.
- ■ All Other Land Cover

0 0.25 0.5 1
Miles

Delaware Valley
Regional Planning Commission
September 2007

Lawrence Township

Map 16:
Landscape Project Habitat Priorities (2004)



Sources : NJDEP,NJDOT,DVRPC.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

TYPE OF CONSERVATION PRIORITY

GRASSLANDS	FORESTED WETLANDS	UPLAND FOREST	EMERGENT WETLANDS
🟩 Critical Habitat	🟩 Critical Habitat	🟥 Critical Habitat	🟪 Suitable Habitat
🟨 Suitable Habitat	🟩 Suitable Habitat	🟧 Suitable Habitat	

0 0.25 0.5 1
Miles

N

Delaware Valley
Regional Planning Commission
September 2007

Grasslands are important habitats because they preserve large amounts of open space and provide habitat for specialized species, such as grassland birds. Many species of grassland birds require large contiguous patches of grassland for successful breeding and roosting.

NJDEP defines grassland habitat as brushland, shrubland, or old fields that were cleared or disturbed at one time and then abandoned. Following abandonment, old fields are overgrown by perennial herbs and grasses. These pioneer plants remain the dominant species for 3 to 20 years. Later, woody plants take over. This habitat is visible, especially along wood edges, roadsides, and in landscapes where mowing is infrequent and where woody plants are not yet the dominant vegetation.

In Lawrence, 586 acres, or four percent of the land cover, is classified as brushland, shrubland or old fields. Brushland and shrubland are generally found adjacent to residential, commercial and industrial development, while old fields occur more often near agricultural or wetland areas. In addition to brushland, shrubland, and old fields, active agricultural cropland and pastureland is considered suitable “grassland” habitat for species that forage or nest on open land. Agricultural cropland and pastureland cover over 10 percent of the township’s land area. See **Map 15: Natural Vegetation (2002)**.

Photo by Chris Linn

Meadow and Drexel Woods near the Lawrence Nature Center

LANDSCAPE PROJECT PRIORITY HABITATS

The Landscape Project, developed by the Endangered and Nongame Species Program of the NJDEP Division of Fish and Wildlife, identifies and documents the value of wetland, grassland, and forest habitat within New Jersey. It categorizes these habitats into one of five groups according to their importance (five being the highest). Categories three through five include habitats throughout the state that possess two exceptional conditions: (1) a documented occurrence of one or more species on either the federal or state threatened and endangered species lists; and (2) a sufficient amount of habitat type to sustain these species. These habitats are collectively known as "critical habitat." Categories one and two include habitats that either have a documented occurrence of a *species of special concern* in New Jersey, or are habitat deemed suitable for species that are included on the state or federal threatened and endangered species lists, but for which there are no documented occurrences or sightings. These habitats are labeled "suitable habitats."

The Landscape Project identifies both critical and suitable habitat in Lawrence. It is important to preserve both levels of habitat in order to maintain the diversity of species that still exists in the township. See **Map 16: Landscape Project Habitat Priorities (2004)** and **Table 18: Landscape Project Habitat Rankings-Acreage in Lawrence Township**.

Landscape Project Data on Wetland Habitat

The Landscape Project divides wetland habitats into two types—forested and emergent wetlands. Emergent wetlands are marshy areas characterized by low-growing shrubs and herbaceous plants in standing water. About 496 acres in Lawrence are identified as priority emergent wetlands habitat. All of these acres are ranked as "suitable habitat." Animals that can be found in wetland habitats include rare fish, mollusks, crustaceans, and insects. Emergent wetlands are also important habitat for migratory waterfowl and passerines (small perching birds), such as migrating flycatchers and warblers.

Lawrence's forested wetlands are the second most common priority habitat type in the township, occupying 2,479 acres, of which 171 are ranked as "critical habitat." Critical forested wetlands are located along the Shabakunk Creek and on the National Guard Armory property in the southeastern corner of the township. Forested wetlands support species such as migratory and nesting warblers, many of which are species of special concern. They can also be home to various rare amphibians (frogs and salamanders).

Landscape Project Data on Upland Forest Habitat

The most common habitat type in Lawrence is upland forest. The Landscape Project ranked 2,480 acres as suitable, and 1,136 acres as critical, upland forest habitat within Lawrence. The majority of critical upland forest is located in the northern tip of the township in the vicinity of Stony Brook and Rosedale Road, with a significant portion of the acreage located on the ETS campus. Another sizable patch of critical upland forest can be found in Mercer County Park Northwest. Finally, a few small patches of critical upland forest can be found adjacent to critical forested wetlands in the southeastern corner of the township near Shabakunk Creek.

Table 18: Landscape Project Habitat Rankings-Acreage in Lawrence Township

Category	Rank	Acres	% of Total Habitat	% of All Lawrence Land
Emergent Wetlands	Suitable Habitat (1)	89.28	1.05%	0.63%
	Suitable Habitat (2)	407.20	4.81%	2.89%
Forested Wetlands	Suitable Habitat (1)	828.31	9.78%	5.89%
	Suitable Habitat (2)	1479.54	17.47%	10.52%
	Critical Habitat (3)	170.83	2.02%	1.21%
Upland Forest	Suitable Habitat (1)	457.48	5.40%	3.25%
	Suitable Habitat (2)	2022.71	23.88%	14.38%
	Critical Habitat (3)	507.67	5.99%	3.61%
	Critical Habitat (4)	628.61	7.42%	4.47%
Grassland	Suitable Habitat (2)	1537.37	18.15%	10.93%
	Critical Habitat (3)	340.53	4.02%	2.42%
Total Habitat		**8469.53**	**100.00%**	**60.21%**
Total Lawrence Land		**14066.00**		**100.00%**

Source: NJDEP

Landscape Project Data on Grassland Species Habitat

The Landscape Project designates 1,537 acres of the township as suitable grassland-species habitat. Most of this habitat is found along Shipetaukin Creek and its tributaries in the central and north-central regions of the township. A large portion of this suitable grassland area is located on and immediately to the west of the Lawrenceville School Golf Course. An additional 340 acres of grassland, found almost entirely in or adjacent to Mercer County Park Northwest, is ranked as critical grassland-species habitat. Grassland-dependent species are the most threatened group of species in New Jersey, primarily because the most common form of grassland habitat—agricultural fields—is the most threatened habitat in the state due to development pressure and rising land values.

A significant portion of land designated as critical or suitable grassland-species habitat within Lawrence is agricultural land. The designation of agricultural land as grassland habitat occurs for the following reasons: (1) migrating birds cannot visually distinguish cropland from grassland; (2) cropland turns into grassland when it is fallow for one year or more; (3) some crops, like alfalfa and soybeans, provide suitable nesting habitat for several bird species, such as sparrows; (4) all or most endangered and threatened birds are area sensitive, requiring large ranges that include agricultural "grasslands;" and (5) agricultural land provides important disturbance buffers, separating humans and domestic predatory animals like dogs and cats from rare and endangered bird species.

Examples of grassland-dependent species that use grassland habitat for nesting or feeding include the grasshopper sparrow and bobolink, and some species of butterflies and moths. Lawrence's designated grassland habitat also provides suitable habitat for migrating birds.

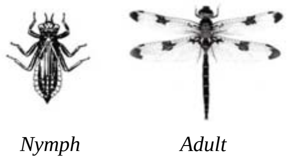
ANIMAL COMMUNITIES

Although no comprehensive inventory of the different animal species within New Jersey, Mercer County, or Lawrence Township exists, there are records of sightings, biological studies of range, and assessments of endangered and threatened status that can be used to identify and describe known and possible animal communities in Lawrence. A list of animal and plant species found in the 184-acre Carson Road Woods, which is located in the northern part of Lawrence, is provided in **Appendix C**. This biological inventory was conducted by the Washington Crossing Audubon Society in 2003. In addition, a list of animal and plant species found on the Pole Farm Property (Mercer County Park Northwest) is included in **Appendix D**. This biological survey was also conducted by the Washington Crossing Audubon Society. Both lists generally apply to Lawrence as a whole.

Invertebrates

Invertebrates are the basis of a healthy environment and are part of every food chain – either as food for amphibians and fish, or as a part of nutrient cycling systems that create and maintain fertile soils. Though they are the most abundant and diverse animal life forms, they are not generally well recognized and their fundamental role in sustaining natural systems is often not fully appreciated.

Dragonflies



The Dragonfly Nymph – a Common Macroinvertebrate found in New Jersey's waterways

Invertebrates consist of insects (beetles, butterflies, moths, ants, dragonflies, termites, bees, flies, wasps and others), arachnids (spiders, ticks and mites), crustaceans (crayfish, microscopic copepods), mollusks (mussels, clams, snails and slugs), and worms.

Macroinvertebrates are invertebrates that are visible to the naked eye but smaller than 50 millimeters. Benthic (bottom dwelling) macroinvertebrate communities provide a basis for ecological monitoring and are relatively simple to collect from shallow stream bottoms. Monitoring the presence of macroinvertebrates reveals the effect of pollutants over a long period of time. The Ambient Biomonitoring Network (AMNET) surveys streams for macroinvertebrate communities, which are an indicator of water quality, as discussed in the *Surface Water Quality* section of this document *(page 46)*.

There are nine endangered invertebrate species (two beetle species, four butterfly species, and three mussel species) and eight threatened invertebrate species (three butterfly species and five mussel species) in the State of New Jersey. Three of these species can be found in Lawrence: the endangered brook floater (a mussel), the threatened triangle floater (a mussel), and the threatened eastern pondmussel. At one time freshwater mussels were abundant in the streams of Lawrence and a major food source for native peoples. Unfortunately, due to destruction of suitable aquatic habitats by dams and pollution, the native mussel population has sharply declined. Of those species on the New Jersey Endangered and Threatened list, one, the dwarf wedgemussel, is listed as endangered under the Federal Endangered Species Act.

Vertebrates

Vertebrates are less numerous than invertebrates, but their larger size makes them much more visible, and they are thus better studied and recorded. Fish species are fairly well documented, as are mammals. Birds that nest in the township are known, but migrants that depend on Lawrence's wet forests as stopover sites in which to rest and feed are not as thoroughly inventoried.

Mammals

Mammals appear to be abundant because they tend to be larger and live in habitats also ideal for human development. There are over 500 mammal species in New Jersey, of which only nine are listed as endangered and none are listed as threatened by the state. Six of these species are whales and, of the three land-based species, only one of these, the bobcat, is found in Lawrence Township. Some common mammals found in Lawrence include cottontail rabbits, eastern gray squirrels, skunks, little brown bats, white-tailed deer, opossums, and raccoons.

Deer Management in New Jersey

Management of white-tailed deer is an issue throughout New Jersey. While many residents prize the presence of mammalian life, mammals often come into conflict with humans in suburban areas. The White-Tailed Deer presents a classic case of this conundrum. Conflicts often arise when humans and deer compete for the same space. According to the US Department of Agriculture, deer cause more damage to agricultural crops than any other vertebrate wildlife species, and farmers in densely human-populated areas appear to be the most affected. Additionally, deer can devastate the under-story of forests through overgrazing, destroying the growth of seedlings and young trees. Finally, as most motorists are well aware, collisions between deer and automobiles frequently result in serious damage.

Controlling deer numbers has become increasingly difficult in New Jersey for numerous reasons, including: (1) hunters have less access to land inhabited by deer; (2) some communities pass ordinances prohibiting hunting; (3) public and private groups establish deer refuges; (4) suburban housing patterns prevent hunting and provide year-round food for deer; (5) public and private groups oppose deer hunting; and (6) the number of hunters in the state has declined.
To minimize human-deer conflicts, the New Jersey Agricultural Experiment Station recommends both lethal and non lethal deer management options for community-based deer management programs. For example, municipalities can extend the hunting season, issue depredation permits to private landowners, engage in sharp shooting, and employ traps and euthanasia to reduce deer numbers. Alternatively, communities and private landowners can choose to apply more costly, non lethal deer management strategies, such as installing reflectors and reducing speed limits on rural roads to decrease deer-vehicle collisions, modifying habitat by planting bad tasting plants on commercial and residential properties, using taste-based and odor-based repellents, and employing traps and translocation techniques.

While current deer problems should be addressed, it is important to note that increasing conflicts between deer and human populations arise as suburban communities spread into once rural areas. The most effective way then to avoid a continuing expansion of conflicts between deer and humans is to preserve the wild habitats to which deer naturally belong.

Fish

When European settlers arrived in present-day Mercer County, they encountered Native Americans who regularly fished along the inland streams and gathered mussels in the Delaware River. Due to the unintended consequences of urban development, industrial advancement, and mechanized agriculture, the amount and diversity of aquatic life has decreased dramatically throughout most of New Jersey.

The New Jersey Division of Fish and Wildlife, under the Bureau of Freshwater Fisheries, monitors and actively aids the propagation, protection, and management of the state's freshwater fisheries. The Bureau raises several million fish for stocking in suitable waterbodies and conducts research and management surveys. Based on survey data supplied by the Bureau, Lawrence's freshwater streams may contain the following fish: redbreasted sunfish, blue gill sunfish, white sucker, chain pickerel, pumpkinseed, eastern mudminnow, common shiner, largemouth bass, tesselated darter, and the American eel.

N.J. Department of Environmental Protection Freshwater Fish Advisories

Fishing provides enjoyable and relaxing recreation, and many people like to eat the fish they catch. Fish are an excellent source of protein, minerals, and vitamins, are low in fat and cholesterol, and play an important role in maintaining a healthy, well-balanced diet.

However, certain fish may contain toxic chemicals, such as polychlorinated biphenyls (PCBs), dioxins, or mercury, which accumulate in water and aquatic life. Chemical contaminants such as dioxin and PCBs are classified by the U.S. Environmental Protection Agency as probably cancer-causing substances in humans. Elevated levels of mercury can pose health risks to the human nervous system. Infants, children, pregnant women, nursing mothers, and women of childbearing age are considered to be at higher risk from contaminants in fish than other members of the general public. Since 1982, NJDEP catches fish at numerous sampling stations throughout the state and tests for contaminant levels, adopting advisories to guide residents on safe consumption practices.

NJDEP issued a fish advisory for the following species of fish in Mercer County: largemouth bass, smallmouth bass, striped bass, chain pickerel, yellow bullhead, sunfish, brown bullhead, American eel, striped bass, channel catfish, white catfish, and bluefish. Recreational fishermen and women should regularly check for local fish advisories on NJDEP's Division of Science, Research and Technology web site: http://www.nj.gov/dep/dsr/njmainfish.htm

US EPA General Consumption Guidelines

- If possible, eat smaller amounts of several different types of fish rather than a large amount of one type that may be high in contaminants. Consume species of fish that have lower levels of contaminants, such as fluke or flounder.
- Smaller fish of a species will usually have lower chemical levels than larger fish in the same location because contaminants tend to buildup in the fish over time. It is advisable to eat smaller fish (of legal size) more often than larger fish.

Birds

There are over 500 species of birds in New Jersey, which is an exceptional number given the state's small size. New Jersey is an important location for migratory birds heading south for winter. Not only is the state an important "rest stop" for birds migrating to warmer climates in Central and South America, but also the New Jersey Atlantic coast and the Delaware Bay are major parts of the Eastern Flyway (established migratory air route) in North America.

Common birds in Lawrence are ducks, woodpeckers, geese, swallows, jays, robins, wrens, sparrows, and some hawks. The threatened grasshopper sparrow and bobolink have been sighted in the township, as has the Cooper's hawk.

Important Bird Areas

Lawrence contains portions of two "Important Bird Areas" (IBAs): the Pole Farm IBA and Brandon Farms IBA. The Important Bird Area Program began as an international initiative for saving bird and wildlife habitat. In North America, the IBA Program is carried out by chapters of the Audubon Society in 46 states. The state IBA Programs have succeeded in protecting tens of thousands of acres of bird habitat and raised public awareness about habitat protection. In New Jersey, the New Jersey Audubon Society, in cooperation with the New Jersey Endangered and Non-game Species Program (ENSP) and the National Audubon Society, runs the Important Bird and Birding Area (IBBA) program. This program identifies not only Important Bird Areas, but also areas important for bird watching.

In New Jersey, for a site to qualify as an IBA, it must meet at least one of four primary criteria. These criteria include: the presence of species of conservation concern; the presence of "regional responsibility species;" the capacity to hold "significant congregations" of one or more bird species; and the presence of exceptionally high numbers of birds during migration relative to the surrounding areas.

Pole Farm IBA is nearly bisected by the Lawrence-Hopewell township boundary. It is bounded by Blackwell Road to the north, Cold Soil Road to the east, Keefe Road to the south, Federal City Road to the west, and Lawrenceville-Pennington Road to the southwest. It is approximately 800 acres and is owned by the Mercer County Park Commission. The habitat of this IBA consists of mostly non tidal wetlands and fallow fields. In addition, there is some shrubland and deciduous forest on the parcel. The Pole Farm IBA is a wintering home for the Northern Harrier, a New Jersey species of Special Concern. Regional Responsibility species, such as the Northern Flicker, Chimney Swift, Wood Thrush and Eastern Towhee, can also be found on the property.

Although Brandon Farms IBA lies primarily in Hopewell Township, a portion of its southeastern edge lies in Lawrence Township. The 1000-acre IBA is bounded by Route 95, Route 31, and Federal City Road. Stockton College of New Jersey owns part of Brandon Farms IBA, while the rest encompasses private land. The area is covered primarily by mixed woods and shrubland. Brandon Farms IBA is home to Regional Responsibility Species, such as Eastern Towhees, Wild Turkeys, Wood Thrushes, Mallards, Northern Flickers, American Woodcocks and Gray Catbirds.

Resident Canada Goose Populations

The State of New Jersey now has a "resident" Canada goose population of approximately 100,000 birds that no longer migrate to more southern locales. This population may double in size in the next five to ten years. While geese are a valuable component of the urban/suburban environment by providing enjoyable wildlife opportunities for the public, they can also cause property and environmental damage. Goose droppings that wash into lakes during storm events can elevate coliform bacteria to unhealthy levels, closing lakes to swimming. Goose droppings limit human use of grassy areas in parks, and because geese can be quite aggressive during the nesting season, they can potentially injure humans.

Removing geese or preventing them from residing in park areas is a difficult task. Because geese move freely, the most effective management solutions are best conducted at the community level. Canada geese are protected by the Migratory Bird Treaty Act. Therefore, a management program may require the US Department of Agriculture's approval. Management techniques include planting shrubby vegetation around streams, lakes, and ponds to block waterfowl access, discouraging humans from feeding geese, and removing geese eggs and replacing with them decoys.

Federal Endangered Species Act*

An "Endangered" species is in danger of extinction throughout all or a significant portion of its range

A "Threatened" species is one that is likely to become endangered in the near future

New Jersey Endangered Species Act**

An "Endangered" species is in danger of immediate extinction within the state due to one of several factors: loss or degradation of habitat, over exploitation, predation, competition, disease, or environmental pollution.

A "Threatened" species is one that may become endangered if environment conditions continue to deteriorate. It is vulnerable due to one of several factors: small population size, restricted range, narrow habitat affinities, or significant population decline.

A species of "Special Concern" is one that warrants special attention because of the evidence of population decline, environmental deterioration, or habitat modification that would result in becoming Threatened. Special Concern status also extends to species whose population size is unknown or unstudied.

* Definitions adapted from U.S. Fish and Wildlife Service, "Listing a Species and Threatened or Endangered: Section 4 of the Endangered Species Act." Washington, DC: February 2001.
** Definitions adapted from N.J. Division of Fish, Game, and Wildlife, Endangered and Non-game Species Program, "Status Definition." Trenton, NJ: April 2002.

Common Reptiles and Amphibians

Reptiles can be quite elusive when surveys attempt to document them. Amphibians of some types are abundant, such as bullfrogs. Other species are rare because they depend on vernal pools, as was discussed in the *Surface Water Resources – Vernal Pools* section of this document *(page 44).* In Lawrence Township, the eastern box turtle, wood turtle, spotted turtle and Fowler's toad – all threatened or species of special concern – have been sighted in the last several years.

Threatened and Endangered Vertebrates

According to the Natural Heritage Database and the Landscape Project, 14 threatened or endangered wildlife species have been sighted in Lawrence over the course of the past several years. Brief descriptions of several of these species and their preferred habitat, provided by the New Jersey Division of Fish and Wildlife, follow.

The Cooper's Hawk (*Accipiter cooperii*) is a member of the Accipiter family – woodland hawks that prey on smaller birds – and is especially adapted to fly through dense cover chasing prey. In New Jersey, Cooper's hawks breed in wooded wetlands dominated by red maple or black gum.

Adjacent upland pine or mixed oak/pine forests usually provide a buffer for nesting hawks. These hawks generally nest in forests composed of trees 30 years or older, which create a closed canopy. On average, a hawk will place his or her nest more than one-third of a mile away from the nearest human inhabitant. While other raptor species were threatened due to hunting practices and predator elimination, Cooper’s hawk populations were not threatened until widespread suburbanization. Additionally, the pesticide DDT impaired many bird species’ reproduction and contributed to declining populations from the 1950s to the 1970s. Populations began to recover due to the nationwide ban of DDT in 1972, coupled with the reforestation of old fields throughout New Jersey. The hawk was listed as endangered in 1974 and downgraded to threatened in 1999. The loss of large, contiguous forests remains a threat to this species and warrants the continued protection of Cooper’s hawk nesting habitats.

The barred owl (*Strix varia*) inhabits contiguous old-growth wetland forests. The owls use cavities in large trees for their nests. In northern New Jersey, barred owls live in mixed deciduous wetland or riparian forests. They avoid sites near residential, agricultural, industrial or commercial areas. They prefer lowlands and avoid rocky hillsides. Barred owls were once abundant in the deep-wood swamps of New Jersey, but they diminished in numbers as they were shot by hunters and as habitat was reduced beginning in the 1940s through the cutting of old-growth forests and the filling of wetlands. In 1979 it was listed as a threatened species in New Jersey.

The bobcat (*Felix refus*) is a member of the Felidae family. Bobcats can occupy a variety of habitats ranging from forests to mixed agricultural areas to rural areas outside of cities. They generally occupy habitats with rocks or dense cover through vines, shrubs or saplings, which provide protection from weather and predators, as well as resting places. In New Jersey, bobcats typically occupy areas of contiguous forest, or fragmented forests interspersed with agricultural areas. In the 1800s, many New Jersey forests were cleared, leading to a decline in the number of bobcats. By the 1970s, the animal was believed to have been extirpated from the state. In 1977, the New Jersey Division of Fish, Game and Wildlife started a bobcat restoration project, releasing bobcats from Maine into northern New Jersey. While bobcat numbers today are steady, the animal is still listed as a state endangered species.

The bobolink (*Dolichonyx oryzivorus*) is a small-sized member of the blackbird family. These birds inhabit meadows or agricultural hayfields and pastures during the breeding season. It was an abundant species in New Jersey in the 1700s and 1800s, but by the 1900s, the species began to decline in numbers because of changing agricultural practices. Through modern farming techniques, such as rotation of fields and mowing, agricultural fields became unsuitable for nesting bobolinks. In 1979, the species was listed as a threatened species in New Jersey.

The grasshopper sparrow (*Ammodramus savannarum*) can be found in grassland, upland meadow, pastures and hayfield habitats. Historically, the species was restricted to natural grasslands created by fires or flooding. However, the rise of agriculture beginning in the late 1800s allowed the species to spread its range. In the 1950s, grasshopper sparrow populations began to decrease with the development of farmland and open space areas. In 1979, the species was listed as a threatened species in New Jersey.

The long-eared owl (*Asio otus*) makes its habitat in dense stands of evergreens and some deciduous trees. The owl requires high foliage density at nesting and roosting sites and will use open areas, such as farm fields, for hunting. Long-eared owl numbers began to decrease in New Jersey by the mid-1900s as development and modern agricultural practices reduced their habitat. Today, the number of breeding pairs in the state remains very low and it is listed as a threatened species.

There are three types of rare freshwater mussels found in Lawrence. These are the threatened triangle floater (*Alasmidonta undulata*), the threatened eastern pondmussel (*Ligumia nasuta*), and the endangered brook floater (*Alasmidonta varicose*).

The wood turtle (*Clemmys insculpta*) occupies both aquatic and terrestrial environments. The aquatic habitats are used for feeding, mating, and hibernation, while the terrestrial habitats are used for foraging and egg laying. The turtle was fairly common in New Jersey until the 1970s, when declines in the species were noted due to stream degradation and loss of habitat. In 1979, the wood turtle was listed as a threatened species in New Jersey. In 1995, the species was proposed for inclusion on the federal endangered species list. However, populations throughout the country were considered stable enough to deny the listing.

