

MASTER PLAN

FRELINGHUYSEN TOWNSHIP

COUNTY OF WARREN

ADOPTED

September 6, 2007


PREPARED BY:

ERIC K. SNYDER AND ASSOCIATES, INC.
40 TRINITY STREET
NEWTON, NJ