See **Appendix C** for a list of *Plants and Animals of Lawrence's Carson Road Woods Park*.
See **Appendix D** for a list of *Plants and Animals of Lawrence's Pole Farm*.
See **Appendix E** for a list of *Plants and Animals of Lawrence's Shipetaukin Woods*.
See **Appendix F** for a list of *State Endangered and Threatened Species*.
See **Table 19** for a list of *Rare Animal Species and Natural Communities Presently Recorded in the NJ Natural Heritage Database for Lawrence Township.*
See **Table 20** for a list of *Rare Plant Species and Natural Communities Presently Recorded in the NJ Natural Heritage Database for Lawrence Township.*

Table 19: Rare Animal Species and Natural Communities Presently Recorded in the NJ Natural Heritage Database for Lawrence Township

Common Name	Scientific Name	Federal Status	State Status	State Rank
barred owl	*Strix varia*	NA	Threatened	S3B
bobcat	*Lynx rufus*	NA	Endangered	S3
bobolink	*Dolichonyx oryzivorus*	NA	Threatened	S2B
brook floater	*Alasmidonta varicosa*	NA	Endangered	S1
Cooper's hawk	*Accipiter cooperii*	NA	Threatened	S3B, S4N
eastern box turtle	*Terrapene carolina*	NA	Special Concern	S5B
eastern pondmussel	*Ligumia nasuta*	NA	Threatened	S1
Fowler's toad	*Bufo woodhousii fowleri*	NA	Special Concern	S4
grasshopper sparrow	*Ammodramus savannarum*	NA	Threatened	S2B
long-eared owl	*Asio otus*	NA	Threatened	S2B, S2N
spine-crowned clubtail	*Gomphus abbreviatus*	NA	NA	S2, S3
spotted turtle	*Clemmys guttata*	NA	Special Concern	S4
triangle floater	*Alasmidonta undulata*	NA	Threatened	S3
wood turtle	*Clemmys insculpta*	NA	Threatened	S3

S1	Critically imperiled in NJ because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres).
S2	Imperiled in NJ because of rarity (6-20 occurrences).
S3	Rare in state with 21 to 100 occurrences (plant species in this category have only 21 to 50 occurrences).
S4	Apparently secure in state, with many occurrences.
S5	Demonstrably secure in state and essentially ineradicable under present conditions.
B	Refers to the breeding population of the element in the state.
N	Refers to the nonbreeding population of the element in the state.
NA	Data not available.

Source: NJDEP, New Jersey Natural Heritage Program

Table 20: Rare Plant Species and Natural Communities Presently Recorded in the NJ Natural Heritage Database for Lawrence Township

Scientific Name	Common Name	Federal Status	NJ Status	State Rank
Carex barrattii	Barratt's Sedge	NA	Endangered	S4
Carex haydenii	Cloud Sedge	NA	Endangered	S1
Cystopteris protrusa	Lowland Fragile Fern	NA	NA	S2
Mimulus alatus	Winged Monkey-flower	NA	NA	S3

S1	Critically imperiled in NJ because of extreme rarity (5 or fewer occurrences or very few remaining individual acres).
S2	Imperiled in NJ because of rarity (6-20 occurrences)
S3	Rare in state with 21 to 50 occurrences. Includes elements that are widely distributed but with small populations/acreage, or with restricted distribution but locally abundant.
S4	Apparently secure in state, with many occurrences.
NA	Data not available

Source: NJDEP, New Jersey Natural Heritage Program

NATURAL HERITAGE DATABASE AND NATURAL HERITAGE PRIORITY SITES

Natural Heritage Priority (NHP) sites are areas designated by the New Jersey Division of Parks and Forestry's Office of Natural Lands Management as exemplary natural communities within the state that are critically important habitats for rare species. Preserving these areas is a top priority for efforts to conserve biological diversity in New Jersey. No NHP sites are located in Lawrence.

The Natural Heritage Database lists documented sightings of endangered and threatened species. Information on particular sites or species may also be provided by the Nature Conservancy or by the NJDEP Endangered and Nongame Species Program, and especially through the latter agency's Landscape Project. See **Appendix F** for rare plants and animals recorded for Lawrence Township.

It is important to note that the Natural Heritage Database lists primarily sightings that have been submitted to it, along with some ecological community data. It incorporates both historically and recently documented sightings. Areas without sightings may never have been surveyed. Conversely, land use in areas with sightings may have changed considerably over recent years, and the species once found there may be gone. Local surveys to update the database and regular consultation of records before any development is approved are two measures that would help to increase threatened and endangered species' protections. See "Cautions and Restrictions on Natural Heritage Data," located in **Appendix G**.

THE BUILT ENVIRONMENT

DEMOGRAPHICS

The 1990 US Census listed a population of 25,787 residents for Lawrence Township. By 2000, the population of Lawrence had grown to 29,159 residents, an increase of 13 percent. The US Census estimated the 2004 population for the township at 31,391. DVRPC projects only a small increase of 423 additional residents by the year 2020.

According to the 2000 Census, 3,844 residents, or 15 percent of Lawrence's total population, are under the age of 20. Of those residents, 3,027 are children between the ages of 5 and 18. This age group represents those residents who are most physically active in the community and most likely to use public recreational facilities.

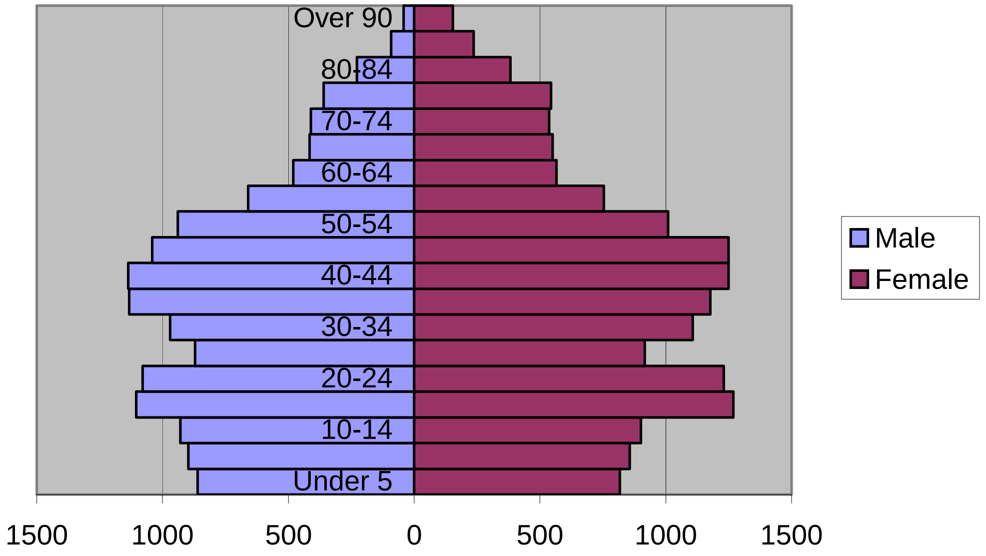


Fig. 4: Age Pyramid for Lawrence Township (2000)

The majority of Lawrence's population lives in single-family detached homes. The newest homes in the township tend to be four- or five-bedroom colonials situated on small lots one-eighth to one-quarter acre in size. Older colonial homes, 20 to 50 years in age, tend to be on one-third to one-half acre lots. There are also 12 condominium complexes containing almost 3,000 condos, farmhouses built in the 1800s, and smaller Cape Cods and ranchers in the southern portion of the township.

TRANSPORTATION

Lawrence has a strategic location in the Mid-Atlantic region. It is only 54 miles from New York City and 33 miles from Philadelphia. Commuters in Lawrence benefit from the Amtrak line connecting New York City with Philadelphia, which bisects the township. This train line is part of the Northeast Corridor route that connects Washington, D.C. to Boston.

The township is relatively accessible by vehicle, as it is serviced by several significant road corridors. The modern roadway transportation corridors that serve Lawrence have fostered much of its past and current growth. The township is accessible by four major roads: Routes 95, 295, 206, and 1. Interstate 95 and Interstate 295 form a semi circle through Lawrence and intersect with U.S. Route 1 and Route 206, which run north-south, bisecting the township.

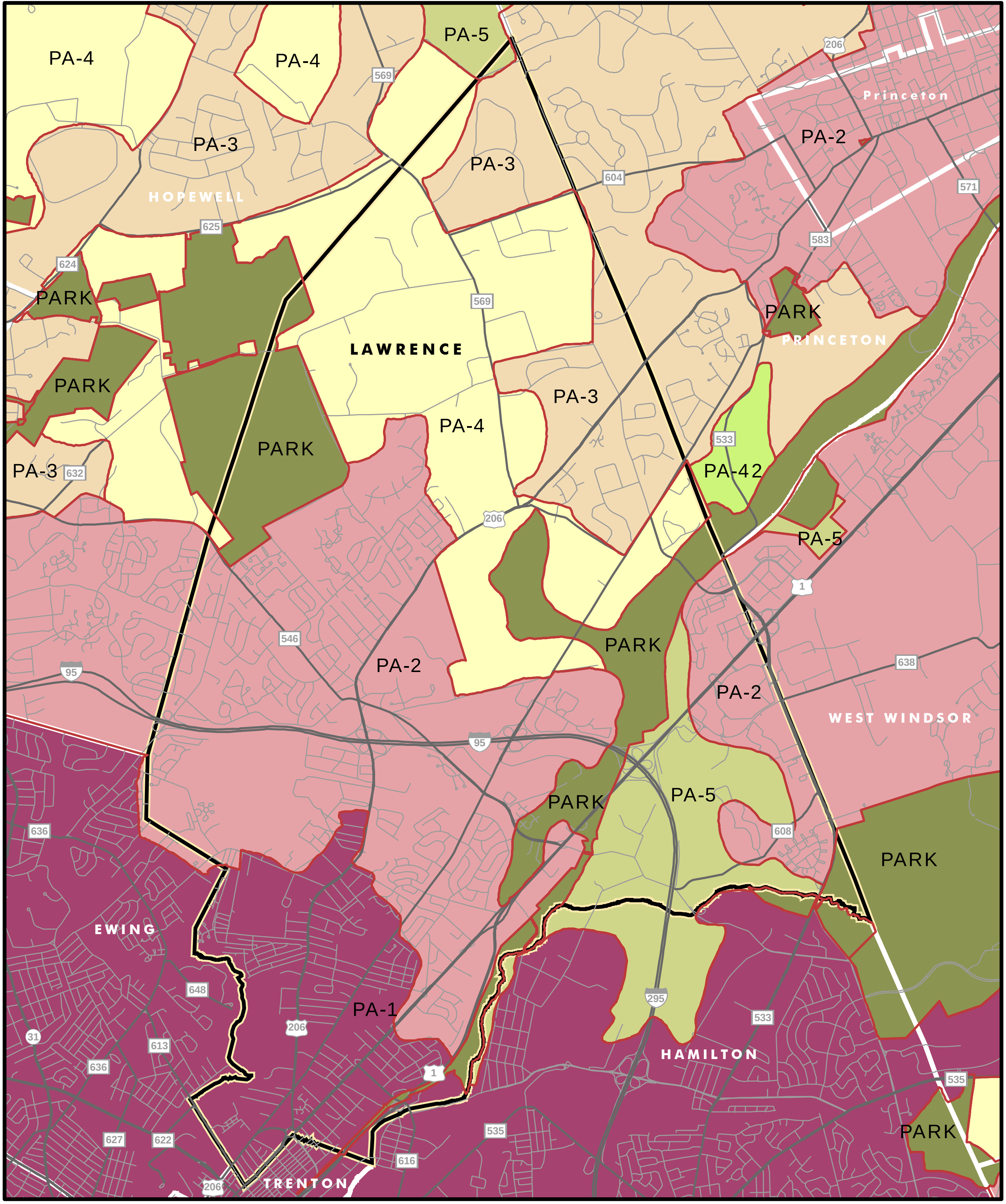
County roads within the township include Routes 546 (Lawrenceville-Pennington Road/Franklin Corner Road), 583 (Princeton Pike), 604 (Rosedale Road), 533 (Quakerbridge Road), and 569 (Carter Road), as well as Lawrence Station, Whitehead, and Grovers Mill roads and the Brunswick Extension. These routes provide access and connections within the township and county and reflect the township's land use and distribution of historic centers of activity. Smaller roads in the township are a mixture of old rural lanes and newer subdivision thoroughfares.

Lawrence experiences heavy congestion during rush hours. Most of this congestion is concentrated along Business Route 1 (Brunswick Pike) and Route 206. The township has plans to redevelop the Business Route 1 corridor to slow traffic and make it more pedestrian friendly. Lawrence designated this stretch of Business Route 1 a Redevelopment Area and drafted a Redevelopment Plan. The plan recommends various traffic calming measures by converting the highway into a boulevard and constructing a landscaped median in the center. Officials hope that these measures will also encourage the development of local businesses in the area. Officials of the municipality are working with the New Jersey Department of Transportation to finalize the plan. Once adopted, township officials plan to explore extending the Redevelopment Area north along the corridor.

New Jersey Transit is also working to alleviate traffic congestion on Route 1 by preparing an alternatives analysis to study the feasibility of providing a Bus-Rapid Transit (BRT) system along the Route 1 corridor. A BRT system is a public transportation system that uses existing infrastructure and scheduling improvements to provide a higher quality of bus service. The New Jersey Transit alternatives analysis will examine various methods of traffic reduction, as well as highway improvements, ridership, cost effectiveness, and locations for routes and stations.

Lawrence Township

Map 17: 2001 State Planning Areas



STATE PLANNING AREA

- 🟪 **PA-1 - Metropolitan**
- 🟥 **PA-2 - Suburban**
- 🟧 **PA-3 - Fringe**
- 🟨 **PA-4 - Rural**
- 🟩 **PA-42 - Rural, Environmentally Sensitive**
- 🟩 **PA-5 - Environmentally Sensitive**
- 🟩 **PARK**

Sources : NJ Department of Community Affairs, Office of Smart Growth,NJDEP,NJDOT,DVRPC
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

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HISTORIC RESOURCES

Lawrence hosts ten places on the National and State Registers of Historic Places, including six historic houses, three historic districts, and one National Historic Landmark. The historic districts contain dozens of individual structures, sites, and buildings, many of which, though not all, are historic. In addition to the National and State Register sites, Lawrence Township has designated other significant sites and structures as "local historic landmarks." Many of these sites are eligible for listing on the State and National Registers of Historic Places. They are described in detail in the *Lawrence Township Master Plan*. See **Map 18: Historic and Cultural Resources** and **Table 21: Sites Listed on the National & State Registers of Historic Places and Locally Designated Landmarks.** The Lawrence Township Historic Preservation Advisory Committee also maintains an official township Historic Property Listing, identifying specific properties, sites and structures that have historic importance at the local level. This list (see **Appendix H**) identifies over 100 historic properties in addition to those already listed on the National and State Registers and the local historic landmark list.

The Lawrence Township Historic Preservation Advisory Committee is responsible for protection of historic structures within the township and education about them. The Committee meets monthly or on an as-needed basis to review applications for exterior modification to any building or structures within the Main Street historic district and to all buildings designated as Landmarks throughout the township. The Committee also advises the State of New Jersey and Mercer County on projects within Lawrence that impact historical structures.

The Lawrenceville Historical Society, by contrast, is a non-profit organization dedicated to preserving and protecting the township's historical structures, such as the 1761 Brearley House, a Georgian Quaker farmhouse, and the 1830 Port Mercer Canal House, which the Society leases from the Delaware and Raritan Canal Commission to serve as its headquarters. The Lawrence Historical Society holds tours, holiday events, and educational programs at these two sites.

Lawrence is rich with historic structures and buildings. The Village of Lawrenceville contains many of the original homes of the early settlers of the area. Many of these buildings are located within the Lawrenceville Main Street Historic District, which was listed on the National and State Registers of Historic Places in 1972. To prepare for inclusion of the Main Street Historic District on the National and State registers, the township's Historic Preservation Advisory Committee studied the area and designated buildings as "key," "contributing," or "non contributing." The historic district encompasses the two-mile stretch of Main Street (Route 206) between Franklin Corner Road and the area slightly north of Fackler Road. It was one of the first registered historic districts in New Jersey. The Main Street Historic District includes over 50 buildings, a nineteent century commercial strip, and an area of the Lawrenceville School known as "the Circle." The Circle contains six dormitories, a chapel, and an administration building, all designed by the architectural firm Peabody and Stearns of Boston. Frederick Law Olmsted, one of the designers of Central Park in New York City, prepared the Circle's landscape plan. The Circle is designated as a National Historic Landmark, the highest designation by the federal government, a designation reserved for only a small number of nationally significant historic properties in the nation.

The old Maidenhead Church, originally built in 1764, is found in the Lawrenceville Main Street Historic District. The church was enlarged in both 1833 and 1853, and is today known as the Presbyterian Church of Lawrenceville. The Presbyterian Church's cemetery still exists, as do two other cemeteries in the village: the Upper Cemetery and the Princessville Cemetery. Veterans from several wars are buried in both the Upper and Princessville cemeteries.

Photo by Chris Linn

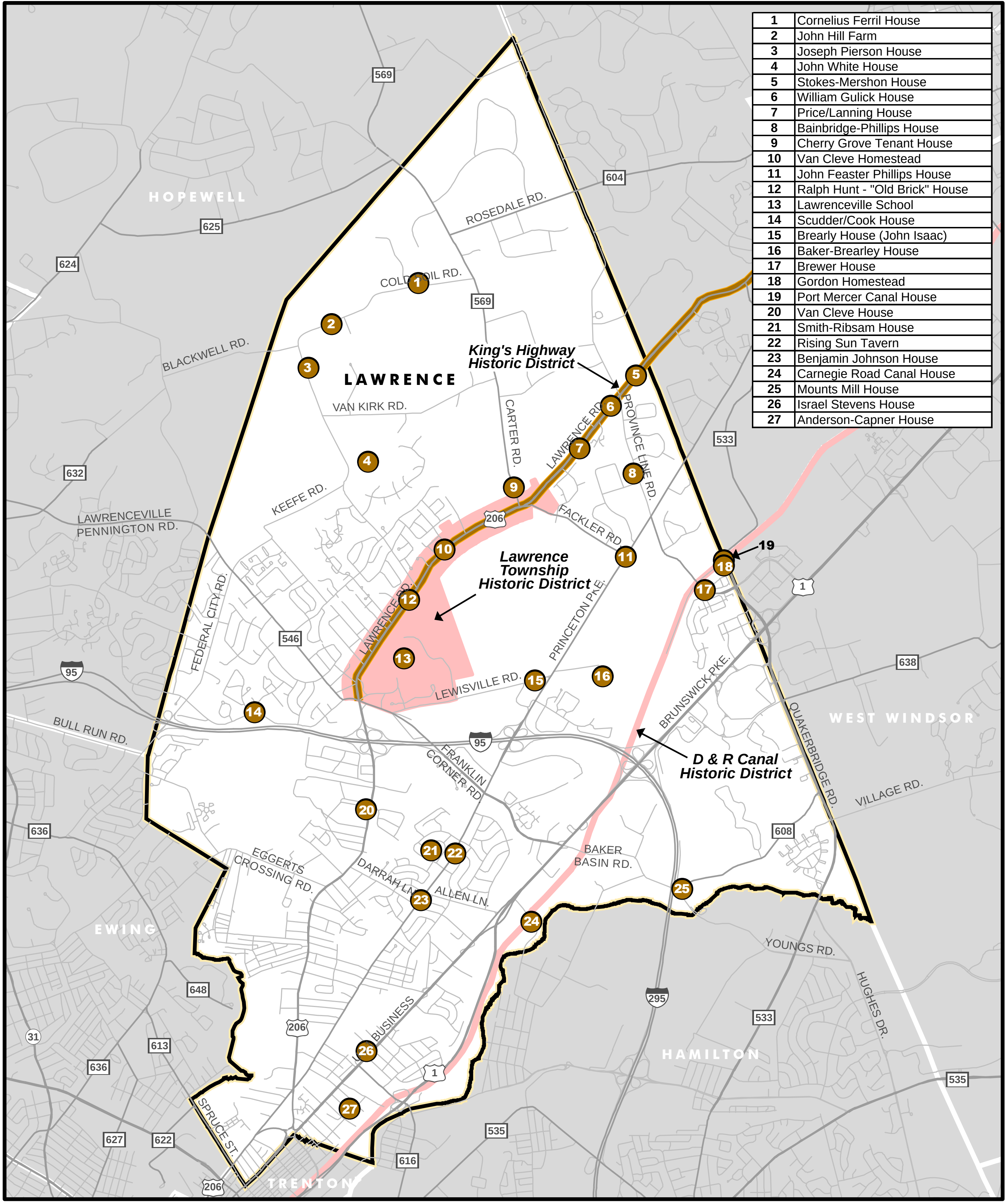
Presbyterian Church of Lawrenceville

The Main Street Historic District is also part of the King's Highway Historic District, which was listed on the New Jersey and National Registers in 2001. This road was originally a narrow Indian path, but eventually was widened and became the main colonial road between New York and Philadelphia, as well as the first postal route and first mapped state highway. The King's Highway Historic District begins at the eastern end of the intersection of Route 206 and Franklin Corner Road in Lawrence and extends to the eastern end of the intersection of Route 27 and Raymond Road in Franklin Township in Somerset County.

There are various mechanisms to enhance historic preservation from the federal to the local level. At the federal level, placing sites and districts on the National Register of Historic Places

Lawrence Township

Map 18: Historic and Cultural Resources



1	Cornelius Ferril House
2	John Hill Farm
3	Joseph Pierson House
4	John White House
5	Stokes-Mershon House
6	William Gulick House
7	Price/Lanning House
8	Bainbridge-Phillips House
9	Cherry Grove Tenant House
10	Van Cleve Homestead
11	John Feaster Phillips House
12	Ralph Hunt - "Old Brick" House
13	Lawrenceville School
14	Scudder/Cook House
15	Brearly House (John Isaac)
16	Baker-Brearley House
17	Brewer House
18	Gordon Homestead
19	Port Mercer Canal House
20	Van Cleve House
21	Smith-Ribsam House
22	Rising Sun Tavern
23	Benjamin Johnson House
24	Carnegie Road Canal House
25	Mounts Mill House
26	Israel Stevens House
27	Anderson-Capner House

Sources : NJHPO,NJDEP,NJDOT,DVRPC
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

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affords them added consideration in the planning for federally assisted projects, and makes properties eligible for certain tax benefits and grant programs. It does not, however, prevent properties from being altered or demolished. Local historic districts, on the other hand, can be created by municipalities to preserve significant historic sites by regulating the erection, alteration, restoration, and demolition of buildings within the historic district. Historical committees, like the Lawrence Township Historic Preservation Advisory Committee, are government bodies that oversee historic preservation planning and decision making in their communities, and the establishment of these committees is typically the first step in implementing local preservation efforts.

Table 21: Sites Listed on the National & State Registers of Historic Places and Locally Designated Landmarks

Name	Location	Designation
Anderson-Capner House	700 Trumbull Ave	National and State
Baker-Brearley House	Meadow Road and Princeton Pike	National and State
Bainbridge-Phillips House	4419 Province Line Road	Local Landmark
Brewer House	634 Rosedale Road	Local Landmark
Brearly House (John Isaac)	2 Lewisville Road	Local Landmark
Carnegie Road Canal House	Near Carnegie Road Bridge	Local Landmark
Cherry Grove Tenant House	17 Carter Road	Local Landmark
Delaware and Raritan Canal Historic District	Entire Canal bed and all land 100 yards to either side of the center line	National and State
Cornelius Ferril House	335 Cold Soil Road	Local Landmark
Gordon Homestead	4240 Province Line Road	Local Landmark
William Gulick House	3641 Lawrenceville-Princeton Road	Local Landmark
John Hill Farm	265 Cold Soil Road	Local Landmark
Ralph Hunt – “Old Brick” House	2750 Main Street	Local Landmark
Benjamin Johnston House	2685 Princeton Pike	Local Landmark
King's Highway Historic District	US Route 206 and NJ Route 27, between Lawrenceville and Kingston	National and State
Lawrence Township Historic District	US Route 206 between Pennington-Lawrenceville Road and Carter Road	National and State
Lawrenceville School	Main Street	National Historic Landmark
Mounts Mill House	301 Lawrence Station Road	Local Landmark
John Feaster Phillips House	3850 Princeton Pike	Local Landmark
Joseph Pierson House	210 Cold Soil Road	Local Landmark
Port Mercer Canal House	4274 Province Line Road	National and State

Name	Location	Designation
Price/Lanning House	3461 Lawrenceville-Princeton Road	Local Landmark
Rising Sun Tavern	2861 Princeton Pike	Local Landmark
Scudder/Cook House	96 Denow Road	Local Landmark
Israel Stevens House	2167 Brunswick Ave	National and State
Smith-Ribsam House	45 Pine Knoll Drive	National and State
Stokes-Mershon House	3801 Lawrenceville-Princeton Road	Local Landmark
Van Cleve Homestead	2942 Main Street	Local Landmark
Van Cleve House	2083 Lawrence Road (Rider University)	Local Landmark
John White House	100 Cold Soil Road	National and State

Sources: New Jersey Historic Preservation Office, Lawrence Township Master Plan (1995), Lawrence Historical Society

TOWNSHIP UTILITIES AND SERVICES

Drinking Water

Residences south of Route 95/295 are supplied with public drinking water by the Trenton Water Works. This area extends north to town hall along Route 206 and along Interstate 95 to Federal City Road. The Lawrenceville Water Company services residences between Interstate 95, Federal City Road, Keefe Road and one-half mile north of Cold Soil Road. The area north of Keefe Road and Meadow Road and one-half mile north of Cold Soil Road is serviced by the New Jersey American Water Company (formerly the Elizabethtown Water Company). Many properties within these areas may also have individual private wells.

The drinking water wells that serve the public in Lawrence Township are listed in **Table 15** on *page 66*. **Map 13: Public Water Supply Wells** shows the location of Lawrence's public water supply wells.

Sewer

Sewerage service for township residents is provided through the Ewing-Lawrence Sewerage Authority (ELSA), which operates a treatment plant located at 600 Whitehead Road in Lawrenceville and discharges into the Assunpink Creek. The area that ELSA services includes about two-thirds of Lawrence. Extensions of the sewer-service area within the township must be approved by the Township Council, and they must be consistent with the Utility Element of the Master Plan and the Mercer County Water Quality Mgmt. Plan and 201 Sewer Service Plans.

Trash/Recycling

In Lawrence, trash is picked up every week and recycling is picked up curbside every other Monday. Recycling service is provided by the county through the Mercer County Improvement

Authority. Materials recycled include glass, plastic, aluminum, newspapers, cardboard and paper. The township also collects brush and yard waste.

Education

The Lawrence public school system serves over 4,000 students. The township has four elementary schools for children pre-K to grade 3: Ben Franklin, Elridge Park, Lawrenceville, and Slackwood elementary schools. The Lawrence Intermediate School educates children grades 4 through 6. In addition, the township has one middle school (Lawrence Middle School) and one high school (Lawrence High School). Due to growing enrollment in the school system, Lawrence plans to expand four of its school buildings: Lawrence High School, Lawrence Middle School, Ben Franklin Elementary School, and Lawrenceville Elementary School.

In addition to public schools, Lawrence is home to the Lawrenceville School, a 700-acre private college preparatory high school founded on Main Street in 1810 as the Academy of Maidenhead. The school was founded by Isaac Van Arsdale Brown in the front parlor of his home and it gradually expanded through the years. John Cleve Brown donated a large sum of money to the school in 1875, enabling the school to construct nine additional buildings, which are today listed on the national, state, and local historic registers. Today, the school has nearly 800 boarding and day students from many states and countries.

Lawrenceville School Dormitory

There are two parochial schools in Lawrence: St. Ann's Elementary School and Notre Dame High School. Two other co-educational independent private day schools are the Princeton Junior School for children pre-K through grade 5 and the Chapin School for children pre-K through grade 8.

Rider University also makes its home in the southwestern part of Lawrence. With roots dating back to 1865, Rider is a private, coeducational university located on a 280-acre campus. Almost 5,000 full-time undergraduate and graduate students attend Rider. Rider consists of four academic colleges – the College of Business Administration, the College of Liberal Arts, Education, and Sciences, the College of Continuing Studies, and Westminster Choir College (located in Princeton Borough) – that offer 60 undergraduate and 18 graduate degree programs. The university is accredited by the Middle States Association of Colleges and Schools. The undergraduate and graduate programs in the College of Business Administration are accredited by AACSB International - The Association to Advance Collegiate Schools of Business. Elementary and secondary education programs and their applicable graduate programs are accredited by the National Council for the Accreditation of Teacher Education (NCATE).

Parks, Open Space and Recreation

Parks

Lawrence provides a wide variety of recreational opportunities at its township parks, which include: Carson Road Woods, Central Park, Colonial Lake Park, Drexel Woods, Eldridge Park, Gilpin Park, Hamnett Park, Lawrence Veterans Park, Shipetauken Woods, Stonicker Park and Village Park. Of these, the largest and most widely used is the 107-acre Central Park located off Eggert Crossing Road. It contains four soccer fields, four baseball diamonds, one football field, three lighted tennis courts, lacrosse fields and five basketball courts.

Colonial Lake Park attracts many fishermen because its 25-acre lake is stocked annually by the New Jersey Division of Fish and Game. The park also offers tennis courts, playground equipment and a jogging path. Two other parks, Veterans Park (20 acres) and Village Park (60 acres), provide tennis courts, jogging paths, playground equipment and sports fields.

Photo by Chris Linn

Central Park

In 1998, Lawrence Township, with the help of a Green Acres Grant, bought the 45-acre Drexel Woods property. The land is forested and is used for passive recreation. Drexel Woods also contains the Lawrence Nature Center, a center for outdoor education and community development. The center is operated by the township's Recreation Department and hosts numerous nature programs, including bird walks, community bonfires, bat hikes, and Earth Day festivities.

Lawrence is also in the process of completing a new township park called Carson Road Woods. Since the 1980s, developers competed to build homes on the 183 acres of farmland and forestland called Carson Road Woods, located between Carson Road and Belleview Terrace. In 2001, the township purchased the land for $8.4 million. Of this money, almost half was privately raised or donated. The remainder of the funds came from the township, county, and state. Lawrence is in the process of developing the park as a passive recreation park for hiking, walking and jogging. The township recently completed five trails on the property, which are lined with wood and trail markers.

Mercer County, meanwhile, is working on its plans for the development of Mercer County Park Northwest, which straddles the border of Hopewell and Lawrence townships and is bounded by

Blackwell Road to the north, Keefe Road to the south, Cold Coil Road to the east, Federal City Road to the west and Lawrenceville-Pennington Road to the southwest. The park joins Rosedale Park to the north and Village Park to the south. Originally, the property was farmed before it was purchased by the American Telephone and Telegraph (AT&T) Company. In 1995, the company sold the land to Mercer County to use as parkland. To prepare for the creation of a new county park, in 1999 the Washington County Audubon Society conducted a biological survey of the property. The results are found in **Appendix D**. Today, most of the property consists of open meadows, wetlands, forest and shrubland. A small portion of the property is still farmed and a few farm structures remain within the park.

Lawrence Township residents also have convenient access to Mercer County Park, which is located on the southeastern border of Lawrence. This park is composed of more than 2,500 acres and includes a small portion of Lawrence, West Windsor and Hamilton townships. The park contains facilities for active and passive recreation, including a dozen softball fields, 18 basketball half-courts, an outdoor tennis center, a boat marina, an ice skating center, picnic areas and seven soccer fields.

Photo by Chris Linn

Mercer County Park Northwest

Open Space and Greenways

In addition to its parks, other forms of open space and greenways are important to township residents. Lawrence is becoming continually more developed, so it is important that the township works to acquire open space. Lawrence obtains open space for passive recreation, farmland preservation and greenways.

The three main groups that work to acquire and protect open space and farmland, and establish greenways within Lawrence, are the Lawrence Township Open Space Committee, the Lawrence Township Greenways Committee, and the Lawrence Township Conservation Foundation. The Lawrence Township Open Space and Greenway committees serve as official advisory bodies to the town council. The Lawrence Township Conservation Foundation is an independent non-profit organization. Together, these three groups play an important role in identifying, acquiring and protecting open space. They educate township residents and farmers about the importance of open space and work with county and state organizations to identify and acquire parcels.

One important state program that has played a significant role in providing funding to acquire open space is the New Jersey Green Acres Program. Created in 1961, the New Jersey Green Acres Program, aims to partner with townships and counties to acquire and preserve open space in New Jersey. The program’s goal is to create a system of interconnected open spaces to protect and enhance the natural environment of New Jersey for historic, scenic and recreational purposes, and public enjoyment. Since 1961, over $1.5 billion has been used to acquire land and develop parks. In 1998, the Garden State Preservation Trust Act was signed into law, which created a stable source of funding for open space, farmland, and historic preservation, as well as recreation development efforts. Unfortunately, as of March 2007, the funds allocated through the 1998 Act were exhausted. As of this writing, efforts are underway to renew the Garden State Preservation Trust Fund.

Lawrence residents are realizing the importance of open space preservation in their township. In 1999, voters approved an open space tax of one cent per hundred dollars of assessed property value. In 2003, the tax was increased to three cents per hundred dollars of assessed property value. Currently, this tax generates approximately $800,000 annually for open space preservation.

In 2000, Lawrence prepared an Open Space and Recreation Plan for the township. It identified a total of 3,084 acres of preserved open space in the township. Since then, the township has acquired almost 300 additional acres of open space for a total of 3,360 acres. Of this, 984 acres are township-owned parkland and open space subject to Green Acres regulation, 110 acres are township-owned open space not subject to Green Acres regulation, 987 acres are other government-owned open lands, 870 acres are privately-owned open space, and 409 acres are preserved farmland in the Farmland Preservation Program. In total, the 3,084 acres account for more than 25 percent of the township’s total acreage. The township has also specifically identified an additional 852 acres of open space for future preservation.

Currently, preserved open space in the northern portion of the township is mostly farmland and county-owned land within Mercer County Park Northwest. Farmland preservation in this part of the township was generally made possible through the state's farmland preservation program or with county funds. All of these farms are along Carson, Cold Soil, or Van Kirk roads. In the southern part of the township, open space occurs mostly in the form of numerous parks. Open space acreage in the southern part of the township is significantly less than in the northern part of the township.

Photo by Chris Linn

Terhune Orchards – A Preserved Farm in Northern Lawrence Township

Further acquisition of open space is important in both parts of the township. In the more rural northern portion, there is pressure from developers to convert open land into residential subdivisions. The southern portion of the township, by contrast, is more densely developed with homes and businesses that contribute runoff to streams, increasing flooding problems. Here, there is a need to preserve land along streams in order to protect and restore vegetated riparian buffers.

One important stream around which Lawrence is considering acquiring more open space is the Assunpink Creek. In January 2000, the Delaware Valley Regional Planning Commission prepared a plan entitled *Closing the Missing Link on the Assunpink Creek Greenway*. The

Assunpink Creek runs through the southern portion of Lawrence and forms the boundary between Lawrence and Hamilton townships. Almost half of the length of the entire Assunpink stream corridor is preserved as parkland. However, there are significant gaps in the Assunpink greenway along the sections of this stream in Lawrence and Hamilton townships. The plan was developed to suggest ways to extend the greenway through the townships to complete the greenway, from the creek's headwaters in Monmouth County to its mouth at the Delaware River. Greenways along bodies of water such as the Assunpink are important because they create riparian buffers, which protect creeks and their water from stormwater runoff, non-point source pollution, sedimentation and other negative effects of development. In addition, the plan suggests creation of a series of trails to connect Mercer County Park with the Delaware and Raritan Canal towpath.


Delaware and Raritan Canal

One of the most important greenways in Lawrence is the Delaware and Raritan Canal, which runs through approximately six miles of the southeastern portion of the township. This canal was built between 1830 and 1834 to fill in a missing link in the intercoastal waterway that extended from Massachusetts to Georgia. The canal was primarily used to transport coal from the anthracite coal fields in eastern Pennsylvania to New York City. Over the years, the canal's importance for transportation gradually waned with the growth of railroads. After the canal's closure in the 1930s, some portions were filled in to accommodate the state's expanding highway system. By the 1970's, the canal was being heavily used for recreation, and citizen activists rallied to save the canal from total destruction. In 1973, the canal and its remaining structures were entered into the National Register of Historic Places, and in 1974, the state established the Delaware and Raritan Canal State Park. In 1992, the park's trail system was designated a National Recreation Trail.

Today, the Delaware and Raritan Canal State Park is 70 miles long, including the 22-mile feeder canal portion, which parallels the Delaware River from above Frenchtown south to Bordentown, and the main canal portion, which runs from Trenton to New Brunswick. The canal provides canoeing, jogging, hiking, biking, fishing, horseback riding, picnicking, and camping opportunities. The path along the main canal portion is part of the East Coast Greenway, an off-road multi-use trail that will eventually extend from Maine to Florida. Fish, including bass, sunfish, catfish, pickerel and perch occupy the canal's water year-round, and in the spring the canal is stocked with trout. Fishing is allowed along the entire canal. There are two canoe rental sites, in Griggstown and Princeton, and numerous launch sites, including one in Lawrence at the foot of Cherry Tree Lane. Every June, there is a "Canoe the Canal" day, a four-mile journey down the canal ending with ice cream at the historic Port Mercer Canal House in Lawrence. The canal park is also an important wildlife corridor. Recent bird surveys revealed 160 species, with 90 thought to nest in the park. Furthermore, the Delaware and Raritan Canal is a source of public water for agriculture, industry and homes. About 75 million gallons of water are pumped from the canal daily for these purposes.

Trails

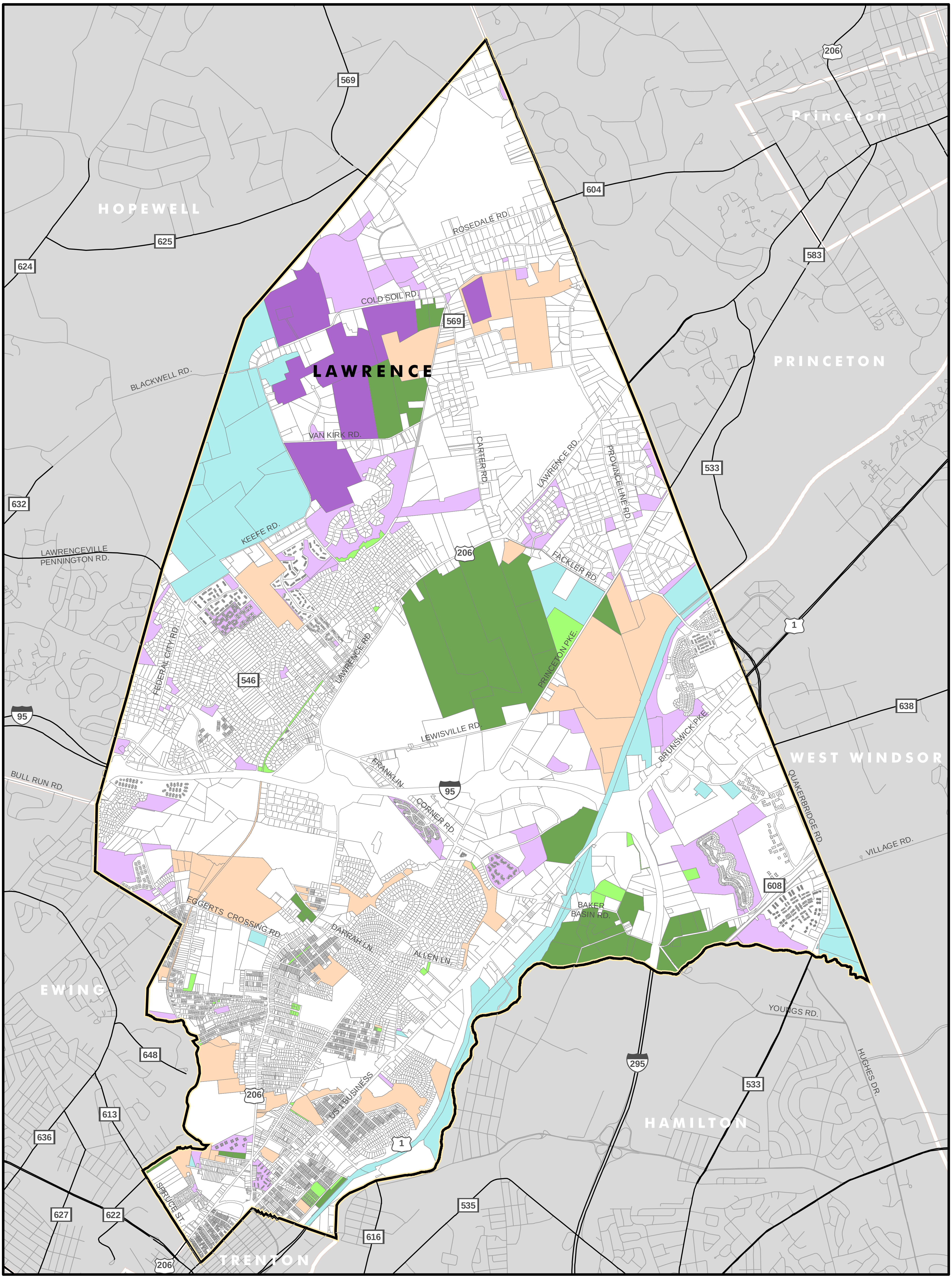
Lawrence is in its third year of development of a 20-mile bike and walking trail: the Lawrence-Hopewell Trail. The trail, when completed, will connect Lawrence and Hopewell townships and will loop through private property, parkland, business parks, and school campuses. Since the trail proposal was introduced in 2001, four segments have been built, while work on the two remaining sections is underway. The four completed sections pass through Lawrence Village Park, the Lawrenceville School campus, the ETS campus, and along the eastern border of the Bristol Myers Squibb Hopewell campus. The remaining sections will run through Mercer County Park Northwest, Carson Road Woods and along Princeton Pike and Lewisville Road. The $7 milliom trail is being financed in part by the Bristol-Myers Squibb Company and ETS. Both of these corporations have campuses in the township and provide almost 4,000 jobs.

Other trails in Lawrence Township include:

- Shipetaukin Woods Trails and Terhune Orchards Farm Trail
- Trails in Mercer County Park Northwest accessible form Federal City and Blackwell roads
- The Johnson Trolley Line north trail, which begins off Denow Road
- Trails in Armory Woods
- Trails in Tiffany Woods
- Trails in Carson Road Woods
- The one-third mile Brearley-Great Meadow Trail, which was built by the township in 1998. It begins at the Brearley House, crosses the Shipetaukin Creek, and connects to the D&R Canal towpath.
- The circular, 2.5-mile Laurie Chauncey Nature Path (on the ETS campus), which curves along the Stony Brook through deciduous forest until it reaches the gas pipeline, where it enters a meadow. The trail consists of many bridges over intermittent streams and offers beautiful views to trail goers.
- Trails in Central Park
- Trails in Drexel Woods
- Trails in Colonial Lake Park

Lawrence Township

Map 19: Existing Open Space



Sources : NJDEP, NJDOT, DVRPC, Clarke,Caton, Hintz
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

- ▨ Township Owned Parkland & Open Space Subject to Green Acres Control
- 🟩 Township Land Not in the Green Acres Program
- ▨ Privately Owned Open Space
- ▨ Government Open Space
- 🟪 Farmland Preservation Program
- 🟩 Potential Open Space Acquisitions

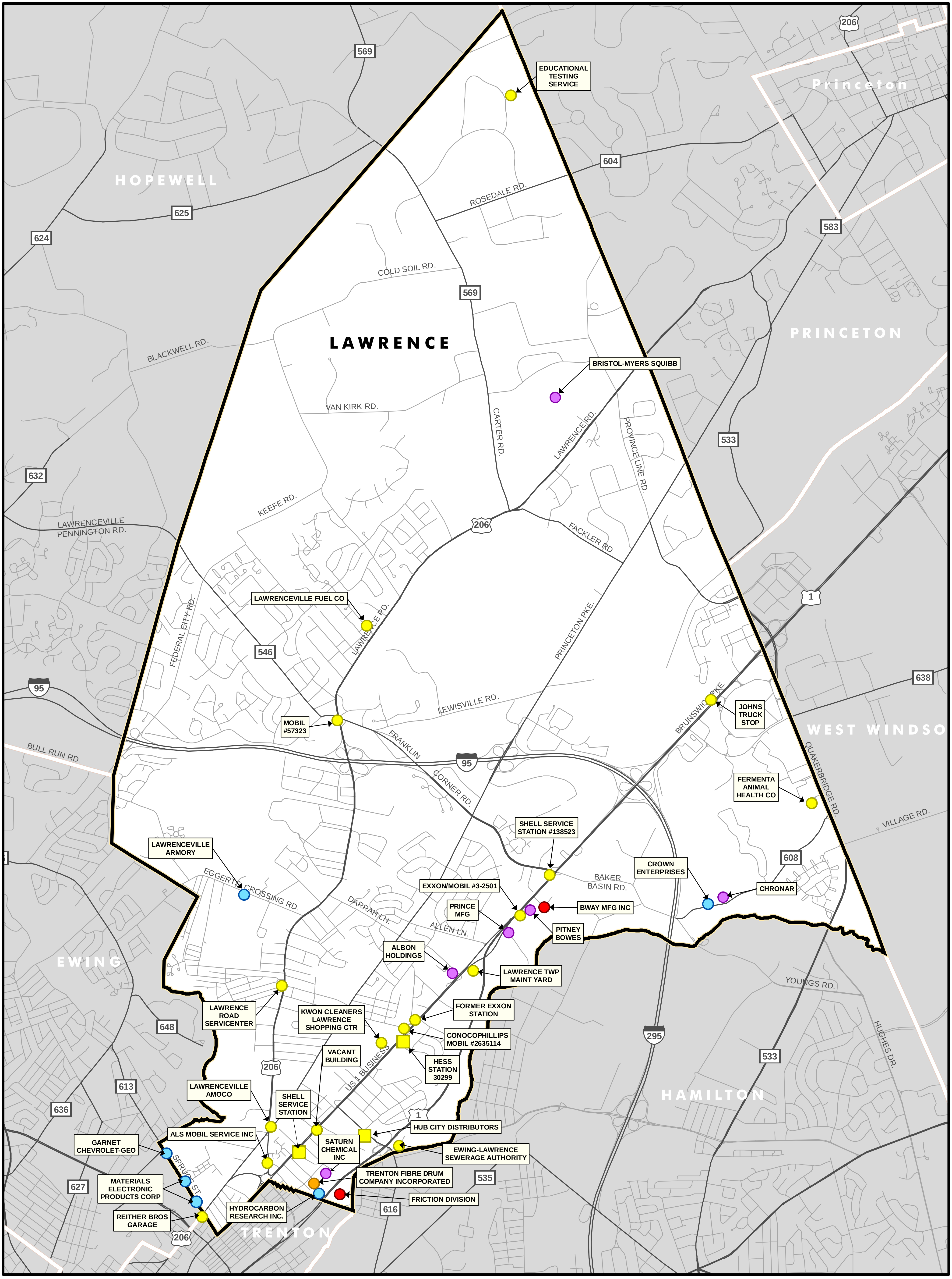
N

0 0.25 0.5 1
Miles

Delaware Valley Regional Planning Commission
September 2007

Lawrence Township

Map 20: Known Contaminated Sites (2006)



Sources : NJDEP,NJDOT,DVRPC.
This map was developed using New Jersey Department of Environmental Protection Geographic Information System digital data, but this secondary product has not been verified by NJDEP and is not state-authorized.

STATUS, LEVEL OF SITE COMPLEXITY

- ● Active - C1
- ● Active - C2
- ● Active - C3
- ● Active - D
- ● Not Applicable
- ■ NFA-A, Limited Restricted Use - C2
- ■ NFA-E, Restricted Use - C3

DRAFT

C1: No Formal Design - Source Known or Identified-Potential GW Contamination
C2: Formal Design - Known Source or Release with GW Contamination
C3: Multi-Phased RA - Unknown or Uncontrolled Discharge to Soil or GW
D: Multi-Phased RA - Multiple Source/Release to Multi-Media Including GW

0 0.25 0.5 1
Miles

Delaware Valley
Regional Planning Commission
September 2007

ENVIRONMENTAL ISSUES

KNOWN CONTAMINATED SITES

A 2005 NJDEP inventory of Known Contaminated Sites reported 563 contaminated sites in Mercer County. Forty of these sites are located in Lawrence. See **Table 22: Known Contaminated Sites in Lawrence Township** and also **Map 20: Known Contaminated Sites**. Of the 40 contaminated sites in Lawrence, 11 are residential properties. In all likelihood, these residential properties are on the Known Contaminated Sites List due to leaking underground storage tanks. These residential sites are not included in the table or shown on the map. **Table 22** and **Map 20** also include six sites on the *Lawrence Township Health Department's Known Contaminated Sites List* that do not appear on NJDEP's Known Contaminated Sites List.

The NJDEP Known Contaminated Sites List includes former factory sites, landfills, locations of current or former leaking underground storage tanks, sites where chemicals or wastes were once routinely discharged, and places where accidents have resulted in spills and pollution. Contamination may have affected soil, groundwater, surface water or a combination of site conditions. The most dangerous sites, from a human health standpoint, can be listed as Superfund sites, which make them eligible for federal cleanup funds. Other sites are handled by state or individual programs, or through private funds.

According to the U.S. Environmental Protection Agency (EPA), a Superfund site is any land in the United States that has been contaminated by hazardous waste and identified by the EPA as a candidate for cleanup because it poses a risk to human health and/or the environment. The EPA states that the National Priorities List (NPL) is a list of the worst hazardous waste sites that have been identified by Superfund. Any site on the NPL is eligible for cleanup using Superfund Trust money. There are 19 superfund or potential superfund sites in Mercer County, two of which are in Lawrence Township. Neither of these, Hydrocarbon Research, Inc., located in Lawrenceville, nor Saturn Chemical, Inc., are on the NPL. Sites not currently listed on the NPL are not eligible for Superfund Trust funds for site remediation. This information was retrieved using the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS). CERCLIS is the national database and management system that EPA uses to track activities at hazardous waste sites considered for cleanup under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), also known as Superfund.

In addition to Hydrocarbon Research, Inc. and Saturn Chemical, Inc., there are two sites with high levels of contamination according to NJDEP: B-Way Manufacturing, Inc. and the Trenton Fibre Drum Company (these sites are at the D and C3 remedial level respectively, according to the state's contaminated sites classification scheme). The D level often means the site has been designated a Superfund site; however, the D level site in Lawrence, B-Way Manufacturing, Inc., does not appear in the Superfund database (CERCLIS).

More detailed information about two of contaminated sites listed above, Saturn Chemical, Inc. and Trenton Fibre Drum Company, is included below.

Saturn Chemical, Inc.

The Saturn Chemical, Inc. plant produced resins for ink and paint. It is documented that harmful solvents, such as xylene, benzene and toluene, leaked from underground storage tanks. The site was destroyed in 1981 by a fire, but the three-acre site located off of New York Avenue is still contaminated.

In 1995, Lawrence received an $820,525 grant from the state to hire a consultant to study the contamination of the site and determine the cost of site cleanup. The study found that while the site was contaminated, the level of toxins in the soil did not pose an immediate threat to the health of the local community or to the water supply. The study estimated that almost $800,000 would be needed to clean up the site. Remedial actions needed would include demolishing and removing buildings and their foundations, removing drums and tanks, excavating tar and contaminated soils, and capping areas. Unfortunately, neither state nor federal money was available at the time to carry out the remediation, and township officials did want to spend local tax dollars on the cleanup since the site did not pose an immediate health risk. However, when another fire broke out on the property in 2001, the township decided to raze the buildings on the site. In addition, the EPA recently performed some soil excavation and removal.

The future of the site is debatable. Although the property is zoned for open space and is owned by the township by default, hundreds of thousands of dollars of cleanup needs to occur before the public can use the property. While some township residents want the site to be cleaned up and turned into a park for active recreation, the majority of residents want to keep the property as a greenfield. Either way, remediation of the site would be beneficial to the township because it would allow for development of an open space connection between Colonial Heights and the Delaware and Raritan Canal through Nash and Hamnet Parks. However, complete remediation of the site awaits funding

Trenton Fibre Drum Company

Lawrence also received a $272,000 grant to study cleanup of the Trenton Fibre Drum Company site on New York Avenue. The Trenton Fibre Drum Company was a drum reconditioning company that cleaned metal drums for reuse by using an acidic wash. In 1984, a fire broke out on the two-acre property and the company went out of business. In 1985, EPA conducted a preliminary investigation of the site and found that the soil and surface water were contaminated with organic compounds and metals. In 1991, the EPA removed almost 1,000 drums, as well as a 550-gallon underground gasoline storage tank, from the site.

Lawrence entered into a Memorandum of Agreement with the NJDEP Site Remediation Program, which led the township to complete a Preliminary Assessment Report and a Site Investigation Report in 1997. The report identified “Areas of Concern” on the property and also found that the soils, surface water and groundwater of the site were contaminated and that the contamination was migrating off site. Seventeen of the “Areas of Concern” were investigated, and the findings indicate that eight of the areas needed further investigation and only one required cleanup activity.

In 2003, the NJDEP's Remedial Response Element completed an investigation and a remedial alternatives analysis of the site and found chemicals, such as lead and PCBs, in the soil. However, they also found that surface water, sediments and the building interior were not significantly impacted.

Table 22: Known Contaminated Sites in Lawrence Township

Name	Address	Zip	Status	Status Date	Lead Agency	Remedial Level
2551 Brunswick Ave Trenton LLC	2551 Brunswick Ave Trenton LLC	08648	Active	1/31/1995	BSCM	C2
Albon Holdings* ECRA Case #92484	2630 Brunswick Pike	08648	Negative Declaration Approved	11/1992		
Al's Mobil Service Inc	135 Lawrenceville Rd	08532	Active	11/30/1996	BSCM	C2
Bristol-Myers Squibb* ECRA Case #89663	3551 Lawrenceville-Princeton Road	08540	Negative Declaration Letter Issued	1/1993		
B-Way Mfg Inc.	6 Litho Rd	08648	Active	5/31/1994	BNCM	D
Chronar Corporation*	330 Bakers Basin Road	08648	Memorandum of Agreement	3/2002		
Crown Enterprises	320 Bakers Basin Rd	08648	Active	7/28/2000	BSCM	C1
Educational Testing Service	Rosedale Rd	08648	Active	12/26/1991	BSCM	C2
Ewing-Lawrence Sewarage Authority	600 Whitehead Rd	08648	Active	4/1/2003	BOMM	C2
Exxon/Mobil #3-2501	2890 Brunswick Pike Lawrenceville LLC	08648	Active	1/21/2005	BSCM	C2
Fermenta Animal Health Co	4100 Quaker Bridge Rd	08648	Active	1/5/2000	BFO-S	C2
Garnet Chevrolet-Geo	1100 Spruce St	08648	Active	8/21/1997	BSCM	C1
Hydrocarbon Research Incorporated	1501 New York Ave	08648	Active	7/31/2001	BFO-S	C1
John's Truck Stop	3271 Rt 1 (Brunswick Pk)	08648	Active	1/7/2005	BSCM	C2
Kwon Cleaners Lawrence Shopping Ctr	2495 Rt 1 (Brunswick Pk)	08648	Active	10/30/2003	BFO-S	C2
Lawrence Road Servicenter	1175 Lawrence Rd	08648	Active	10/24/2003	OWR	C2
Lawrenceville Amoco	2001 Princeton Pike	08448	Active	5/19/1998	BSCM	C2
Lawrenceville Armory	Eggert Crossing Rd	08648	Active	9/11/1998	BSCM	C1
Lawrenceville Fuel Co	16 Gordon Ave	08648	Active	1/26/2001	BSCM	C2
Lawrence Township Municipal Building	2207 Lawrenceville Road	08648	Active	10/12/2005	INS	B
Materials Electronic Products Co	1040 Spruce St	08648	Active	2/28/2001	CAS	C1

Name	Address	Zip	Status	Status Date	Lead Agency	Remedial Level
Materials Electronic Products Corp	990 Spruce St	08648	Active	8/19/2002	BNCM	C1
Mobil #57323	2417 Main St	08648	Active	2/28/1995	BSCM	C2
Mobil #57325	2515 Brunswick Pike	08648	Active	4/29/1992	BSCM	C2
NJDOT Maintenance Yard	2798 Rt 1 (Brunswick Pk)	08648	Active	3/21/1994	BFO-S	C2
Pitney Bowes*	2900 Brunswick Pike	08648	Negative Declaration Affidavit	9/1993		
Prince Manufacturing*	2750 Brunswick Pike	08648				
Project Freedom-Lawrenceville	Princeton Avenue	08648	Active	10/28/2001	BFO-S	C2
Saturn Chemical*	1600 New York Avenue	08638				
Shell Service Station #138523	2961 Brunswick Pike	08648	Active	7/14/1997	BSCM	C2
Trenton Fibre Drum Company Incorporated	1545 New York Ave	08532	Active	9/25/1997	BCM	C3
Vacant Building (CVS)	1920 Brunswick Pike	08648	Active	3/4/1992	BSCM	C2
Hess Station 30299	Rte 1 & Colonial Lake Dr	08638	NFA-A	12/29/1998	BOMM	C2
Hub City Distributors	649 Whitehead Rd	08638	NFA-A	7/2/1999	BSCM	C2
Shell Service Station	1720 Brunswick Ave	08648	NFA-A	2/28/2001	BSCM	C2

Sources: NJDEP Site Remediation and Waste Management, Lawrence Township Health Department

*Site is listed on the Lawrence Township Health Department's Known Contaminated Sites List, but is not present in NJDEP's database of Known Contaminated Sites.

A case manager is assigned to every *NJDEP Known Contaminated Site* case and can provide further information on each site. The Case Manager can be reached by contacting NJDEP's Site Remediation Program's lead agency, which is listed in the table for each site. Go to http://www.state.nj.us/dep/srp/kcs-nj/Mercer/index.html for contact information or call 1-800-253-5647.

Status

Code	Meaning
NFA-A	No further action for a partial area of a site

Lead Agencies

Initials	Full Name
BCM	Bureau of Case Management
BFO-S	Bureau of Field Operations-Southern
BNCM	Bureau of Northern Case Management
BOMM	Bureau of Operation, Maintenance and Management
BSCM	Bureau of Southern Case Management
CAS	Case Assignment Section
INS	Initial Notice Section
OWR	Office of Wellfield Remediation

Explanation of Remedial Levels

Remedial Level	Explanation of Site Complexity
B	A single phase remedial action with a single contaminant affecting only the soil.
C1	A remedial action with simple sites; one or two contaminants localized to soil and the immediate spill or discharge area.
C2	A remedial action with more complicated contaminant discharges; multiple site spills and discharges; more than one contaminant, with both soil and groundwater impacted or threatened.
C3	A multiphase remedial action with high complexity and threatening sites. Multiple contaminants, some at high concentrations with unknown sources, continuing to impact soils, groundwater, and possibly surface waters and potable water resources. Dangerous for direct contact with contaminated soils.
D	Same conditions as C3 except that D levels are also usually designated federal "Superfund Sites."

UNDERGROUND STORAGE TANKS

There are a number of businesses in Lawrence Township that still have underground storage tanks. As these tanks age and rust, they often begin to leak, which becomes a serious threat to the groundwater below them. These sites sometimes overlap with, and are listed as, Known Contaminated Sites, but are often less contaminated and require a lower level of remediation. See **Table 23: Underground Storage Tanks in Lawrence Township**.

Table 23: Underground Storage Tanks in Lawrence Township

PI Number	PI Name	Street Address	Bureau
000179	Lawrenceville Amoco	2001 Princeton Pike	BSCM
000675	Lawrenceville Armory	Eggert Crossing Rd	BSCM
002562	Educational Testing Service	Rosedale Rd	BSCM
003784	Mobil #57323	2417 Main St	BSCM
003788	Mobil #57325	2515 Brunswick Pike	BSCM
003791	Als Mobil Service Inc	135 Lawrenceville Rd	BSCM

PI Number	PI Name	Street Address	Bureau
004193	PSE&G Southern Division-Lawrenceville	4140 Quakerbridge Rd	INS
007349	2890 Brunswick Pike Lawrenceville LLC	2890 Brunswick Pike	BSCM
007604	Shell Service Station #138523	2961 Brunswick Pike	BSCM
008688	2551 Brunswick Ave Trenton LLC	2551 Brunswick Ave	BSCM
012004	Crown Enterprises	320 Bakers Basin Rd	BSCM
018692	Johns Truck Stop	3271 Rt 1	BSCM
018889	Vacant Building	1920 Brunswick Pike	BSCM
019702	Lawrenceville Fuel Co.	20 Gordon Ave	BSCM
031900	Garnet Chevrolet-Geo	1100 Gordon Ave	BSCM
217423	Brown's Paving	260 Eggerts Crossing Rd	BSCM
259256	2 Allegheny Avenue	2 Allegheny Ave	INS

Source: NJDEP

GROUNDWATER CONTAMINATION

Eight contaminated sites in Lawrence have groundwater contamination. These sites are restricted by a *Classification Exception Area (CEA)* designation. See **Table 24: Sites with CEA Designations**. A CEA can be established for a contaminated site’s aquifer if state drinking-water quality standards are not or will not be met due to: (1) natural groundwater quality, (2) discharges from a NJPDES permitted site, or (3) pollution caused by human activity, sometimes associated with a pollution remedy conducted under a NJDEP Administrative Consent order, within a contaminated site. A CEA designation suspends aquifer use in the affected areas until state drinking-water standards are met. It is not a groundwater remedy; it is an institutional control established in conjunction with an approved remedy. NJDEP may revise or establish a CEA at any time to more accurately reflect the groundwater conditions using current data. If possible, NJDEP or the entity responsible for the remediation or monitoring of the site (known as the Responsible Party) estimates the duration the CEA will remain in effect. Often, a responsible party applying for a NJPDES permit or submitting a remediation plan for a contaminated site will also submit a CEA designation application, called a CEA Fact Sheet, detailing the aquifer contamination.

Information about the dangers of different types of pollutants found in aquifers or wells can be found at the Environmental Defense Scorecard website: www.scorecard.org.

RADON

Radon is a radioactive gas that comes from the natural decay of uranium found in nearly all soils. It moves up through the ground to the air above and into all types of homes through cracks and other holes in foundations. A build up of radon contamination within a home can present residents with a long-term health hazard, specifically, lung cancer. It is invisible, odorless, and tasteless; the only method of detection is to conduct a radon test of the air within a home. Fortunately, radon testing is inexpensive. If radon levels are high in a home, NJDEP suggests the homeowner take the following actions: (1) prevent radon from entering the house by repairing cracks and insulation, and (2) dilute radon concentrations currently in the house through installing ventilation systems.

Table 24: Sites with CEA Designations

Site ID	Name	Date CEA approved	Duration of CEA (years)	Area of CEA (square feet)	Type of Contamination	Perimeter of CEA Boundary (feet)
NJL600043194	Hess Service Station #30299	12/29/98	5	31,275	Benzene, Methyl Tertiary Butyl Ether	715
NJD071613087	Ewing-Lawrence Sewerage Auth.	10/28/98	2	1,403	Benzene	165
NJL500047840	Princeton University Press	03/09/00	3.10	32,707	Benzene	641
NJD986629160	Hub City Distributors, Inc.	07/02/00	4	456	Benzene, Methyl Tertiary Butyl Ether, Xylenes, Tentatively Identified Compounds (TICs)	85
NJD986597730	Shell Service Station	02/22/01	2.6	38,464	Benzene	818
NJD069884765	Rider University	08/13/01	1.8	11,264	Methyl Tertiary Butyl Ether	386
NJD986606598	Mobil Service Station #15-KYO	06/30/03	8.08	41,047	Benzene, Methyl Tertiary Butyl Ether, t-Butyl Alcohol, Tentatively Identified Compounds (TICs), Toluene, Xylenes, Ethylbenzene	821
NJD075484139	Hydrocarbon Technologies Inc.	08/12/03	5	165,132	Benzene, Trichloroethylene, Chlorobenzene, 1,1-dichloroethene, Vinyl Chloride	1,884

Source: NJDEP

NJDEP classifies townships into three categories as to the risk of having high radon levels. Tier 1 is the highest level. Lawrence is listed as a Tier 1 municipality with a high risk of having high radon levels in homes. The level at which homeowners should take immediate action is 4.0 picocuries per liter of air. While state law does not require radon testing before a real estate transaction, NJDEP recommends that a contingency clause be included in a sale contract, allowing the buyer to have the home tested for radon and fixing the home if an elevated level of radon gas is discovered. State law (N.J.A.C. 26:2D-73) does require, at the time of a real estate transaction, that the seller provide the buyer with a copy of the results of any radon testing if such testing was conducted during tenure.

The Lawrence Township health department has radon kits available for sale to measure the level of radon in residents’ homes. The health department also has free literature available regarding radon testing and remediation.

FLOODING

Lawrence often experiences significant flooding from storm events. The most severe flooding in Lawrence occurs along the Shabakunk Creek. The Shabakunk Creek begins in Hopewell Township, then passes through Ewing Township, before entering Lawrence.

One of the most severe flooding events in Lawrence occurred on the evening of June 12, 1996, when heavy rains caused widespread flooding throughout western Mercer County. The storm was considered a 100-year storm event and it dumped more than seven inches of rain on the area in less than four hours and pelted the area with marble- to golf ball-size hail. The sudden rains swelled the Shabakunk Creek and its tributaries. Water rushed into the creek's 100-year floodplain and beyond. Hundreds of roads throughout the Mercer County region were closed due to waters that reached chest level in some places. In Lawrence, police considered evacuating parts of the township. Also, basement flooding posed a serious fire hazard when waters got close to outlets, electrical boxes and gas lines.

The 1996 June flood heightened concerns about flooding in the area, and on September 10, 1996, a New Jersey Senate Urban Policy and Planning Committee meeting took place to address some of these concerns. Attendees included township representatives from Trenton, Ewing and Lawrence, as well as state government officials from agencies such as the Department of Environmental Protection and the Department of Transportation. Officials discussed flood remediation and mitigation strategies, such as desnagging, bridge replacements, deepening Colonial Lake, putting more water in the Delaware and Raritan Canal, and underground storage retention.

Even before the September 1996 committee meeting, there were attempts to develop a solution to flooding problems. Several plans were developed, including the Natural Resources Conservation Service (NRCS) comprehensive plan of 1964. This plan suggested building reservoirs (the last of which was built in Hamilton Township in 1994) to contain excess water during storm events. The plan proposed a reservoir on the Shipetauken Creek, but it was not constructed. After severe flooding events in 1975, the NRCS reexamined the Assunpink Creek area to determine the impact of the reservoirs. The agency reported, in a 1982 report, that the reservoirs produced only slight mitigation effects, and that "there was nothing else that they, or the federal government, could do to resolve the problem."

In addition to the NRCS study, the Army Corps of Engineers conducted a study on a portion of the Shabakunk Creek in 1992 to determine the impact of proposed flood remedial work in Ewing Township on Lawrence. The study concluded that the proposed work would modestly *increase* flooding in Lawrence Township.

A lasting solution to flooding problems in Lawrence and neighboring townships will require preserving, maintaining and restoring wetlands, woodlands and naturally-functioning floodplains. Reforestation, the planting of vegetated riparian buffers, and the creation of greenways along waterbodies all help to restore the ability of floodplains to capture, store and retain floodwaters and keep people and structures out of harm's way during flooding events.

Impervious surfaces, such as asphalt, are a large contributor to flooding problems because they do not allow water to percolate into the ground. On an impervious surface, water is forced to travel downhill until it can find a place to sink into soil or enter a waterbody. This runoff is greatest after the beginning of a storm or a major snow melt. As impervious surfaces increase, runoff increases in quantity, velocity, temperature and pollution levels. Development is a large contributor to impervious surfaces through construction of roads, sidewalks, parking lots, driveways, rooftops, and compacted soil. A municipality can lessen these effects by reducing the amount of impervious surfaces within its jurisdiction and by implementing stormwater best management practices (BMPs). Most importantly, development should be kept out of floodplains to the greatest degree possible so floods can occur (as they naturally do) with few impacts to people and property.

OTHER ENVIRONMENTAL CONCERNS

Toxic Releases

According to the EPA annual Toxics Release Inventory (TRI), the B-Way Manufacturing facility on Litho Road ranks high in the release of toxic chemicals to the environment in New Jersey. In 2004 (the most recent data available), approximately 19,559 pounds of toxic chemicals were released to land, air, and water by the facility. Chemicals released include trimethylbenzene, certain glycol ethers, ethylbenzene, methyl isobutyl ketone, n-butyl alcohol, naphthalene, and xylene. The Bristol-Myers Squibb facility located on Province Line Road in Lawrenceville is also listed in the EPA's Toxics Release Inventory. The 2004 report listed this facility as releasing almost 2,000 pounds of ammonia into the environment.

Historic Pesticides

New Jersey is one of the first states in the nation to address issues relating to toxic pesticide residuals, such as dichloro-diphenyl-trichloroethane (better known as DDT), arsenic, and lead, which remain in the soil from past agricultural operations. In 1996, NJDEP convened a task force to study the extent of the historic pesticide problem in New Jersey and to develop strategies for protecting human health. The task force's findings were issued in an April 1999 report. While the task force examined 18 agricultural sites throughout New Jersey (none in Mercer County), it is estimated that five percent of the state's land area is impacted by residues from agricultural pesticides. The primary human health concern of residual contamination is the ingestion of contaminated soil. Therefore, small children who may ingest soil are at the greatest health risk. This issue may affect residents of homes and subdivisions built on former cropland and orchards. Homeowners can take precautions, such as maintaining grass coverage and washing hands and toys after playing in exposed soil. Some developers may be willing to address this problem by testing and removing the existing topsoil and bringing in clean topsoil before construction commences.

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To learn more about a contaminated site, contact one of the lead agencies overseeing the case or visit the web site: http://www.state.nj.us/dep/srp/. Site Remediation and Waste Management, formerly known as the Site Remediation Program, is a program unit within NJDEP that provides financial aid and technical guidance in cleaning up the state's more serious contaminated sites that pose a danger to human health and the environment. SRWM maintains an inventory of 38,000 sites, of which 25,000 require no further remediation action. The bureaus within SRWM are listed below for easy reference:

Bureau	**Acronym**	**Telephone No.**
Case Management	BCM	(609) 633-1455
Construction	BC	(609) 984-2991
Emergency Response Region I	BER-I	(973) 669-3955
Emergency Response Region II	BER-II	(609) 584-4130
Environmental Evaluation, Cleanup and Responsibility Assessment	BEECRA	(609) 777-0899
Environmental Measurements and Site Assessment	EMSA	(609) 584-4280
Underground Storage Tanks	BUST	(609) 292-8761
Field Operation - Case Assignment Section	BFO-CA	(609) 292-2943
Field Operations - Initial Notice	BFO-IN	(609) 633-0708
Field Operations - Northern Field Office	BFO-N	(973) 669-3960
Field Operations - Southern Field Office	BFO-S	(609) 584-4150
Fund Management, Compliance and Recovery	BFMCR	(609) 633-0719
Site Management	BSM	(609) 984-2990

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APPENDIX A

APPENDIX A: Private Well Testing Act

The Private Well Testing Act (PWTA) (*N.J.S.A. 58:12A-26 et seq.*), enacted in 2002 and administered by NJDEP, requires that well water be tested for contaminants when properties served by certain types of drinking water wells are sold or leased. The law does not prohibit the sale of property in cases where the water fails one or more drinking water test standards. Rather, the fundamental goal of the PWTA is to ensure that purchasers and lessees of properties served by private potable wells are fully aware of the quality of the untreated drinking water sources prior to sale or lease. The state law allows the buyer and seller to determine which party will pay for the test, as well as what actions, if any, need to be taken if test results indicate a contaminant is present in the water above an applicable standard. However, individual county health rules may mandate that certain actions are required in order for a real estate transaction to be finalized.

The PWTA program requires that water be tested for primary contaminants (health-based) and secondary parameters (aesthetic characteristics). Primary contaminants are contaminants that may cause a potential health risk if consumed on a regular basis above the established maximum contaminant level (MCL). New Jersey regulates 18 primary contaminants, five more than federal EPA requirements. Primary contaminants include bacteriological (fecal coliform and *E. coli*), Volatile Organic Compounds (VOCs), inorganics (arsenic, lead, mercury, and nitrates), and Radiological (radium decay) substances. A certified laboratory must collect a water sample at a point before the water goes through any treatment. This sample represents the condition of the ground water in the aquifer, which may be different from water out of a kitchen faucet. Property owners may choose to also have the tap water tested to assure that filters or treatments are working effectively.

Volatile Organic Compounds regulated by NJDEP

- Benzene
- Carbon Tetrachloride
- meta-Dichlorobenzene
- ortho-Dichlorobenzene
- para-Dichlorobenzene
- 1, 1-Dichloroethane
- 1, 2-Dichloroethane
- 1, 1-Dichloroethylene
- *cis* – 1, 2-Dichloroethylene
- *trans* – 1, 2-Dichloroethylene
- 1, 2-Dichloropropane
- Ethylbenzene
- Methyl tertiary butyl ether
- Methylene Chloride
- Monochlorobenzene
- Naphthalene
- Styrene
- 1, 1, 2, 2-Tetrachloroethane
- Tetrachloroethylene
- Toluene
- 1, 2, 4-Trichlorobenzene
- 1, 1, 1-Trichloroethane
- 1, 2, 2-Trichloroethane
- Trichloroethylene
- Vinyl Chloride
- Xylenes (Total)

The PWTA program requires tests for three naturally occurring secondary parameters: pH, iron, and manganese. Secondary drinking water standards address aesthetics, such as corrosivity, taste, and color, and testing for these parameters determines if water is suitable for laundering, plumbing, and showering. For example, due to the nature of soils and geology in southern New Jersey, the ground waters tend to be acidic (pH below 7), while ground waters in the northern part are neutral (pH=7) to basic (pH above 7). If the pH is too low (less than 6.5), water has a bitter metallic taste and causes corrosion of pipes and fixtures. If the pH is too high (greater than 8.5), the water has a slippery feel, it tastes like soda, and deposits can form on plumbing fixtures.

Test results are reported by the lab to the person who requested the testing, to NJDEP, and to the local health authority. Suspicious or unexpected results are neither confirmed nor verified by NJDEP. Local health authorities will investigate suspect results, if necessary.

APPENDIX A: Private Well Testing Act

In February 2004, NJDEP released an online report summarizing the initial well test results reported to the agency during the PWTA program's first six months (September 2002 to March 2003). Results for 5,179 wells are included, which represent approximately one percent of private wells used as potable water supplies in New Jersey. The compilation of water test results is organized by county and municipality, but does not include the names of specific property owners, their addresses, or well locations, because releasing that information is prohibited by law. About 92 percent of the 5,179 wells passed all the required (health-based) standards, with the exception of lead. Of the eight percent (417 wells) of wells sampled that exceeded the maximum contaminant level for primary contaminants, the most common reason for failure statewide was nitrate (inorganics), followed by fecal coliform (bacteriological), and VOCs. Nitrates are found in ground water due to a number of factors, including natural deposits, runoff from fertilizer, leaching from septic tanks, and leaking sewage pipes.

More wells in northern New Jersey were found to have fecal coliform or *E. coli* bacteria than in southern New Jersey. The northern/southern difference is probably due to the different geology in these regions. Northern New Jersey is characterized by limestone subject to solution cavities, fractured bedrock, or gravel water-bearing zones, while the southern part of the state is composed mainly of coastal plain sand and gravel, which appears to provide better protection of ground water from fecal contaminants.

The test results for Mercer County and Lawrence Township are summarized in the table below. NJDEP's initial report indicates the presence of several drinking water contaminants, including mercury, gross alpha (radium), 1,2,3-Trichloropropane, and 1,2-Dichloropropane, in the county's groundwater, but not necessarily in the township's groundwater.

Summary of PWTA Test Results for Mercer County (Sept. 2002 – March 2003)

Municipality	# Wells sampled	Total # Wells over the MCL*	Fecal coliform/ E. coli	Nitrate	Mercury	Any VOC** over the MCL
Lawrence Township	9	0	0	0	0	0
Mercer County Totals	***131***	***16***	***2***	***1***	***0***	***5***

Source: NJDEP, Division of Science, Research, and Technology (DSRT)

* MCL – Maximum Contaminant Level, set as the limit of a particular substance allowable to achieve a water quality standard

** VOC – Volatile Organic Compound.

APPENDIX B

APPENDIX B: Federal and State Conservation Programs for Farmers and Landowners

There are several financial and economic incentive programs and technical assistance to help farmers plan and use conservation practices on their farms. The United States Department of Agriculture Natural Resources Conservation Service (NRCS) has a Farm Service Agency office in Freehold, Monmouth County, which serves Mercer County. NRCS staff members are available to work with farmers to help identify their conservation goals and then craft appropriate conservation plans to meet those goals.

Numerous programs provide financial incentives to help farmers voluntarily engage in these practices. Financial incentives can include rental payments to farmers for reserved land, easement payments, and cost sharing, up to 100 percent for some programs, to develop and follow conservation plans.

The **Conservation Reserve Program (CRP)** is offered by NRCS and administered by the Farm Service Agency. It provides technical and financial aid and gives farmers assistance in complying with federal, state and tribal environmental laws. The primary environmental goals of this program include reducing soil erosion, reducing sedimentation in streams and lakes, improving water quality, establishing wildlife habitat, and enhancing forest and wetland resources. The program's website address is: http://www.nrcs.usda.gov/programs/crp/

The State of New Jersey partnered with the USDA to help farmers protect water quality by establishing a $100 million **Conservation Reserve Enhancement Program (CREP)**, which is the New Jersey version of the federal program**.** Under an agreement signed by former Governor McGreevy in February 2004, the USDA provides $77 million and the state contributes $23 million for New Jersey farmers to install stream buffers in order to reduce the flow of nonpoint source pollution into the state's waterways. New Jersey's goal is to enroll 30,000 acres of agricultural land into this state/federal program over a 10-year period. Types of buffers to be installed include trees, shrubs, vegetative filter strips, contour grass strips and grass waterways. Under the program, a landowner installs and maintains approved practices through a 10- or 15-year rental contract agreement. A landowner entering the state Farmland Preservation Program or Green Acres Program also may opt for a permanent easement under the Conservation Reserve Enhancement Program. This would provide additional payment for permanent maintenance of approved conservation practices. The program will pay landowners annual rental and incentive payments for participating in the program, as well as 100 percent of the cost to establish approved practices. Additional information can be found at www.fsa.usda.gov, or contact the local Farm Service Agency (FSA) Office or Soil and Water Conservation District Office.

Another program designed to conserve natural resources is called the **Wetlands Reserve Program (WRP)**. WRP is a voluntary resource conservation program that provides landowners the opportunity to receive financial incentive to restore, protect and enhance wetlands in exchange for returning marginal land from agriculture. WRP is made possible by a reauthorization in the Farm Security and Rural Investment Act of 2002, known as the Farm Bill. The program has three enrollment options: permanent easement, 30-year easement, or restoration cost-share agreement, which has a minimum 10-year commitment. Applications are accepted on a continuous basis and applications may be obtained and filed at any time. Please see the website for more details: www.nrcs.usda.gov/programs/farmbill/2002/

The **Grassland Reserve Program (GRP)** is another conservation program authorized by the Farm Bill of 2002. GRP is a voluntary program that protects grasslands, pasturelands, and rangelands without prohibiting grazing. Participants voluntarily put limitations on the future use of their land while retaining the ability and right to conduct grazing practices, produce hay, mow or harvest for seed production, conduct fire rehabilitation, and construct firebreaks and fences. There are four enrollment options: permanent easement; 30-year easement; rental agreement, which is available in 10-, 15-, 20- or 30-year contracts; and restoration agreement. Participants are compensated in different ways according to the enrollment option. For more information and application procedures, visit the GRP website: www.fsa.usda.gov/dafp/GRP/default1.htm

The **Wildlife Habitat Incentives Program (WHIP)** is similar to those above in that it is also a USDA voluntary program, but differs in that WHIP targets landowners who want to preserve and protect fish and wildlife habitat on non federal lands. The program provides technical and cost sharing provisions to protect these environments. Enrollment consists of a cost-share agreement, lasting from 5 to 10 years. In New Jersey, NRCS has received over $900,000 to implement WHIP since 1998, where the majority of funds have been used for cost-share payments to landowners. A state plan has been developed in New Jersey and targets several areas as priority wildlife habitat areas. NRCS has also targeted a priority species, the bog turtle, for protection. For more information visit the NRCS New Jersey website: www.nj.nrcs.usda.gov

The **Environmental Quality Incentives Program (EQIP)** is also a part of the reauthorized Farm Bill of 2002. EQIP is a voluntary program that focuses on conservation that promotes both agricultural production and environmental quality. The program itself offers technical and financial assistance with installation and implementation of structural and management practices on agricultural land. EQIP features a minimum contract term compared to other programs lasting a maximum of 10 years. Landowners are eligible for incentive and cost-share payments of up to 75 percent, and sometimes up to 90 percent, while still engaging in livestock or agricultural production activities. For more information please visit the website: www.nrcs.usda.gov/programs/eqip

The **Conservation Security Program (CSP)** is a voluntary program administered by the NRCS and authorized by the Farm Bill of 2002. This program is intended to promote conservation and improvement of soil, water, air, energy, plant and animal life, etc., on tribal and private working lands. Working lands refer to a variety of land types, including cropland, grassland, prairie land, improved pasture and rangeland. In some cases, forested lands would also be included in this category. CSP is available in 50 states as well, as the Caribbean and Pacific Basin areas, and provides equal access to funding. For more information please visit the website: www.nrcs.usda.gov/programs/csp/

The **Forestland Enhancement Program (FLEP)** is also authorized through the Farm Bill of 2002 and replaces the Stewardship Incentives Program (SIP) and the Forestry Incentives Program (FIP). FLEP is a voluntary program for landowners of non-industrial private forest and it provides technical, educational, and cost-sharing assistance in an effort to promote the conservation of these forested areas. Landowners must have a forest management plan. They are limited to 1,000 acres per year for the cost-share practices. For more information about this program, please visit the website: http://www.fs.fed.us/spf/coop/programs/loa/flep.shtml and the

APPENDIX B: Federal and State Conservation Programs for Farmers and Landowners

National Association of State Foresters website to find your local agency:
www.stateforesters.org

The **Farm and Ranch Lands Protection Program (FRPP)** is a voluntary land conservation program that assists farmers to keep their lands for agricultural purposes. FRPP provides matching funds to those provided by state, tribal, local government or non government organizations offering farm and ranch protection programs designed to purchase conservation easements. The FRPP is authorized by the Farm Bill of 2002 and managed by the NRCS. Conservation easements are purchased by the state, tribal or local entity. The participating landowner agrees not to convert their land to non agricultural uses and to develop a conservation plan for any highly erodible lands. Landowners do, however, maintain all of their rights to utilize their land for agricultural purposes. For more information about FRPP, please visit the website: www.nrcs.usda.gov/programs/farmbill/2002/ and search for the Farm and Ranch Lands Protection Program.

The **State Agricultural Development Committee (SADC) in New Jersey** has made soil and water conservation grants available as part of the Farmland Preservation Program. The grants gives landowners up to 50 percent of the funds required for approved soil and water conservation projects. Farms are only eligible if they are already enrolled in a permanent or eight-year easement program. Soil projects can include measures to prevent or control erosion, control pollution on agricultural land, and improve water management for agricultural purposes. Projects must be completed within three years of SADC funding approval. However, under special circumstances, the grant may be renewed for an additional year. For more information, contact the local Soil Conservation District or the State Agricultural Development Committee at (609) 984-2504 or visit the website: http://www.state.nj.us/agriculture/sadc/sadc.htm for additional details.

The **Landowner Incentive Program (LIP)** is a preservation program for private landowners who wish to protect and conserve rare wildlife habitat and species. LIP is funded by the U.S. Fish and Wildlife Service and is administered by NJDEP's Division of Fish and Wildlife Endangered Nongame Species Program. Participating landowners receive both technical and financial assistance through this competitive grant program. Last year $1.12 million was awarded for a variety of preservation programs including habitat improvements, habitat management and habitat protection projects. Generally, a five-year minimum commitment is required and longer terms are preferred. A 25 percent cost-share is required of the landowner. While the LIP is seeking funding for additional habitat protection projects, it may be another year before grants are available. Interested landowners are encouraged to contact Kim Korth, ENSP assistant zoologist at (609) 984-1581, for additional details. To learn more about the program in general visit the website: http://www.state.nj.us/dep/fgw/ensp/lip_prog.htm or http://www.state.nj.us/dep/fgw/ensp/pdf/lip_broch.pdf

APPENDIX C

BIRDS

Common Name	Scientific name	Family
Canada goose	*Branta canadensis*	Anatidae
mallard duck	*Anas platyrhynchos*	Anatidae
black vulture	*Coragyps atratus*	Cathartidae
turkey vulture	*Cathartes aura*	Cathartidae
osprey	*Pandion haliaetus*	Accipitridae
bald eagle	*Haliaeetus leucocephalus*	Accipitridae
northern harrier	*Circus cyaneus*	Accipitridae
sharp-shinned hawk	*Accipiter striatus*	Accipitridae
Cooper's hawk	*Accipiter cooperii*	Accipitridae
red-tailed hawk	*Buteo jamaicensis*	Accipitridae
wild turkey	*Meleagris gallopavo*	Phasianidae
killdeer	*Charadrius vociferus*	Charadriidae
American woodcock	*Scolopax minor*	Scolopacidae
ring-billed gull	*Larus delawarensis*	Laridae
mourning dove	*Zenaida macroura*	Columbidae
eastern screech owl	*Otus asio*	Strigidae
great horned owl	*Bubo virginianus*	Strigidae
chimney swift	*Chaetura pelagica*	Apodidae
red-bellied woodpecker	*Melanerpes carolinus*	Picidae
yellow-bellied sapsucker	*Sphyrapicus varius*	Picidae
downy woodpecker	*Picoides pubescens*	Picidae
hairy woodpecker	*Picoides villosus*	Picidae
northern flicker	*Colaptes auratus*	Picidae
pileated woodpecker	*Dryocopus pileatus*	Picidae
eastern wood-pewee	*Contopus virens*	Tyrannidae
eastern phoebe	*Sayornis phoebe*	Tyrannidae
great crested flycatcher	*Myiarchus crinitus*	Tyrannidae
eastern kingbird	*Tyrannus tyrannus*	Tyrannidae
tree swallow	*Tachycineta bicolor*	Hirundinidae
barn swallow	*Hirundo rustica*	Hirundinidae
blue jay	*Cyanocitta cristata*	Corvidae
American crow	*Corvus brachyrhynchos*	Corvidae
fish crow	*Corvus ossifragus*	Corvidae
Carolina chickadee	*Poecile carolinensis*	Paridae
tufted titmouse	*Baeolophus bicolor*	Paridae
white-breasted nuthatch	*Sitta carolinensis*	Sittidae
brown creeper	*Certhia americana*	Certhiidae
Carolina wren	*Thryothorus ludovicianus*	Troglodytidae
house wren	*Troglodytes aedon*	Troglodytidae
winter wren	*Troglodytes troglodytes*	Troglodytidae
ruby-crowned kinglet	*Regulus calendula*	Regulidae
blue-gray gnatcatcher	*Polioptila caerulea*	Sylviidae

eastern bluebird	*Sialia sialis*	Turdidae
hermit thrush	*Catharus guttatus*	Turdidae
wood thrush	*Hylocichla mustelina*	Turdidae
American robin	*Turdus migratorius*	Turdidae
gray catbird	*Dumetella carolinensis*	Mimidae
northern mockingbird	*Mimus polyglottos*	Mimidae
brown thrasher	*Toxostoma rufum*	Mimidae
cedar waxwing	*Bombycilla cedrorum*	Bombycillidae
European starling	*Sturnus vulgaris*	Sturnidae
white-eyed vireo	*Vireo griseus*	Vireonidae
red-eyed vireo	*Vireo olivaceus*	Vireonidae
blue-winged warbler	*Vermivora pinus*	Parulidae
Nashville warbler	*Vermivora ruficapilla*	Parulidae
yellow warbler	*Dendroica petechia*	Parulidae
magnolia warbler	*Dendroica magnolia*	Parulidae
yellow-rumped warbler	*Dendroica coronata*	Parulidae
prairie warbler	*Dendroica discolor*	Parulidae
palm warbler	*Dendroica palmarum*	Parulidae
blackpoll warbler	*Dendroica striata*	Parulidae
black-and-white warbler	*Mniotilta varia*	Parulidae
ovenbird	*Seiurus aurocapillus*	Parulidae
common yellowthroat	*Geothlypis trichas*	Parulidae
Wilson's warbler	*Wilsonia pusilla*	Parulidae
scarlet tanager	*Piranga olivacea*	Thraupidae
northern cardinal	*Cardinalis cardinalis*	Cardinalidae
rose-breasted grosbeak	*Pheucticus ludovicianus*	Cardinalidae
indigo bunting	*Passerina cyanea*	Cardinalidae
eastern towhee	*Pipilo erythrophthalmus*	Emberizidae
American tree sparrow	*Spizella arborea*	Emberizidae
field sparrow	*Spizella pusilla*	Emberizidae
savannah sparrow	*Passerculus sandwichensis*	Emberizidae
song sparrow	*Melospiza melodia*	Emberizidae
swamp sparrow	*Melospiza georgiana*	Emberizidae
white-throated sparrow	*Zonotrichia albicollis*	Emberizidae
dark-eyed junco	*Junco hyemalis*	Emberizidae
red-winged blackbird	*Agelaius phoeniceus*	Icteridae
common grackle	*Quiscalus quiscula*	Icteridae
brown-headed cowbird	*Molothrus ater*	Icteridae
orchard oriole	*Icterus spurius*	Icteridae
Baltimore oriole	*Icterus galbula*	Icteridae
purple finch	*Carpodacus purpureus*	Fringillidae
house finch	*Carpodacus mexicanus*	Fringillidae
American goldfinch	*Carduelis tristis*	Fringillidae
house sparrow	*Passer domesticus*	Passeridae

APPENDIX C: Plants and Animals of Lawrence's Carson Road Woods Park

AMPHIBIANS

Common Name	Scientific Name	Family
northern spring peeper	*Pseudacris crucifer*	Hylidae
green frog	*Rana clamitans*	Ranidae
pickerel frog	*Rana palustris*	Ranidae
northern two-lined salamander	*Eurycea b. bislineata*	Plethodontidae
redback salamander	*Plethodon cinereus*	Plethodontidae

REPTILES

Common Name	Scientific Name	Family
eastern milk snake	*Lampropeltis t. triangulum*	Colubridae
eastern garter snake	*Thamnophis s. sirtalis*	Colubridae
eastern box turtle	*Terrapene carolina*	Emydidae

MAMMALS

Common Name	Scientific Name	Family
white-tailed deer	*Odocoileus virginianus*	Cervidae
coyote	*Canis latrans*	Canidae
red fox	*Vulpes vulpes*	Canidae
house cat	*Felis catus*	Felidae
Virginia opossum	*Didelphis virginiana*	Didelphidae
northern short-tailed shrew	*Blarina brevicauda*	Soricidae
mole	*Family Talpidae*	Talpidae
eastern cottontail	*Sylvilagus floridanus*	Leporidae
white-footed mouse	*Peromyscus leucopus*	Muridae
gray squirrel	*Sciurus carolinensis*	Sciuridae

BUTTERFLIES AND MOTHS

Common Name	Scientific Name	Family
black swallowtail	*Papilio polyxenes*	Papilionidae
eastern tiger swallowtail	*Papilio glaucus*	Papilionidae
spicebush swallowtail	*Papilio troilus*	Papilionidae
cabbage white	*Pieris rapae*	Pieridae
clouded sulphur	*Colias philodice*	Pieridae
orange sulphur	*Colias eurytheme*	Pieridae
blue azure	*Celastrina ladon*	Lycaenidae
summer azure	*Celestrina neglecta*	Lycaenidae
eastern tailed blue	*Everes comyntas*	Lycaenidae
spring azure	*Celastrina argiolus*	Lycaenidae
great spangled fritillary	*Speyeria cybele*	Nymphalidae
pearl crescent	*Phyciodes tharos*	Nymphalidae
question mark	*Polygonia interrogationis*	Nymphalidae
eastern comma	*Polygonia comma*	Nymphalidae
mourning cloak	*Nymphalis antiopa*	Nymphalidae
American painted lady	*Vanessa virginiensis*	Nymphalidae

painted lady	*Vanessa cardui*	Nymphalidae
red admiral	*Vanessa atalanta*	Nymphalidae
buckeye	*Junonia coenia*	Nymphalidae
red-spotted purple	*Limenitis arthemis*	Nymphalidae
little wood satyr	*Megisto cymela*	Nymphalidae
common wood nymph	*Cercyonis pegala*	Nymphalidae
monarch	*Danaus plexippus*	Nymphalidae
Delaware skipper	*Anatrytone logan*	Hesperiidae
silver-spotted skipper	*Epargyreus clarus*	Hesperiidae
Juvenal's dusky wing	*Erynnis juvenalis*	Hesperiidae
swarthy skipper	*Nastra lherminier*	Hesperiidae
least skipper	*Ancyloxypha numitor*	Hesperiidae
Peck's skipper	*Polites coras*	Hesperiidae
little glassywing	*Pompeius verna*	Hesperiidae
sachem	*Atalopedes campestris*	Hesperiidae
dun skipper	*Euphyes vestris*	Hesperiidae
spicebush silkmoth	*Callosamia promethea*	Saturniidae:

DRAGONFLIES AND DAMSELFLIES

Common Name	**Scientific Name**	**Family**
common green darner	*Anax junius*	Aeshnidae
black-shouldered spinyleg	*Dromogomphus spinosus*	Gomphidae
dot-tailed whiteface	*Leucorrhinia intacta*	Libellulidae
widow skimmer	*Libellula luctuosa*	Skimmers
twelve-spotted skimmer	*Libellula pulchella*	Skimmers
painted skimmer	*Libellula semifasciata*	Skimmers
common whitetail	*Libellula lydia*	Skimmers
eastern amberwing	*Perithemis tenera*	Skimmers
meadowhawk	*Sympetrum sp.*	Skimmers
black saddlebags	*Tramea lacerata*	Skimmers
black-winged damselfly	*Calopteryx maculata*	Calopterygidae

MISCELLANEOUS INSECTS AND SPIDERS

Common Name	**Scientific Name**	**Family**
soldier beetle	*Family cantharidae*	Cantharidae
ladybird beetle	*Family coccinellidae*	Coccinellidae
Mydas fly	*Family mydadae*	Mydadae
water strider	*Gerris remigis*	Gerridae
small milkweed bug	*Lygaeus kalmii*	Lygaeidae
spittlebug	*Family cercopidae*	Cercopidae
honey bee	*Apis mellifera*	Apidae
bumblebee	*Bombus sp.*	Apidae
bald-faced hornet	*Dolichovespula maculata*	Vespidae
hornet	*Family vespidae*	Vespidae
meadow grasshopper type	*Family tettiganiidae*	Tettiganiidae
grasshopper (green short-horned)	*Family acrididae*	Acrididae

locusts	*Family acrididae*	Acrididae
cricket	*Family gryllidae*	Gryllidae
European mantis	*Mantis religiosa*	Mantidae
Chinese mantis	*Tenodera aridifolia*	Mantidae
praying mantis	*Family mantidae*	Mantidae
eastern wood tick	*Dermacentor sp.*	Ixodidae
orb weaver spider	*Araneus sp.*	Araneidae
garden spider	*Araneus diadematus*	Araneidae
sheet web spiders	*Family linyphiidae*	Linyphiidae
wolf spider	*Lycosa sp.*	Lycosidae
fishing spider	*Dolomedes sp.*	Pisauridae
eastern daddy-long-legs	*Leiobunum sp.*	Phalangiidae

TREES

Common Name	**Scientific Name**	**Family**
eastern red cedar	*Juniperus virginiana var virginiana*	Cupressaceae
European larch	*Larix decidua*	Pinaceae
Norway spruce	*Picea abies*	Pinaceae
blue spruce	*Family Pinaceae*	Pinaceae
eastern white pine	*Pinus strobus*	Pinaceae
douglas fir	*Pseudotsuga menziesii*	Pinaceae
American holly	*Ilex opaca var opaca*	Aquifoliaceae
flowering dogwood	*Cornus florida*	Cornaceae
dogwood	*Cornus sp.*	Cornaceae
black gum	*Nyssa sylvatica var sylvatica*	Nyssaceae
honey-locust	*Gleditsia triacanthos*	Fabaceae
gray birch	*Betula populifolia*	Betulaceae
birch	*Betula sp.*	Betulaceae
American hornbeam	*Carpinus caroliniana var virginiana*	Betulaceae
white oak	*Quercus alba*	Fagaceae
swamp white oak	*Quercus bicolor*	Fagaceae
pin oak	*Quercus palustris*	Fagaceae
red oak	*Quercus rubra var rubra*	Fagaceae
black oak	*Quercus velutina*	Fagaceae
American beech	*Fagus grandifolia*	Fagaceae
sweet gum	*Liquidambar styraciflua*	Hamamelidaceae
bitter-nut hickory	*Carya cordiformis*	Juglandaceae
shagbark hickory	*Carya ovata*	Juglandaceae
black walnut	*Juglans nigra*	Juglandaceae
sassafras	*Sassafras albidum*	Lauraceae
tulip poplar	*Liriodendron tulipifera*	Magnoliaceae
sweet cherry	*Prunus avium*	Rosaceae
black cherry	*Prunus serotina var serotina*	Rosaceae
cherry	*Prunus sp.*	Rosaceae
crabapple	*Pyrus sp.*	Rosaceae
eastern cottonwood	*Populus deltoides var deltoides*	Salicaceae
aspen or cottonwood	*Populus sp.*	Salicaceae

willow	*Salix sp.*	Salicaceae
box elder	*Acer negundo var negundo*	Aceraceae
Norway maple	*Acer platanoides*	Aceraceae
red maple	*Acer rubrum*	Aceraceae
silver maple	*Acer saccharinum*	Aceraceae
white ash	*Fraxinus americana*	Oleaceae
green ash	*Fraxinus pennsylvanica*	Oleaceae
ash	*Fraxinus sp.*	Oleaceae
princess tree	*Paulownia tomentosa*	Scrophulariaceae
American elm	*Ulmus americana*	Ulmaceae
slippery elm	*Ulmus rubra*	Ulmaceae
elm	*Ulmus sp.*	Ulmaceae

SHRUBS

Common Name	Scientific Name	Family
winterberry	*Ilex verticillata var verticillata*	Aquifoliaceae
holly	*Ilex sp.*	Aquifoliaceae
Japanese barberry	*Berberis thunbergii*	Berberidaceae
barberry	*Berberis sp.*	Berberidaceae
Japanese honeysuckle	*Lonicera japonica*	Caprifoliaceae
amur honeysuckle	*Lonicera maackii*	Caprifoliaceae
Morrow's bush honeysuckle	*Lonicera morrowii*	Caprifoliaceae
twinsisters	*Lonicera tatarica*	Caprifoliaceae
honeysuckle	*Family caprifoliaceae*	Caprifoliaceae
common elderberry	*Sambucus canadensis var canadensis*	Caprifoliaceae
viburnum	*Viburnum sp.*	Caprifoliaceae
arrowwood	*Viburnum dentatum*	Caprifoliaceae
blackhaw	*Viburnum prunifolium*	Caprifoliaceae
Russian olive	*Elaeagnus angustifolia*	Elaeagnaceae
autumn olive	*Elaeagnus umbellata var parvifolia*	Elaeagnaceae
spicebush	*Lindera benzoin*	Lauraceae
bayberry	*Family myricaceae*	Myricaceae
oriental hedge; oriental privet	*Ligustrum sp.*	Oleaceae
Asiatic privet	*Ligustrum sp.*	Oleaceae
privet	*Ligustrum sp.*	Oleaceae
red chokeberry	*Aronia arbutifolia*	Rosaceae
multiflora rose	*Rosa multiflora*	Rosaceae
Virginia rose	*Rosa virginiana var virginiana*	Rosaceae
blackberry	*Rubus orarius*	Rosaceae
raspberry	*Rubus sp.*	Rosaceae
wineberry	*Rubus phoenicolasius*	Rosaceae
winged euonymus	*Euonymus sp.*	Celastraceae
poison ivy	*Toxicodendron radicans*	Anacardiaceae
staghorn sumac	*Rhus hirta*	Anacardiaceae

VINES

Common Name	Scientific Name	Family
Virginia creeper	*Parthenocissus quinquefolia*	Vitaceae
frost grape	*Vitis vulpina*	Vitaceae
grape	*Vitis sp.*	Vitaceae
Asiatic bittersweet	*Celastrus orbiculata*	Celastraceae
bittersweet	*Celastrus sp.*	Celastraceae
common greenbrier	*Smilax rotundifolia*	Smilacaceae
greenbrier	*Smilax sp.*	Smilacaceae
Smilax sp.	*Smilax sp.*	Smilacaceae

FERNS

Common Name	Scientific Name	Family
northern lady-fern	*Athyrium filix-femina var angustum*	Dryopteridaceae
sensitive fern	*Onoclea sensibilis*	Dryopteridaceae
Christmas fern	*Polystichum acrostichoides var acrostichoides*	Dryopteridaceae
hayscented fern	*Dennstaedtia punctiloba*	Polypodiaceae
rock polypody	*Polypodium virginianum*	Polypodiaceae
New York fern	*Thelypteris noveboracensis*	Thelypteridaceae
Marsh fern	*Thelypteris palustris var pubescens*	Thelypteridaceae

GRASSES AND RUSHES

Common Name	Scientific Name	Family
yellow-fruit sedge	*Carex annectens var xanthocarpa*	Cyperaceae
connecting sedge	*Carex annectens var annectens*	Cyperaceae
Bailey's sedge	*Carex baileyi*	Cyperaceae
bladder sedge	*Carex intumescens*	Cyperaceae
sallow sedge	*Carex lurida*	Cyperaceae
Pennsylvania sedge	*Carex pensylvanica*	Cyperaceae
pointed broom sedge	*Carex scoparia var scoparia*	Cyperaceae
wide-spreading sedge	*Carex squarrosa*	Cyperaceae
an awl-fruit sedge	*Carex stipata*	Cyperaceae
tussock sedge	*Carex stricta*	Cyperaceae
fox sedge	*Carex vulpinoidea var vulpinoidea*	Cyperaceae
dark-green bulrush	*Scirpus atrovirens*	Cyperaceae
woolgrass	*Scirpus cyperinus*	Cyperaceae
bentgrass	*Agrostis sp.*	Poaceae
rough bentgrass	*Agrostis scabra*	Poaceae
broom-sedge	*Andropogon virginicus var virginicus*	Poaceae
Andropogon sp.	*Andropogon sp.*	Poaceae
sweet vernal grass	*Anthoxanthum odoratum ssp odoratum*	Poaceae
meadow brome	*Bromus commutatus*	Poaceae
smooth brome	*Bromus inermis ssp inermis*	Poaceae
Japanese brome	*Bromus japonicus*	Poaceae
sweet wood-reed	*Cinna arundinacea*	Poaceae

orchard grass	*Dactylis glomerata ssp glomerata*	Poaceae
poverty wild oat grass	*Danthonia spicata*	Poaceae
nodding wild rye	*Elymus canadensis*	Poaceae
tumble grass	*Eragrostis spectabilis*	Poaceae
white-hair panic grass	*Panicum villosissimum var villosissimum*	Poaceae
Panicum sp.	*Panicum sp.*	Poaceae
tall fescue	*Festuca arundinacea*	Poaceae
nerved manna grass	*Glyceria striata*	Poaceae
perennial rye grass	*Lolium perenne var perenne*	Poaceae
Japanese stilt grass	*Microstegium vimineum*	Poaceae
switch grass	*Panicum virgatum var virgatum*	Poaceae
reed canary grass	*Phalaris arundinacea*	Poaceae
meadow timothy	*Phleum pratense*	Poaceae
phragmites	*Phragmites sp.*	Poaceae
Kentucky blue grass	*Poa pratensis ssp pratensis*	Poaceae
old-pasture spear grass	*Poa saltuensis*	Poaceae
cultivated rye	*Secale cereale*	Poaceae
yellow foxtail	*Pennisetum glaucum*	Poaceae
foxtail	*Setaria sp.*	Poaceae
Indian grass	*Sorghastrum nutans*	Poaceae
intermediate quack grass	*Thinopyrum intermedium*	Poaceae
quack grass	*Agropyrum repens*	Poaceae
Canadian rush	*Juncus canadensis*	Juncaceae
soft rush	*Juncus effusus*	Juncaceae
poverty rush	*Juncus tenuis*	Juncaceae
rush	*Juncus sp.*	Juncaceae

HERBACEOUS PLANTS

Common Name	**Scientific Name**	**Family**
wild carrot	*Daucus carota*	Apiaceae
yarrow	*Achillea milefolium*	Asteraceae
ragweed	*Ambrosia artemisiifolia*	Asteraceae
common burrdock	*Arctium minus*	Asteraceae
mugwort	*Artemisis vulgaris*	Asteraceae
calico aster	*Aster lateriflorus var lateriflorus*	Asteraceae
New England aster	*Aster novae-angliae*	Asteraceae
panicled aster	*Aster simplex*	Asteraceae
aster	*Family asteraceae*	Asteraceae
tickseed sunflower	*Bidens coronata*	Asteraceae
chicory	*Cichorium intybus*	Asteraceae
Canadian thistle	*Cirsium arvense*	Asteraceae
bull thistle	*Cirsium vulgare*	Asteraceae
thistle	*Family asteraceae*	Asteraceae
daisy fleabane	*Erigeron strigosus var strigosus*	Asteraceae
common fleabane	*Erigeron sp.*	Asteraceae
boneset	*Eupatorium perfoliatum*	Asteraceae
Eupatorium sp.	*Eupatorium spp.*	Asteraceae

grass-leaved goldenrod	*Euthamia graminifolia*	Asteraceae
a quickweed	*Galinsoga sp.*	Asteraceae
sweet everlasting	*Gnaphalium obtusifolium*	Asteraceae
panicled hawkweed	*Hieracium paniculatum*	Asteraceae
a hawkweed	*Hieracium pratense*	Asteraceae
ox-eye daisy	*Leucanthemum vulgare*	Asteraceae
golden ragwort	*Senecio aureus*	Asteraceae
Canadian goldenrod	*Solidago canadensis var canadensis*	Asteraceae
goldenrod	*Solidago sp.*	Asteraceae
lance-leaved goldenrod	*Solidago graminifolia*	Asteraceae
early goldenrod	*Solidago juncea*	Asteraceae
rough-stemmed goldenrod	*Solidago rugosa*	Asteraceae
common dandelion	*Taraxacum officinale ssp officinale*	Asteraceae
New York ironweed	*Vernonia noveboracensis*	Asteraceae
cockleburr	*Xanthium sp.*	Asteraceae
white snakeroot	*Eupatorium rugosum*	Asteraceae
jewelweed	*Impatiens sp.*	Balsaminaceae
mayapple	*Podophyllum peltatum*	Berberidaceae
garlic mustard	*Alliaria officinalis*	Brassicaceae
yellow rocket	*Barbarea vulgaris*	Brassicaceae
quaker bittercress	*Cardamine pensylvanica*	Brassicaceae
cuckoo flower	*Cardamine pratensis var pratensis*	Brassicaceae
bulbous bittercress	*Cardamine bulbosa*	Brassicaceae
wild pepperwort	*Lepidium virginicum var virginicum*	Brassicaceae
cress	*Family brassicaceae*	Brassicaceae
indian-tobacco	*Lobelia inflata*	Campanulaceae
lobelia	*Lobelia sp.*	Campanulaceae
common mouse-ear chickweed	*Cerastium fontanum ssp vulgare*	Caryophyllaceae
St. Johnswort	*Hypericum perforatum*	Clusiaceae
violet bush-clover	*Lespedeza violacea*	Fabaceae
slender bush-clover	*Lespedeza virginica*	Fabaceae
yellow hop clover	*Trifolium agrarium*	Fabaceae
red clover	*Trifolium pratense*	Fabaceae
white clover	*Trifolium repens*	Fabaceae
centaury	*Centaurium umbellatum*	Gentianaceae
wild geranium	*Geranium maculatum*	Gentianaceae
spreading dogbane	*Apocynum androsaemifolium*	Apocynaceae
indian-hemp	*Apocynum cannabinum var cannabinum*	Apocynaceae
dogbane	*Apocynum sp.*	Apocynaceae
white milkweed	*Asclepias variegata*	Asclepiadaceae
milkweed	*Asclepias sp.*	Asclepiadaceae
American pennyroyal	*Hedeoma pulegioides*	Lamiaceae
catnip	*Nepeta cataria*	Lamiaceae
self-heal	*Prunella vulgaris*	Lamiaceae
mountain mint	*Pycnanthemun muticum*	Lamiaceae
blue vervain	*Verbena hastata var hastata*	Verbenaceae
vervain	*Verbena sp.*	Verbenaceae

enchanter's-nightshade	*Circaea lutetiana var canadensis*	Onagraceae
purple-leaved willow-herb	*Epilobium coloratum*	Onagraceae
seedbox	*Ludwigia alternifolia*	Onagraceae
ludwigia	*Ludwigia sp.*	Onagraceae
common evening-primrose	*Oenothera biennis*	Onagraceae
evening primrose	*Oenothera villosa*	Onagraceae
primrose	*Oenothera sp.*	Onagraceae
beechdrops	*Epifagus virginiana*	Orobanchaceae
water-pepper	*Polygonum hydropiper*	Polygonaceae
lady's-thumb	*Polygonum persicaria*	Polygonaceae
sheep sorrel	*Rumex acetosella*	Polygonaceae
dock	*Family Polygonaceae?*	Polygonaceae
bitter dock	*Rumex obtusifolius*	Polygonaceae
Virginia knotweed	*Tovara virginiana*	Polygonaceae
pokeweed	*Phytolacca americana var americana*	Phytolaccaceae
spring beauty	*Claytonia virginica var virginica*	Portulacaceae
plantain	*Plantago major? / rugelii?*	Plantaginaceae
scarlet pimpernel	*Anagallis arvensis var arvensis*	Primulaceae
wind-flower	*Anemone quinquefolia var quinquefolia*	Ranunculaceae
kidney-leaf buttercup	*Ranunculus abortivus*	Ranunculaceae
goldencups	*Ranunculus bulbosus*	Ranunculaceae
small-flowered agrimony	*Agrimonia parviflora*	Rosaceae
agrimony	*Agrimonia sp.*	Rosaceae
indian-strawberry	*Duchesnea indica*	Rosaceae
strawberry	*Fragaria sp.*	Rosaceae
white avens	*Geum canadense var canadense*	Rosaceae
rough cinquefoil	*Potentilla norvegica ssp monspeliensis*	Rosaceae
common cinquefoil	*Potentilla simplex ?*	Rosaceae
American golden-saxifrage	*Chrysosplenium americanum*	Saxifragaceae
partridge-berry	*Mitchella repens*	Rubiaceae
purple gerardia	*Gerardia purpurea*	Scrophulariaceae
butter-and-eggs	*Linaria vulgaris*	Scrophulariaceae
foxglove beardtongue	*Penstemon digitalis*	Scrophulariaceae
beardtongue	*Penstemon sp.*	Scrophulariaceae
common mullein	*Verbascum thapsus*	Scrophulariaceae
mullein	*Verbascum sp.*	Scrophulariaceae
thyme-leaf speedwell	*Veronica serpyllifolia var serpyllifolia*	Scrophulariaceae
ground-cherry	*Physalis sp.*	Solanaceae
horse nettle	*Solanum carolinense var carolinense*	Solanaceae
common morning-glory	*Ipomoea purpurea*	Convolvulaceae
ivy-leaf morning-glory	*Ipomoea hederacea*	Convolvulaceae
Canadian clearweed	*Pilea pumila*	Urticaceae
common blue violet	*Viola papilionacea*	Violaceae
jack-in-the-pulpit	*Arisaema triphyllum ssp triphyllum*	Araceae
skunk-cabbage	*Symplocarpus foetidus*	Araceae
strict blue-eyed grass	*Sisyrinchium montanum*	Iridaceae
star-of-bethlehem	*Ornithogalum umbellatum*	Liliaceae

false Solomon's seal	*Smilacina racemosa*	Liliaceae
onion grass	*Allium sp.*	Liliaceae
broad-leaf cattail	*Typha latifolia*	Typhaceae
cattail	*Typha sp.*	Typhaceae
horsetail	*Equisetum sp.*	Equisetaceae

Source: Carson Road Woods Biological Inventory, Washington Crossing Audubon Society, March 2003

APPENDIX D

APPENDIX D: Plants and Animals of Lawrence's Pole Farm

FERNS

Common Name	Scientific name	Family
northern lady fern	*Athyrium filix-femina*	Aspleniaceae
Christmas fern	*Polystichum acrostichoides*	Aspleniaceae
tree clubmoss	*Lycopodium obscurum (dendroideum?)*	Lycopodiaceae
cut-leaved grape fern	*Botrychium dissectum*	Ophioglossaceae
hayscented fern	*Dennstaedtia punctilobula*	Polypodiaceae
sensitive fern	*Onoclea sensibilis*	Polypodiaceae
New York fern	*Thelypteris noveboracensis*	Polypodiaceae

HERBS

Common Name	Scientific name	Family
indian hemp	*Apocynum cannabinum*	Apocynaceae
skunk cabbage	*Symplocarpus foetidus*	Araceae
swamp milkweed	*Asclepias incarnata*	Asclepiadaceae
purple milkweed	*Asclepias purpurascens*	Asclepiadaceae
common milkweed	*Asclepias syrica*	Asclepiadaceae
jewelweed	*Impatiens capensis*	Asclepiadaceae
terrestrial water starwort	*Callitriche terrestris*	Callitrichaceae
wild bergamot	*Monarda fistulosa*	Caprifoliaceae
purple bergamot	*Mondarda media*	Caprifoliaceae
Deptford pink	*Dianthus armeria*	Caryophyllaceae
evening lychnis, white campion	*Lychnis alba*	Caryophyllaceae
yarrow	*Achillea milefolium*	Compositae
ragweed, common	*Ambrosia artemisiifolia*	Compositae
mugwort	*Artemisis vulgaris*	Compositae
many-flowered aster	*Aster ericoides*	Compositae
New England aster	*Aster novae angliae*	Compositae
health aster	*Aster pilosus*	Compositae
small white aster	*Aster vimineus*	Compositae
tickseed sunflower	*Bidens coronata*	Compositae
beggar ticks	*Bidens polylepis*	Compositae
spotted knapweed	*Centaurea maculosa*	Compositae
ox-eye daisy	*Chrysanthemum leucanthemum*	Compositae
chicory	*Cichorium intybus*	Compositae
Canada thistle	*Circium arvense*	Compositae
field thistle	*Circium discolor*	Compositae
bull thistle	*Circium vulgare*	Compositae
horseweed	*Conyza canadensis*	Compositae
fleabane, common & daisy	*Erigeron sp.*	Compositae
spotted joe-pye weed	*Eupatorium maculatum*	Compositae
boneset	*Eupatorium perforliatum*	Compositae
joe-pye weed	*Eupatorium purpureum (fistulosun?)*	Compositae
grass-leaved goldenrod	*Euthamia graminifolia*	Compositae
sneezeweed	*Helenium autumnale*	Compositae
tall sunflower	*Helianthus giganteus*	Compositae

APPENDIX D: Plants and Animals of Lawrence's Pole Farm

Jerusalem artichoke	*Helianthus tuberosus*	Compositae
wild lettuce	*Lactuca canadensis*	Compositae
black-eyed susan	*Rudbeckia hirta*	Compositae
tall goldenrod	*Solidago altissima*	Compositae
Canada goldenrod	*Solidago canadensis*	Compositae
late goldenrod	*Solidago gigantea*	Compositae
lance-leaved goldenrod	*Solidage graminifolia*	Compositae
early goldenrod	*Solidago juncea*	Compositae
gray goldenrod	*Solidago nemoralis*	Compositae
rough-stemmed goldenrod	*Solidago rugosa*	Compositae
oyster plant	*Tragopogon porrifolius*	Compositae
New York ironweed	*Vernonia noveboracensis*	Compositae
clotbur/cocklebur	*Xanthium strumarium*	Compositae
field mustard	*Brassica rapa (?)*	Cruciferae
dry oak woodland sedge	*Carex pennsylvanica*	Cyperaceae
sedge	*Carex spp. (several spp.)*	Cyperaceae
woolgrass	*Scirpus cyperinus*	Cyperaceae
bulrush	*Scirpus georgianus (?)*	Cyperaceae
closed or bottle gentian	*Gentiana clausa*	Gentianaceae
redtop (bentgrass)	*Agrostis alba*	Graminaceae
ticklegrass	*Agrostis hyemalis*	Graminaceae
bushy beard-grass	*Andropogon glomeratus*	Graminaceae
little bluestem (broom beardgrass)	*Andropogon scoparius*	Graminaceae
broomsedge	*Andropogon virginicus*	Graminaceae
orchard grass	*Dactylis glomerata*	Graminaceae
smooth crab brass	*Digitalis ischamaemum*	Graminaceae
barnyard grass	*Echinochloa crusgalli*	Graminaceae
spikerush	*Elechris olivacea*	Graminaceae
wild rye	*Elymus virginicus*	Graminaceae
tussock sedge	*Karex stricta*	Graminaceae
fall panicum	*Panicum dicotomiflorum*	Graminaceae
switch grass	*Panicum virgatum*	Graminaceae
reed canary grass	*Phalaris arundinacea*	Graminaceae
common reed grass	*Phragmites communis*	Graminaceae
little blue stem	*Schizachyrium scoparium*	Graminaceae
green bulrush	*Scirpus atrovirers*	Graminaceae
nodding foxtail grass	*Setaria faberi*	Graminaceae
yellow foxtail grass	*Setaria glauca*	Graminaceae
bristly foxtail	*Setaria sp.*	Graminaceae
indian grass	*Sorgastrum nutans*	Graminaceae
grease grass/purple top	*Tridens flava*	Graminaceae
common St. Johnswort	*Hypericum perforatum*	Guttiferae
soft rush	*Juncus effusus*	Juncaceae
secund rush	*Juncus secundus*	Juncaceae
cut-leaved water-horehound	*Lycopus americanus*	Labiatae
stalked bugleweed	*Lycopus rubellus*	Labiatae
self-heal	*Prunella vulgaris*	Labiatae

narrow-leafed mountain mint	*Pycnanthemum tenuifolium*	Labiatae
mountain mint	*Pycnanthemum muticum*	Labiatae
hairy skullcap	*Scutellaria ellipica*	Labiatae
tick trefoil	*Desmodium sp.*	Leguminosae
round-headed bush clover	*Lespedeza capitata*	Leguminosae
white sweet clover	*Melilotus alba*	Leguminosae
trailing wild bean	*Strophostyles helvola*	Leguminosae
yellow hope clover	*Trifolium agarium*	Leguminosae
red clover	*Trifolium pratense*	Leguminosae
white clover	*Trifolium repens*	Leguminosae
asparagus	*Asparagus officinalis*	Lilaceae
turks-cap lilly	*Lilium superbum*	Liliaceae
false solomon's seal	*Smilacina racemosa*	Lilaceae
purple loosestrife	*Lythrum salicaria*	Lythraceae
velvetleaf	*Abutilon theophrasti*	Malvaceae
Viginia meadow beauty	*Rhexia virginica*	Melastomataceae
purple-leaved willow-herb	*Epilobium coloratum*	Onagraceae
water purslane	*Ludwigia palustris*	Onagraceae
evening primrose	*Oenothera biennis*	Onagraceae
sundrops	*Oenothera fruticosa*	Onagraceae
nodding ladies' tresses	*Spiranthes cernua*	Orchidaceae
yellow wood sorrel	*Oxalis stricta*	Oxalidaceae
pokeweed	*Phytolacca americana*	Phytolaccaaceae
English plaintain	*Plangago lanceolata*	Plantaginaceae
plaintain	*Plantago major?/rugelii?*	Plantaginaceae
deer tongue grass	*Dicanthelium spp.*	Poaceae
Japanese stilt grass	*Microstegium vimineum*	Poaceae
halberd-leaved tearthumb	*Polygonum arifolium*	Polygonaceae
cespitose knotweed	*Polygonum cespitosum*	Polygonaceae
lady's thumb	*Polygonum persicaria*	Polygonaceae
water smartweed	*Polygonum punctatum*	Polygonaceae
arrow-leaved tearthumb	*Polygonum sagittatum*	Polygonaceae
curled cock	*Rumex crispus*	Polygonaceae
Virginia knotweed	*Tovara virginiana*	Polygonaceae
striped wintergreen	*Chimaphila maculata*	Pyrola
goatsbeard	*Aruncus dioicus*	Rosaceae
white avens	*Genum canadense*	Rosaceae
common cinquefoil	*Potentilla simplex?*	Rosaceae
potentilla	*Potentilla sp.*	Rosaceae
steeplebush	*Spitea tomentosa*	Rosaceae
bedstraw	*Galium sp.*	Rubiaceae
clayton's bedstraw	*Galium tinctorium*	Rubiaceae
partridge berry	*Mitchella repens*	Rubiaceae
purple gerardia	*Gerardia purpurea*	Scrophulariaceae
winged monkeyflower	*Mimulus alatus*	Scrophulariaceae
hairy beardtongue	*Penstemon hirsutus?*	Scrophulariaceae
moth mullein	*Verbascum blattaria*	Scrophulariaceae

common mullien	*Verbascum thapsus*	Scrophulariaceae
horse nettle	*Solanum caolinense*	Solanaceae
black nightshade	*Solanum nigrum*	Solanaceae
cattail	*Typha latifolia*	Typhaceae
queen anne's lace	*Daucus carota*	Umbelliferae
blue vervain	*Verbena hastata*	Verbenaceae

SHRUBS

Common Name	**Scientific name**	**Family**
smooth sumac	*Rhus Glabra*	Anacardiaceae
deciduous leaved holly	*Ilex decidua?*	Aquifoliaceae
winterberry	*Ilex verticillata*	Aquifoliaceae
Japanese barberry	*Berberis thunbergii*	Berberidaceae
common elderberry	*Sambucus canadensis*	Caprifoliaceae
maple-leafed viburnum	*Viburnum acerfolium*	Caprifoliaceae
arrowwood	*Viburnum dentatum*	Caprifoliaceae
nannyberry	*Viburnum lentago*	Caprifoliaceae
black haw	*Viburnum prunifolium?*	Caprifoliaceae
winged Euonymus	*Euonumus sp.*	Celastraceae
silky dogwood	*Cornus amomum*	Cornaceae
panicled dogwood	*Cornus racemosa*	Cornaceae
red-osier dogwood	*Cornus sericea*	Cornaceae
black huckleberry	*Gaylussacia bacatta*	Ericaceae
maleberry	*Lyonia ligustrina*	Ericaceae
highbush blueberry	*Vaccinium corymbossum*	Ericaceae
spicebush	*Lindera benzoin*	Lauraceae
bayberry (northern)	*Myrica pennsylvanica*	Myricaceae
autumn olive	*Elaegnus umbellata*	Oleaceae
shadbush	*Amerlanchier arborea*	Rosaceae
hawthorn	*Crategus sp.*	Rosaceae
red chokeberry	*Pyrus arbutifolia*	Rosaceae
American crabapple	*Pyrus coronaria*	Rosaceae
crabapple	*Pyrus sp.*	Rosaceae
multiflora rose	*Rosa multiflora*	Rosaceae
swamp rose	*Rosa palustris?*	Swamp Rose
Virginia rose	*Rosa virginiana*	Rosaceae
common blackberry	*Rubus allegheniensis*	Rosaceae
dewberry	*Rubus flagellaris*	Rosaceae
blackberry	*Rubus pennsylvanicus?*	Rosaceae

TREES

Common Name	**Scientific name**	**Family**
Norway maple	*Acer platanoides*	Aceraceae
red maple	*Acer rubrum*	Aceraceae
winged sumac	*Rhus copallina*	Anacardiaceae
staghorn sumac	*Rhus typhina*	Anacardiaceae

river birch	*Betula nigra*	Betulaceae
grey birch	*Betula populifolia*	Betulaceae
honey locust	*Gleditsia triacanthos*	Caesalpiniaceae
flowering dogwood	*Cornus florida*	Cornaceae
eastern red cedar	*Juniperus virginiana*	Cupressaceae
persimmon	*Diospyros virginiana*	Ebenaceae
black locust	*Robinia pseudoacacia*	Fabaceae
American beech	*Fagus grandifolia*	Fagaceae
white oak	*Quercus alba*	Fagaceae
swamp white oak	*Quercus bicolor*	Fagaceae
scarlet oak	*Quercus coccinea*	Fagaceae
pin oak	*Quercus palustris*	Fagaceae
black oak	*Quercus velutina*	Fagaceae
sweet gum	*Liquidambar stryaciflua*	Hamamelidaceae
shagbark hickory	*Carya ovata*	Juglandaceae
mockernut hickory	*Carya tomentosa*	Juglandaceae
sassafras	*Sassafras albidum*	Laueaceae
tulip poplar	*Liriodendron tulipifera*	Magnoliaceae
white ash	*Fraxinum americana*	Oleaceae
green ash	*Fraxinus Pennsylvanica*	Oleaceae
plane tree	*Platanus sp.*	Platanaceae
buckthorn	*Rhamnus cathartica(?)*	Rhamnaceae
princess tree	*Paulownia tomentosa*	Rhamnaceae
apple (Sp.)	*Malus sp.*	Rosaceae
black cherry	*Prunus serotina*	Rosaceae
big-toothed aspen	*Populus grandidentata*	Salicaceae
poplar sp., small toothed	*Populus sp.*	Salicaceae
weeping willow	*Salix babylonica*	Salicaceae
black willow	*Salix nigra*	Salicaceae
willow	*Salix sp.*	Salicaceae
American elm	*Ulmus americana*	Ulmaceae
slippery elm	*Ulmus rubra*	Ulmaceae

VINES

Common Name	**Scientific name**	**Family**
poison Ivy	*Toxicodendron radicans*	Anacardiaceae
Japanese honeysuckle	*Lonicera japonica*	Caprifoliaceae
morrow's honeysuckle	*Lonicera morrowii*	Caprifoliaceae
asiatic bittersweet	*Celastrus orbiculatus*	Celastraceae
ivy-leaved morning glory	*Ipomoea heteracea (I.nil)*	Convolvulaceae
small white morning glory	*Ipomoea lacunosa*	Convolvulaceae
common morning glory	*Ipomoea purpurea*	Convolvulaceae
common greenbrier	*Smilax rotundifolia*	Liliaceae
Virginia creeper	*Parthenocissus quinquefolia*	Vitaceae
grape	*Vitis sp.*	Vitaceae
fox grape	*Vitus labrusca?*	Vitaceae

ALGAE

Common Name	**Scientific name**	**Family**
stonewort (Green Alga)	*Nitella sp.*	

FUNGI

Common Name	**Scientific name**	**Family**
fly agaric	*Amanita muscaria*	Amanitaceae
webcap	*Cortinarius sp.*	Cortinariaceae
pinkgill	*Entoloma sp.*	Entolomataceae
waxycap	*Hygrophorus sp.*	Hygrophoraceae
puffball	*Bovista pila*	Lycoperdacea
vase puffball	*Calvatia cyathiformis*	Lycoperdacea
aastern stinkhorn	*Phallus ravenelii*	Phallaceae
turkeytail	*Coriolus versicolor*	Polyporaceae
coincap	*Collybia sp.*	Tricholomataceae
amethyst tallowgill	*Laccaria amerthystina*	Tricholomataceae
deceiver	*Laccaria lacata*	Tricholomataceae

BIRDS

Common Name	**Scientific name**	**Family**
great blue heron	*Ardea herodias*	Ardeidae
snow goose	*Chen caerulescens*	Anatidae
Canada goose	*Branta canadensis*	Anatidae
mute swan	*Cygnus olor*	Anatidae
wood duck	*Aix sponsa*	Anatidae
black vulture	*Coragyps atratus*	Cathartidae
turkey vulture	*Cathartes aura*	Cathartidae
osprey	*Pandion haliaetus*	Accipitridae
northern harrier	*Circus cyaneus*	Accipitridae
sharp-shinned hawk	*Accipiter striatus*	Accipitridae
cooper's hawk	*Accipiter cooperii*	Accipitridae
broad-winged hawk	*Buteo platypterus*	Accipitridae
red-tailed hawk	*Buteo jamaicensis*	Accipitridae
rough-legged hawk	*Buteo lagopus*	Accipitridae
American kestrel	*Falco sparverius*	Falconidae
peregrine falcon	*Falco peregrinus*	Falconidae
ring-necked pheasant	*Phasianus colchicus*	Phasianidae
northern bobwhite	*Colinus virginianus*	Phasianidae
wild turkey	*Meleagris gallopavo*	Meleagrididae
Virginia rail	*Rallus limicola*	Rallidae
killdeer	*Charadrius vociferus*	Charadriidae
ring-billed gull	*Larus delawarensis*	Laridae
herring gull	*Larus argentatus*	Laridae
rock dove	*Columba livia*	Columbidae
mourning dove	*Zenaida macroura*	Columbidae

black-billed cuckoo	*Coccyzus erythropthalmus*	Cuculidae
eastern screech-owl	*Otus asio*	Strigidae
great horned owl	*Bubo virginianus*	Strigidae
common nighthawk	*Chordeiles minor*	Caprimulgidae
chimnet swift	*Chaetura pelagica*	Apodidae
ruby-throated hummingbird	*Archilochus colubris*	Trochilidae
red-bellied woodpecker	*Melanerpes carolinus*	Picidae
downey woodpecker	*Picoides pubescens*	Picidae
hairy woodpecker	*Picoides villosus*	Picidae
northern flicker	*Colaptes auratus*	Picidae
eastern wood-pewee	*Contopus virens*	Tyrannidae
willow flycatcher	*Empidonax traillii*	Tyrannidae
eastern phoebe	*Sayornis phoebe*	Tyrannidae
great crested flycatcher	*Myiarchus crintitus*	Tyrannidae
eastern kingbird	*Tyrannus tyrannus*	Tyrannidae
northern shrike	*Lanius excubitor*	Laniidae
white-eyed vireo	*Vireo griseus*	Vireonidae
yellow-throated vireo	*Vireo-throated Vireo*	Vireonidae
red-eyed vireo	*Vireo olivaceus*	Vireonidae
blue jay	*Cyanocitta cristata*	Corvidae
American crow	*Corvus brachyrhynchos*	Corvidae
fish crow	*Corvus ossifragus*	Corvidae
purple martin	*Progne subis*	Hirundinidae
tree swallow	*Tachycineta bicolor*	Hirundinidae
barn swallow	*Hirundo rustica*	Hirundinidae
carolina chickadee	*Parus carolinensis*	Paridae
black-capped chickadee	*Parus atricapillus*	Paridae
tufted titmouse	*Parus bicolor*	Paridae
red-breasted nuthatch	*Sitta canadensis*	Sittidae
white-breasted nuthatch	*Sitta carolinensis*	Sittidae
Carolina wren	*Thryothorus ludovicianus*	Troglodytidae
house wren	*Troglodytes aedon*	Troglodytidae
golden-crowned kinglet	*Regulus satrapa*	Sylviidae
blue-gray gnatcatcher	*Polioptila caerulea*	Sylviidae
eastern bluebird	*Sialia sialis*	Turdidae
veery	*Catharus fuscescens*	Turdidae
wood thrush	*Hylocichla mustelina*	Turdidae
American robin	*Turdus migratorius*	Turdidae
European starling	*Sturnus vulgaris*	Sturnidae
gray catbird	*Dumetella carolinensis*	Mimidae
northern mockingbird	*Mimus polyglottos*	Mimidae
brown thrasher	*Toxostoma rufum*	Mimidae
cedar waxwing	*Bombycilla cedrorum*	Bombycillidae
blue winged warbler	*Vermivora pinus*	Parulidae
yellow warbler	*Dendroica petechia*	Parulidae
chestnut-sided warbler	*Dendroica pennsylvanica*	Parulidae
magnolia warbler	*Dendroica magnolia*	Parulidae

yellow-rumped warbler	*Dendroica coronata*	Parulidae
palm warbler	*Dendroica palmarum*	Parulidae
blackpoll warbler	*Dendroica striata*	Parulidae
black-and-white warbler	*Mniotilta varia*	Parulidae
American redstart	*Setophaga ruticilla*	Parulidae
ovenbird	*Seiurus aurocapillus*	Parulidae
common yellowthroat	*Geothylypis trichas*	Parulidae
Wilson's warbler	*Wilsonia pusilla*	Parulidae
scarlet tanager	*Piranga olivacea*	Thraupidae
rufous-sided towhee	*Pipilo erthrophthalmus*	Fringillidae
chipping sparrow	*Spizella passerina*	Fringillidae
field sparrow	*Spizella pusilla*	Fringillidae
savannah sparrow	*Passerculus sandwichensis*	Fringillidae
grasshopper sparrow	*Ammodramus savannarum*	Fringillidae
song sparrow	*Melospiza melodia*	Fringillidae
swamp sparrow	*Melospiza georgiana*	Fringillidae
white-throated sparrow	*Zonotrichia albicollis*	Fringillidae
dark-eyed junco	*Junco hyemalis*	Fringillidae
northern cardinal	*Cardinalis cardinalis*	Fringillidae
rose-breasted grosbeak	*Pheucticus ludovicianus*	Fringillidae
indigo bunting	*Passerina cyanea*	Fringillidae
purple finch	*Carpodacus purpureus*	Fringillidae
house finch	*Carpodacus mexicanus*	Fringillidae
American goldfinch	*Carduelis tristis*	Fringillidae
bobolink	*Dolichonyx oryzivorus*	Icteridae
red-winged blackbird	*Agelaius phoeniceus*	Icteridae
eastern meadowlark	*Sturnella magna*	Icteridae
common grackle	*Quiscalus quiscula*	Icteridae
brown-headed cowbird	*Molothrus ater*	Icteridae
orchard oriole	*Icterus spurius*	Icteridae
northern oriole	*Icterus galbula*	Icteridae
house sparrow	*Passer domesticus*	Ploceidae

VERTEBRATES (Excluding Birds)

Common Name	Scientific name	Family
bluegill sunfish	*Lepomis macrochirus*	Centarchidae
northern spring peeper	*Pseudacris crucifer*	Hylidae
bullfrog	*Rana catesbeiana*	Ranidae
green frog	*Rana clamitans melanota*	Ranidae
pickerel frog	*Rana palustris*	Ranidae
northern two-lined salamander	*Eurycea b. bislineata*	Plethodontidae
redback salamander	*Plethodon cinereus*	Plethodontidae
eastern garter snake	*Thamnophis s. sirtalis*	Colubridae
eastern milk snake	*Lampropeltis t. triangulum*	Colubridae
northern black racer	*Coluber c.constrictor*	Colubridae

common snapping turtle	*Chelydra s. serpentina*	Chelydridae
easten box turtle	*Tarrapene c. carolina*	Emydidae
eastern painted turtle	*Chrysemys p. picta*	Emydidae
spotted turtle	*Clemmys guttata*	Emydidae
wood turtle	*Clemmys insculpta*	Emydidae
eastern cottontail rabbit	*Sylvilagus floridanus*	Leporidae
gray squirrel	*Sciuris carolinensis*	Sciuridae
groundhog	*Marmota monax*	Sciuridae
meadow vole	*Microtus pennsylvanicus*	Cricetidae
white-footed mouse	*Peromyscus leucopus*	Cricetidae
raccoon	*Procyon lotor*	Procyonidae
coyote	*Canis latrans*	Canidae
red fox	*Vulpes fulva*	Canidae
house cat	*Felis catus*	Felidae
white-tail deer	*Odocoileus virginianus*	Cervidae
bat (species?)		Vespertilionidae
northern short-tailed shrew	*Blarina brevicauda*	Soricidae
eastern mole	*Scalopus aquaticus*	Talpidae

MOTHS

Common Name	**Scientific name**	**Family**
hummingbird clearwing	*Hemaris thysbe*	Sphingidae
luna moth	*Actius luna*	Saturniidae
long-winged dagger moth	*Acronicta longa*	Noctuidae
ipsilon dart	*Agrotis ipsilon*	Noctuidae
copper underwing	*Amphipyra pyramidiodes*	Noctuidae
green cutworm moth	*Anicla infecta*	Noctuidae
velvetbean caterpillar moth	*Anticarsia gemmatalis*	Noctuidae
clover looper moth (female)	*Caenurgina crassiuscula*	Noctuidae
forage looper moth	*Caenurgina erechtea*	Noctuidae
girlfriend underwing	*Catocala amica*	Noctuidae
gaceful underwing	*Catocala gracilis*	Noctuidae
woody underwing	*Catocala grynea*	Noctuidae
the little wife	*Catocala muliercula*	Noctuidae
the bride	*Catocala neogama*	Noctuidae
residua underwing	*Catocala residua*	Noctuidae
ultronia underwing	*Catocala ultronia*	Noctuidae
snowy dart	*Euagrotis illapsa*	Noctuidae
common idia	*Idia aemula*	Noctuidae
American idia	*Idia americalis*	Noctuidae
glossy black idia	*Idia lubricalis*	Noctuidae
ursula wainscot	*Leucania ursula*	Noctuidae
roadside sallow	*Metaxaglaea sp (probably viatica)*	Noctuidae
maple looper moth	*Parallelia bistriaris*	Noctuidae
armyworm moth	*Pseudaletia unipuncta*	Noctuidae

the herald	*Scoliopteryx libatrix*	Noctuidae
variable sallow	*Sericaglaea signata*	Noctuidae
yellow-striped armyworm moth	*Spadoptera ornithogalli*	Noctuidae
fall armyworm moth	*Spodoptera frugiperda*	Noctuidae
lesser or greater black letter dart	*Xestia adela or X. dolosa*	Noctuidae
pael-banded dart	*Xestia badinodis*	Noctuidae
horrid underwing (horrid zale)	*Zale horrida*	Noctuidae
lunate zale	*Zale lunata*	Noctuidae
brown-shaded gray	*Anacamptodes defectaria*	Geometridae
grape leaffolder moth	*Desmia funeralis*	Pyralidae

BUTTERFLIES

Common Name	**Scientific name**	**Family**
eastern black swallowtail	*Papilio polyxenes*	Papilionidae
eastern tiger Swallowtail	*Pterourus glaucus*	Papilionidae
spicebush swallowtail	*Pterourus troilus*	Papilionidae
cabbage white	*Artogeia rapae*	Pieridae
clouded sulfur	*Colias philodice*	Pieridae
orange sulfur	*Colias eurytheme*	Pieridae
spring azure	*Celestrina ladon*	Lycaenidae
summer azure	*Celestrina neglecta*	Lycaenidae
eastern tailed blue	*Everes comyntas*	Lycaenidae
buckeye	*Junonia coenia*	Nymphalidae
mourning cloak	*Nymphalis antiopa*	Nymphalidae
pearl crescent	*Phyciodes tharos*	Nymphalidae
question mark	*Polygonia interrogationis*	Nymphalidae
great spangled frittilary	*Speyeria cybele*	Nymphalidae
American painted lady	*Vanessa virginiensis*	Nymphalidae
red admiral	*Vanessa atalanta*	Nymphalidae
red-spotted purple	*Basilarchia astyanax*	Nymphalidae
viceroy	*Basilarchia archippus*	Nymphalidae
common wood nymph	*Cercyonis pegala*	Satyridae
little wood satyr	*Megisto cymela*	Satyridae
monarch	*Danaus plexippus*	Danaidae
silver-spotted skipper	*Epargyreus clarus*	Hesperidae
juvenal's duskywing	*Erynnis juvenalis*	Hesperidae
least skipper	*Ancyloxypha numitor*	Hesperidae
dun skipper	*Euphyes ruricola*	Hesperidae
peck's skipper	*Polites peckius*	Hesperidae
little glassy-wing	*Pompeius verna*	Hesperidae
European skipper	*Thmyelicus lineola*	Hesperidae

INSECTS

Common Name	Scientific name	Family
six-spotted green tiger beetle	*Cicindela sexgutta*	Cicindelidae
black-winged damselfly	*Calopteryx maculata*	Calopterygidae
white-tail dragonfly	*Plathemis lydia*	Libellulidae
skimmer species		
praying mantis	*Mantis religosa*	Mantidae

Source: Adapted from Biological Survey of the “Pole Farm,” The Washington Crossing Audubon Society, January 1999.

APPENDIX E

APPENDIX E: Plants and Animals of Lawrence's Shipetauken Woods

BIRDS

Common Name	Scientific name
Canada goose	*Branta canadensis*
Mallard	*Anas platyrhynchos*
Turkey Vulture	*Cathartes aura*
Red tailed hawk	*Buteo jamaicensis*
Sharp-shinned hawk	*Accipiter striatus*
Bobwhite	*Colinus virginianus*
Ring billed gull	*Larus delawarensis*
Mourning dove	*Zenaida macroura*
Northern flicker	*Colaptes auratus*
Red-bellied woodpecker	*Centurus carolinus*
Downy woodpecker	*Picoides pubescens*
Hairy woodpecker	*Picoides villosus*
Eastern wood pewee	*Contopus virens*
Acadian flycatcher	*Empidonax virescens*
Barn swallow	*Hirundo rustica*
Blue jay	*Cyanocitta cristata*
American crow	*Corvus brachyrhynchos*
Carolina chickadee	*Parus carolinensis*
Tufted titmouse	*Parus bicolor*
White-breasted nuthatch	*Sitta carolinensis*
House wren	*Troglodytes aedon*
Carolina wren	*Thryothorus ludovicianus*
Blue-gray gnatcatcher	*Polioptila caerulea*
Eastern bluebird	*Sialia sialis*
American robin	*Turdus migratorius*
Swainson's thrush	*Catharus ustulatus*
Wood thrush	*Hylocichla mustelina*
Nothern mockingbird	*Mimus polyglottos*
European starling	*Sturnus vulgaris*
Red-eyed vireo	*Vireo olivaceus*
Ovenbird	*Seiurus aurocapillus*
Prairie warbler	*Dendroica discolor*
Black and white warbler	*Mniotilta varia*
Common yellowthroat	*Geothlypis trichas*
Northern parula	*Parula americana*

APPENDIX E: Plants and Animals of Lawrence's Shipetauken Woods

BIRDS

Common Name	Scientific name
Black-throated green warbler	*Dendroica virens*
Black-throated blue warbler	*Dendroica caerulescens*
Yellow warbler	*Dendrocia petechia*
Yellow-rumped warbler	*Dendroica coronata*
Palm warbler	*Dendroica palmarum*
American redstart	*Setophaga ruticilla*
Scarlet tanager	*Piranga olivacea*
Northern cardinal	*Cardinalis cardinalis*
Eastern towhee	*Pipilo erythrophthalmus*
White-throated sparrow	*Zonotrichia albicollis*
Song sparrow	*Melospiza melodia*
Chipping sparrow	*Spizella passerina*
Field sparrow	*Spizella pusilla*
Swamp sparrow	*Melospiza georgiana*
American tree sparrow	*Spizella arborea*
Northern oriole	*Icterus galbula*
Red-winged blackbird	*Agelaius phoeniceus*
Common grackle	*Quiscalus quiscula*
Brown-headed cowbird	*Molothrus ater*
American goldfinch	*Carduelis tristis*
Dark-eyed junco	*Junco hyemalis*

TREES

Common Name	Scientific name	Habitat
Black locust	*Robinia pseudoacacia*	Forest edges and Field
Sweet gum	*Liquidambar styraciflua*	Field and Forest edge
American elm	*Ulmus americana*	Field and Forest edge
Red mulberry	*Morus rubra*	Field and Forest edge
Black cherry	*Prunus serotina*	Forest edge
Sassafrass	*Sassafras albidum*	Forest edge
Autumn olive	*Elaeagnus umbellata*	Field
Witch hazel	*Hamamelis virginiana*	Forest
American beech	*Fagus grandifolia*	Forest
Bitternut hickory	*Carya cordiformis*	Forest
Black walnut	*Juglans nigra*	Forest edges

APPENDIX E: Plants and Animals of Lawrence's Shipetauken Woods

TREES

Common Name	Scientific name	Habitat
Umbrella magnolia	*Magnolia tripetala*	Forest
Flowering dogwood	*Cornus florida*	Forest
Fringe tree	*Chionanthus virginicus*	Forest
Hawthorn sp.	*Crataegus sp*	Forest
Ironwood	*Carpinus caroliniana*	Forest
Persimmon	*Diospyros virginiana*	Forest
Pignut hickory	*Carya glabra*	Forest
Pin oak	*Quercus palustris*	Forest
Eastern red cedar	*Juniperus virginiana*	Field
Red maple	*Acer rubrum*	Forest
Red oak	*Quercus rubra*	Forest
Slippery elm	*Ulmus rubra*	Forest
Shagbark hickory	*Carya ovata*	Forest
Sugar maple	*Acer saccharum*	Forest
Tulip poplar	*Liriodendron tulipifera*	Forest
White ash	*Fraxinus americana*	Forest
White oak	*Quercus alba*	Forest
Catalpa	*Catalpa bignonioides*	Forest edge
Green ash	*Fraxinus pennsylvanica*	Forest
American beech	*Fagus grandifolia*	Forest

SHRUBS AND VINES

Common Name	Scientific name	Habitat
Japanese honeysuckle	*Lonicera japonica*	Forest Edge
Pennsylvania blackberry	*Rubus pennsylvanica*	Forest Edge
Multiflora rose	*Rosa multiflora*	Forest edge, Field, and Forest
Virginia creeper	*Parthenocissus quinquefolia*	Forest edge and Forest
Staghorn sumac	*Rhus typhina*	Forest edge
Poison ivy	*Toxicodendron radicans*	Forest edge and Forest
Fox grape	*Vitis labrusca*	Forest edge
Amur honeysuckle	*Lonicera maackii*	Forest edge
Wineberry	*Rubus phoenicolasius*	Forest
Asiatic bittersweet	*Celastrus orbiculatus*	Forest
Spicebush	*Lindera benzoin*	Forest
Common greenberier	*Smilax rotundifolia*	Forest

SHRUBS AND VINES

Common Name	**Scientific name**	**Habitat**
Pinxter azalea	*Rhododendron canescens*	Forest
Japanese barberry	*Berberis thunbergii*	Forest
Maple-leaf viburnam	*Viburnum acerifolium*	Forest
Winged euonymus	*Euonymus alatus*	Forest
Northern arrowood	*Viburnum recognitum*	Forest
Ibota privet	*Ligustrum obtusifolium*	Forest
Chokeberry sp.	Aronia sp.	Forest
Elderberry	Sambucus canadensis	Forest

HERBS

Common Name	**Scientific name**	**Habitat**
Mugwort	*Artemisia vulgares*	Field
Wintercress	*Barbarea vulgaris*	Field
Dandelion	*Taraxacum officinale*	Field
Common plantain	*Plantago major*	Field
Goldenrod spp.	*Solidago sp.*	Field
Garlic mustard	*Alliaria officinalis*	Field and Forest
Yarrow	*Achillea millefolium*	Field
Reed canary grass	*Phalaris arundinaceae*	Field
Common milkweed	*Asclepias syriaca*	Field
Sweet vernal grass	*Anthoxanthum odoratum*	Field
Little bluestem	*Schizachyrium scoparium*	Field
Curly dock	*Rumex crispus*	Field
Early buttercup	*Ranunculus fascicularis*	Field
Common blue violet	*Viola papilionacea*	Field and Forest
Indian strawberry	*Duchesnea indica*	Field
Indian hemp	*Apocynum cannabinum*	Field
Spotted touch-me-not	*Impatiens capensis*	Forest
Sensitive fern	*Onoclea sensibilis*	Forest
Jack-in-the-pulpit	*Arisaema atrorubens*	Forest
Mayapple	*Podophyllum peltatum*	Forest
Ladie's thumb	*Polygonum persicaria*	Forest
Spring beauty	*Claytonia virginica*	Forest
Spring cress	*Cardamine bulbosa*	Forest
Canada mayflower	*Maianthemum canadense*	Forest

HERBS

Common Name	Scientific name	Habitat
Smooth Solomon's seal	*Polygonatum biflorum*	Forest
Skunk cabbage	*Symplocarpus foetidus*	Forest
Tussock sedge	*Carex stricta*	Forest
Trout lily	*Erythronian americanum*	Forest
Japanese stiltgrass	*Microstegium vimineum*	Forest
Wood reedgrass	*Cinna arundinacea*	Forest
Rough bedstraw	*Gallium asprellum*	Forest
Trout lily	*Erythronium umbilicatum*	Forest
Gill-over-the-ground	*Glechema hederacea*	Field
Rough avens	*Geum lacinatum*	Field
Orchard grass	*Dactylis glomerata*	Field
Fescue	*Festuca sp.*	Field
Lady fern	*Athyrium Filix-femina*	Forest
white clover	*Trifolium repens*	Field
Deptford pink	*Dianthus armeria*	Field
Oxeye daisy	*Chrysanthemum leucanthemum*	Field
Black medick	*Medicago lupulina*	Field
Carolina cranesbill	*Geranium carolinianum*	Field
White snakeroot	*Eupatorium rugosum*	Forest
Mild water pepper	*Polygonum hydropiper*	Forest
Halberd-leaved tearthumb	*Polygonum arifolium*	Forest
Honewort	*Cryptotaenia canadensis*	Forest
Bamboo sp.	*Bambusa/Phyllostachys/Pseudosasa sp.*	Field

Source: Lawrence Township, August 2007

APPENDIX F

APPENDIX F: State Endangered and Threatened Species

Birds

Endangered		Threatened	
American Bittern	*Botaurus lentiginosos*	Bobolink	*Dolichonyx oryzivorus* BR
Eagle, bald	*Haliaeetus leucocephalus* BR **	Eagle, bald	*Haliaeetus leucocephalus* NB **
Falcon, peregrine	*Falco peregrinus*	Hawk, Cooper's	*Accipiter cooperii*
Goshawk, northern	*Accipiter gentilis* BR	Hawk, red-shouldered	*Buteo lineatus* NB
Grebe, pied-billed	*Podilymbus podiceps**	Night-heron, black-crowned	*Nycticorax nycticorax* BR
Harrier, northern	*Circus cyaneus* BR	Night-heron, yellow-crowned	*Nyctanassa violaceus*
Hawk, red-shouldered	*Buteo lineatus* BR	Knot, red	*Calidris canutus* BR
Owl, short-eared	*Asio flammeus* BR	Osprey	*Pandion haliaetus* BR
Plover, piping	*Charadrius melodus***	Owl, barred	*Strix varia*
Sandpiper, upland	*Batramia longicauda*	Owl, long-eared	*Asio otus*
Shrike, loggerhead	*Lanius ludovicianus*	Rail, black	*Laterallus jamaicensis*
Skimmer, black	*Rynchops niger* BR	Skimmer, black	*Rynchops niger* NB
Sparrow, Henslow's	*Ammodramus henslowii*	Sparrow, grasshopper	*Ammodramus savannarum* BR
Sparrow, vesper	*Pooecetes gramineus* BR	Sparrow, Savannah	*Passerculus sandwichensis* BR
Tern, least	*Sterna antillarum*	Sparrow, vesper	*Pooecetes gramineus* NB
Tern, roseate	*Sterna dougallii***	Woodpecker, red-headed	*Melanerpes erythrocephalus*
Wren, sedge	*Cistothorus platensis*		

Reptiles

Endangered		Threatened	
Rattlesnake, timber	*Crotalus h. horridus*	Snake, northern pine	*Pituophis m. melanoleucus*
Snake, corn	*Elaphe g. guttata*	Turtle, Atlantic green	*Chelonia mydas***
Snake, queen	*Regina septemvittata*	Turtle, wood	*Clemmys insculpta*
Turtle, bog	*Clemmys muhlenbergii***		
Atlantic hawksbill	*Eretmochelys imbricata***		
Atlantic leatherback	*Dermochelys coriacea***		
Atlantic loggerhead	*Caretta caretta***		
Atlantic Ridley	*Lepidochelys kempi***		

APPENDIX F: State Endangered and Threatened Species

Amphibians

Endangered		Threatened	
Salamander, blue-spotted	*Ambystoma laterale*	Salamander, eastern mud	*Pseudotriton montanus*
Salamander, eastern tiger	*Ambystoma tigrinum*	Salamander, long-tailed	*Eurycea longicauda*
Treefrog, southern gray	*Hyla chrysocelis*	Treefrog, pine barrens	*Hyla andersonii*

Invertebrates

Endangered		Threatened	
Beetle, American burying	*Nicrophorus mericanus***	Elfin, frosted (butterfly)	*Callophrys irus*
Beetle, northeastern beach tiger	*Cincindela d. dorsalis***	Floater, triangle (mussel)	*Alasmidonta undulata*
Copper, bronze	*Lycaena hyllus*	Fritillary, silver-bordered (butterfly)	*Bolaria selene myrina*
Floater, brook (mussel)	*Alasmidonta varicosa*	Lampmussel, eastern (mussel)	*Lampsilis radiata*
Floater, green (mussel)	*Lasmigona subviridis*	Lampmussel, yellow (mussel)	*Lampsilis cariosa*
Satyr, Mitchell's (butterfly)	*Neonympha m. mitchellii***	Mucket, tidewater (mussel)	*Leptodea ochracea*
Skipper, arogos (butterfly)	*Atrytone arogos arogos*	Pondmussel, eastern (mussel)	*Ligumia nasuta*
Skipper, Appalachian grizzled (butterfly)	*Pyrgus wyandot*	White, checkered (butterfly)	*Pontia protodice*
Wedgemussel, dwarf	*Alasmidonta heterodon***		

Mammals		Fishes	
Endangered		**Endangered**	
Bat, Indiana	*Myotis sodalis***	Sturgeon, shortnose	*Acipenser brevirostrum***
Bobcat	*Lynx rufus*		
Whale, black right	*Balaena glacialis***		
Whale, blue	*Balaenoptera musculus***		
Whale, fin	*Balaenoptera physalus***		
Whale, humpback	*Megaptera novaeangliae***		
Whale, sei	*Balaenoptera borealis***		
Whale, sperm	*Physeter macrocephalus***		
Woodrat, Allegheny	*Neotoma floridana magister*		

Source: NJDEP, Division of Fish & Wildlife

**Also on the federal Endangered and Threatened list

APPENDIX G

APPENDIX G: Rare Plant and Animal Species and Natural Communities Presently Recorded in the NJ Natural Heritage Database for Lawrence Township

Common Name	**Scientific Name**	**State Status***	**State Rank***	**Global Rank***
Animal Species				
barred owl	*Strix varia*	T/T	S3B	G5
bobcat	*Lynx rufus*	E	S3	G5
bobolink	*Dolichonyx oryzivorus*	T/T	S2B	G5
brook floater	*Alasmidonta varicosa*	E	S1	G3
cooper's hawk	*Accipiter cooperii*	T/T	S3B, S4N	G5
eastern box turtle	*Terrapene carolina*	SC	S5B	G5
eastern pond mussel	*Ligumia nasuta*	T	S1	G4, G5
Fowler's toad	*Bufo woodhousii fowleri*	SC	S4	G5
grasshopper sparrow	*Ammodramus savannarum*	T/S	S2B	G5
long-eared owl	*Asio otus*	T/T	S2B, S2N	G5
spine-crowned clubtail	*Bomphus abbreviatus*		S2, S3	G3, G4
spotted turtle	*Clemmys guttata*	SC	S4	G5
triangle floater	*Alasmidonta undulata*	T	S3	G5
wood turtle	*Clemmys insculpta*	T	S3	G4
Vascular Plants				
Barratt's sedge	*Carex barrattii*	E	S4	G4
Cloud sedge	*Cared haydenii*	E	S1	G5
Lowland fragile fern	*Cystopteris protrusa*		S2	G5
Winged monkey-flower	*Mimulus alatus*		S3	G5

APPENDIX G: Rare Plant and Animal Species and Natural Communities Presently Recorded in the NJ Natural Heritage Database for Lawrence Township

* Key to Federal and State Status Codes

E	Endangered species – one whose prospects for survival within the state are in immediate danger due to one or many factors – a loss of habitat, over exploitation, predation, competition, disease. An endangered species require immediate assistance or extinction will probably follow.
T	Threatened species – a species that may become endangered if conditions surrounding the species begin to or continue to deteriorate.
S	Stable species – a species whose population is not undergoing any long-term increase/decrease within its natural cycle.
SC	Special Concern – applies to animal species that warrant special attention because of some evidence of decline, inherent vulnerability to environmental deterioration, or habitat modification that would result in their becoming a Threatened species. This category would also be applied to species that meet the foregoing criteria and for which there is little understanding of their current population status in the state.
S1	Critically imperiled in NJ because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres).
S2	Imperiled in NJ because of rarity (6 to 20 occurrences).
S3	Rare in state with 21 to 50 occurrences. Includes elements which are widely distributed but with small populations/acreage, or with restricted distribution but locally abundant.
S4	Apparently secure in state, with many occurrences.
S5	Demonstrably secure in state and essentially ineradicable under present conditions.
B	Refers to the breeding population of the element in the state.
N	Refers to the non breeding population of the element in the state.
G3	Either very rare and local throughout its range or found locally in a restricted range, making it vulnerable to extinction throughout its range.
G4	Apparently secure globally; although it may be quite rare in parts of its range, especially at the periphery.
G5	Demonstrably secure globally; although it may be quite rare in parts of its range, especially at the periphery.

Source: NJDEP, New Jersey Natural Heritage Program

APPENDIX G: Rare Plant and Animal Species and Natural Communities Presently Recorded in the NJ Natural Heritage Database for Lawrence Township

CAUTIONS AND RESTRICTIONS ON NATURAL HERITAGE DATA

The quantity and quality of data collected by the Natural Heritage Program is dependent on the research and observations of many individuals and organizations. Not all of this information is the result of comprehensive or site-specific field surveys. Some natural areas in New Jersey have never been thoroughly surveyed. As a result, new locations for plant and animal species are continuously added to the database. Since data acquisition is a dynamic, ongoing process, the Natural Heritage Program cannot provide a <u>definitive</u> statement on the presence, absence, or condition of biological elements in any part of New Jersey. Information supplied by the Natural Heritage Program summarizes existing data known to the program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. The attached data is provided as one source of information to assist others in the preservation of natural diversity.

This office cannot provide a letter of interpretation or a statement addressing the classification of wetlands as defined by the Freshwater Wetlands Act. Requests for such determination should be sent to the DEP Land Use Regulation Program, P.O. Box 401, Trenton, NJ 08625-0401.

The Landscape Project was developed by the Division of Fish & Wildlife, Endangered and Nongame Species Program to map critical habitat for rare animal species. Some of the rare species data in the Landscape Project is in the Natural Heritage Database, while other records were obtained from other sources. Natural Heritage Database response letters will list <u>all</u> species (if any) found during a search of the Landscape Project. However, any reports that are included with the response letter will only reference specific records if they are in the Natural Heritage Database. This office cannot answer any inquiries about the Landscape Project. All questions should be directed to the DEP Division of Fish and Wildlife, Endangered and Nongame Species Program, P.O. Box 400, Trenton, NJ 08625-0400.

This cautions and restrictions notice must be included whenever information provided by the Natural Heritage Database is published.

NJ Department of Environmental Protection
Division of Parks and Forestry
Natural Lands Management

APPENDIX H

APPENDIX H: Historic Properties of Lawrence Township

Lawrence Township Historic Property Listing

#	Prop Location	Owner Address	Owner City/State	Zip	Owner
700	TRUMBULL AVE	700 TRUMBULL AVE	LAWRENCEVILLE, NJ	08648	SARETZKY, KATHLINDA & GARY D
18	CARNEGIE ROAD	JOHN FITCH PLAZA	TRENTON, NJ	08625	DEPT OF ENVIRONMENTAL PROTECTION
2167	BRUNSWICK AVE	2167 BRUNSWICK AVE	LAWRENCEVILLE, NJ	08648	O'NEAL, BILLY JOE JR & LAUREN
2083	LAWRENCE RD	2083 LAWRENCE RD	LAWRENCEVILLE, NJ	08648	RIDER UNIVERSITY
45	PINE KNOLL DR	45 PINE KNOLL RD	LAWRENCEVILLE, NJ	08648	CLORAN, MICHAEL E & ELYSE M
2685	PRINCETON PIKE	2685 PRINCETON PIKE	LAWRENCEVILLE, NJ	08648	NICHOLS, J RANDALL
2681	PRINCETON PIKE	2681 PRINCETON PIKE	LAWRENCEVILLE, NJ	08648	HUTCHISON, JOHN & SHERYL
301	LAWRENCE STN RD	301 LAWRENCE STATION RD	LAWRENCEVILLE, NJ	08648	HALCAK, CARL
96	DENOW ROAD	96 DENOW ROAD	LAWRENCEVILLE, NJ	08648	APPLEGATE, ROBERT UX
100	MEADOW ROAD	2207 LAWRENCEVILLE RD	LAWRENCEVILLE, NJ	08648	TOWNSHIP OF LAWRENCE
3850	PRINCETON PIKE	17 ELM ST	MORRISTOWN, NJ	07960	ENTERPRISE HOLDE CO
2467	MAIN STREET	2467 MAIN STREET	LAWRENCVILLE, NJ	08648	NICTAKIS, PETER E UX
2459	MAIN STREET	2459 MAIN STREET	LAWRENCEVILLE, NJ	08648	TILTON, JUDITH ANN & EMMA H TILTON
2453	MAIN STREET	2453 MAIN ST	LAWRENCEVILLE, NJ	08648	HILL,WILLIAM C III
2449	MAIN STREET	49 MORAN AVE	PRINCETON, NJ	08540	SOMERS, ELIZABETH D
2431	MAIN STREET	620 LIBERTY AVE 19TH FL	PITTSBURGH, PA	15222	MDLTC BK C/O PNC RLTY SV P2PTPP03-4
1	MONROE AVE	1 MONROE AVE	LAWRENCEVILLE, NJ	08648	NAGGAR, J A & M K KLINGENBERG
2525	MAIN STREET	2525 MAIN STREET	LAWRENCEVILLE, NJ	08648	PALLOTTI, MICHAEL & DARLENE
2515	MAIN STREET	PO BOX 6126	LAWRENCVILLE, NJ	08648	TRUSTEES OF LAWRENCEVILLE SCHOOL
2505	MAIN STREET	2505 MAIN STREET	LAWRENCEVILLE, NJ	08648	BRANDT, DANIEL J W & JENNIFER H
2499	MAIN STREET	2499 MAIN STREET	LAWRENCEVILLE, NJ	08648	HULLFISH, WILLIAM R UX
2489	MAIN STREET	2489 MAIN STREET	LAWRENCEVILLE, NJ	08648	FLANAGAN, PATRICIA C/O APRILL
2475	MAIN STREET	PO BOX 6126	LAWRENCEVILLE, NJ	08648	TRUSTEES OF LAWRENCEVILLE SCHOOL
2565	MAIN STREET	2565 MAIN STREET	LAWRENCEVILLE, NJ	08648	BAKER, THOMAS & CAROLE
2557	MAIN STREET	PO BOX 6126	LAWRENCEVILLE, NJ	08648	TRUSTEES OF LAWRENCEVILLE SCHOOL
2549	MAIN STREET	PO BOX 6126	LAWRENCEVILLE, NJ	08648	TRUSTEES OF LAWRENCEVILLE SCHOOL
2535	MAIN STREET	2535 MAIN STREET	LAWRENCEVILLE, NJ	08648	ULTAN, SUSAN D
2571	MAIN STREET	2571 MAIN STREET	LAWRENCEVILLE, NJ	08648	LONGHI, GLORIA I
2611	MAIN STREET	PO BOX 6126	LAWRENCEVILLE, NJ	08648	TRUSTEES OF LAWRENCEVILLE SCHOOL
2581	MAIN STREET	PO BOX 6126	LAWRENCEVILLE, NJ	08648	TRUSTEES OF LAWRENCEVILLE SCHOOL
2579	MAIN STREET	2579 MAIN STREET	LAWRENCEVILLE, NJ	08648	WILLIS, EDWARD DAVID & ANN C
2617	MAIN STREET	PO BOX 6126	LAWRENCEVILLE, NJ	08648	TRUSTEES OF LAWRENCEVILLE SCHOOL
2635	MAIN STREET	PO BOX 6126	LAWRENCEVILLE, NJ	08648	TRUSTEES OF LAWRENCEVILLE SCHOOL
2651	MAIN STREET	64 RIVER DRIVE	TITUSVILLE, NJ	08560	HINKLE, HERBERT D & PATRICIA A
2647	MAIN STREET	35 NURSERY RD	TITUSVILLE, NJ	08560	VITELLA, JOSEPH A
2641	MAIN STREET	PO BOX 6126	LAWRENCEVILLE, NJ	08648	TRUSTEES OF LAWRENCEVILLE SCHOOL

APPENDIX H: Historic Properties of Lawrence Township

#	Prop Location	Owner Address	Owner City/State	Zip	Owner
2641	MAIN STREET	C/O A WILSON HOGATE HALL	LAWRENCEVILLE, NJ	08648	LAWR SQ SO MASTER ASSOC,LAWR SCHOOL
2627	MAIN STREET	PO BOX 6126	LAWRENCEVILLE, NJ	08648	TRUSTEES OF LAWRENCEVILLE SCHOOL
2621	MAIN STREET	PO BOX 6126	LAWRENCEVILLE, NJ	08648	TRUSTEES OF LAWRENCEVILLE SCHOOL
2673	MAIN STREET	226 LANDIS AVE - ACCT PYB	VINELAND, NJ	08360	1ST ST PROP #41 LLC- SUN NAT'L BANK
2667	MAIN STREET	974 LAWRENCEVILLE RD	PRINCETON, NJ	08540	BEARSNOUT LLC CO CHAMBERS WALK CAFE
2665	MAIN STREET	31 FRESH PONDS ROAD	EAST BRUNSWICK, NJ	08816	BAILEY, LAWRENCE ETALS
2663	MAIN STREET	31 FRESH PONDS ROAD	EAST BRUNSWICK, NJ	08816	BAILEY, LAWRENCE ETALS
2659/2661	MAIN STREET	10 BENJAMIN TRAIL	PENNINGTON, NJ	08534	VITELLA, JOSEPH & ANTHONY
NO #	MAIN STREET	PO BOX 6126	LAWRENCEVILLE, NJ	08648	TRUSTEES OF LAWRENCEVILLE SCHOOL
2942	MAIN STREET	2942 MAIN ST RD6	LAWRENCEVILLE, NJ	08648	CRANSTOUN, WINNIFRED
3020	MAIN STREET	PO BOX 6126	LAWRENCEVILLE, NJ	08648	THE LAWRENCEVILLE SCHOOL
3030	LAWRENCEVILLE RD	3030 LAWRENCEVILLE RD	LAWRENCEVILLE,NJ	08648	DIX, R M JR & XUAN
3070	LAWR-PRIN ROAD	3070 LAWR-PRIN ROAD	LAWRENCEVILLE,NJ	08648	THOMAS, MARIA ISABEL
3090	LAWR-PRIN ROAD	3090 LAWRENCEVILLE RD	LAWRENCEVILLE,NJ	08648	HOFFMANN, AGNES C
3200	MAIN STREET	974 LAWR-PRINCETON RD	PRINCETON, NJ	08540	CHERRY GROVE FARM LLC
NO #	LAWR-PRIN ROAD	974 LAWR-PRINCETON RD	PRINCETON, NJ	08540	CHERRY GROVE FARM LLC
2688	MAIN STREET	2688 MAIN STREET	LAWRENCEVILLE, NJ	08648	LAWRENCEVILLE PRESBYTERIAN CHURCH
2	LEWISVILLE ROAD	PO BOX 6126	LAWRENCEVILLE, NJ	08648	TRUSTEES OF LAWRENCEVILLE SCHOOL
2858	MAIN STREET	BOX 6196	LAWRENCEVILLE, NJ	08648	HILL, HARRY R JR ET UX
2868	MAIN STREET	2868 MAIN STREET	LAWRENCEVILLE, NJ	08648	HUSTON, JOHN J JR & HARRIET
2898	MAIN STREET	2898 MAIN ST	LAWRENCEVILLE, NJ	08648	COFFEE, DOROTHY
2805	MAIN STREET	2805 MAIN STREET	LAWRENCEVILLE, NJ	08648	BATTLE, CAROLYN A
2801	MAIN STREET	108 CYPRESS COURT	HAMMONTON, NJ	08037	KISS-GROSS, CHARITAS
2797	MAIN STREET	14 STRATTON CT	FLEMINGTON, NJ	08822	LLOYD, HARRY J
2793	MAIN STREET	2789 MAIN STREET	LAWRENCEVILLE, NJ	08648	WOOLSEY, H G UX
2789	MAIN STREET	2789 MAIN STREET	LAWRENCEVILLE, NJ	08648	HEIM, CHARLES G & DEBORAH J
2785	MAIN STREET	2785 MAIN STREET	LAWRENCEVILLE, NJ	08648	MAPLE, JOHN U ET UX
2779	MAIN STREET	PO BOX 6126	LAWRENCEVILLE, NJ	08648	TRUSTEES OF LAWRENCEVILLE SCHOOL
2775	MAIN STREET	2775 MAIN STREET	LAWRENCEVILLE, NJ	08648	MC CALL, DAVID B JR & ABIGAIL S
2761	MAIN STREET	480 WASH-CROSS PENN RD	TITUSVILLE, NJ	08560	BROPHY, MARTIN & SANDRA
2739	MAIN STREET	2739 MAIN STREET	LAWRENCEVILLE, NJ	08648	VOLIVA, RICHARD L JR & MARILYN M
2737	MAIN STREET	2737 MAIN STREET	LAWRENCEVILLE, NJ	08648	ALLEN, RAYMOND D UX
2735	MAIN STREET	20 BAYARD LANE	PRINCETON, NJ	08540	PEACOCK INN ASSOCIATES INC
2727	MAIN STREET	2727 MAIN STREET	LAWRENCEVILLE, NJ	08648	HASSETT, WILLIAM A & AFTON L
2721	MAIN STREET	2721 MAIN STREET	LAWRENCEVILLE,NJ	08648	SEITCHIK, PETER & JOAN W
2719	MAIN STREET	2719 MAIN STREET	LAWRENCEVILLE, NJ	08648	MOTT, PAUL B JR UX

APPENDIX H: Historic Properties of Lawrence Township

#	Prop Location	Owner Address	Owner City/State	Zip	Owner
2711	MAIN STREET	2711 MAIN STREET	LAWRENCEVILLE, NJ	08648	KEUFFEL, ELIZABETH R (TRUST)
2705	MAIN STREET	2705 MAIN STREET	LAWRENCEVILLE, NJ	08648	STACKPOLE, WILLIAM ET UX
2695	MAIN STREET	69 FARRAND RD	PRINCETON, NJ	08540	HUCKEL, KIRK D ET UX
2691	MAIN STREET	7 NORTHFIELD COURT	LAWRENCEVILLE, NJ	08648	HUNT, JONATHAN A & MARY E
2687	MAIN STREET	BOX 6466	LAWRENCEVILLE,NJ	08648	GULDALIAN, JACK ETUX
2685	MAIN STREET	35 CRAVEN LANE	LAWRENCEVILLE,NJ	08648	HULLFISH REAL ESTATE CO , LLC
2681/2683	MAIN STREET	35 CRAVEN LANE	LAWRENCEVILLE, NJ	08648	HULLFISH REAL ESTATE CO , LLC
100	COLD SOIL RD	P.O. BOX 6494	LAWRENCEVILLE, NJ	08648	SEYMOUR, PAUL & SHELLEY & PRIN U
2	CONCORD AVE	2 CONCORD AVE	LAWRENCEVILLE, NJ	08648	TATA, SURESH S & NIVEDITA S
12	GRANDVIEW AVE	12 GRANDVIEW AVE	LAWRENCEVILLE, NJ	08648	FRAZEE, ELIZABETH L & T MCNULTY III
2	EDGEWOOD AVENUE	2 EDGEWOOD AVENUE	LAWRENCEVILLE,NJ	08648	KERNEY, J REGAN
3001	LAWR-PRIN ROAD	55 GREEN AVE	LAWRENCEVILLE, NJ	08648	LAWRENCEVILLE CEMETERY - J CAMPBELL
3011	LAWR-PRIN ROAD	3011 LAWRENCEVILLE RD	LAWRENCEVILLE,NJ	08648	MORRISON RICHARD & WILLARD MICHELLE
3031	LAWR-PRIN ROAD	3031 LAWR-PRIN ROAD	LAWRENCEVILLE,NJ	08648	BOISSON, JEAN B & CATRINA L
3051	LAWRENCEVILLE RD	3051 LAWRENCEVILLE RD	LAWRENCEVILLE,NJ	08648	PEREZ, FRANCISCO J
3071	LAWR-PRIN ROAD	3071 LAWR-PRIN ROAD	LAWRENCEVILLE, NJ	08648	CRANE, DAVID UX - ORCHARD HILL
3069	LAWRENCEVILLE RD	3069 LAWRENCEVILLE RD	LAWRENCEVILLE,NJ	08648	JONES, JEANNE M
3091	LAWR-PRIN ROAD	PO BOX 7408	PRINCETON, NJ	08543	DE RAVEL D'ESCLAPON, RYSIA
17	CARTER RD	974 LAWRENCEVILLE RD	PRINCETON, NJ	08540	THE HAMILL FAMILY LP
1	CARTER RD	1 CARTER RD	PRINCETON, NJ	08540	BAUS, ROBERT D & MAUREEN O'MALLEY-
1	SHADOWSTONE LN	1 SHADOWSTONE LANE	LAWRENCEVILLE, NJ	08648	TAYLOR, FRANCES X & NANCY
2837	MAIN STREET	2837 MAIN STREET	LAWRENCEVILLE, NJ	08648	TRAINER, ROBERT W & S VICTORIA
2895	MAIN STREET	2895 LAWRENCEVILLE RD	LAWRENCEVILLE, NJ	08648	FICHTNER,AARON R & CIOCIOLA,HEATHER
2897	MAIN STREET	2897 MAIN ST	LAWRENCEVILLE, NJ	08648	CAIAZZO, CATHIANNE
2909	MAIN STREET	2909 MAIN ST	LAWRENCEVILLE, NJ	08648	ADAMSKY, GREGORY P & SUSANNE M
2913	MAIN STREET	2913 MAIN STREET	LAWRENCEVILLE, NJ	08648	CHENOWETH, KATHARINE A
2915	MAIN STREET	PO BOX 6978	LAWRENCEVILLE, NJ	08648	SALLEE, ERIC UX
2923	MAIN STREET	2923 MAIN STREET	LAWRENCEVILLE, NJ	08648	MUMBY, ROBERT J
2931	MAIN STREET	2931 MAIN STREET	LAWRENCEVILLE,NJ	08648	SKOVRON, MARY LOU
2945	MAIN STREET	1 CONCORD AVE	LAWRENCEVILLE,NJ	08648	CHIARDIA, IDA MARIE
3301	LAWR-PRIN ROAD	500 EAST 83RD STREET	NEW YORK, NY	10028	PRESSEL, MICHAEL G & JANET
3271	LAWR-PRIN ROAD	3271 LAWR-PRIN ROAD	PRINCETON, NJ	08540	JOHNSTON, MICHAEL G ET UX
3231	LAWR-PRIN ROAD	1327 CANAL ROAD	PRINCETON, NJ	08540	DELAWARE & RARITAN GREENWAY
3641	LAWR-PRIN ROAD	411 HACKENSACK AVE 7TH FL	HACKENSACK, NJ	07601	L'VILLE RLTY CO - STRAUS CAPITAL GR
3461	LAWRENCEVILLE RD	3461 LAWRENCEVILLE RD	PRINCETON, NJ	08540	WAABEN, SIGURD G UX
3270	LAWR-PRIN ROAD	3270 LAWR-PRIN ROAD	PRINCETON, NJ	08540	J R F LAWRENCE INC
4419	PROVINCE LINE RD	4416 PROVINCE LINE RD	PRINCETON, NJ	08540	DOUGHERTY, PATRICIA PAINE

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#	Prop Location	Owner Address	Owner City/State	Zip	Owner
335	COLD SOIL RD	335 COLD SOIL RD	PRINCETON, NJ	08540	SARGENT, DOUGLAS UX
265	COLD SOIL RD	PO BOX 9269	TRENTON, NJ	08650	DI DONATO,E B -MALLARD PROP MGT GRP
210	COLD SOIL RD	210 COLD SOIL RD	PRINCETON, NJ	08540	HAUTAU, JANET M
3801	LAWR-PRIN ROAD	3801 LAWR-PRIN ROAD	PRINCETON, NJ	08540	STOKES, MARIE LOUISE ET VIR
634	ROSEDALE RD	634 ROSEDALE RD	PRINCETON, NJ	08540	LASLEY, JANET & MARC BRAHANEY
NO #	MEADOW ROAD	2207 LAWRENCEVILLE RD	LAWRENCEVILLE, NJ	08648	TOWNSHIP OF LAWRENCE

Source: Lawrence Township

DELAWARE VALLEY REGIONAL PLANNING COMMISSION

Publication Abstract

Title: ***Environmental Resource Inventory for Lawrence Township, Mercer County, New Jersey***

Date Published: **March 2008**
Publication No. **08025**

Geographic Area Covered: Lawrence Township, Mercer County, New Jersey

Key Words: Conservation, endangered species, environment, environmental resource inventory, floodplains, forests, grasslands, historic resources, history, landscape project, Lawrence Township, Mercer County, natural resources, open space, parks, soils, watershed, water quality, wetlands.

ABSTRACT

This publication documents the natural and community resources of Lawrence Township, Mercer County, New Jersey. The natural resource information includes descriptions, tables and maps of land use; soils; drinking water aquifers and wells; surface waters including watersheds, streams, lakes, wetlands, and floodplains; impacts on water resources and surface water quality; impervious coverage; vegetation including wetlands, forests and grasslands; animal communities; threatened and endangered species; deer management; Heritage Priority Sites; and known contaminated sites. Community resources that are briefly described include population, transportation, township utilities and services, and protected open space. A short history of the community is also included.

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for the TOWNSHIP of

LAWRENCE

MERCER COUNTY, NEW JERSEY

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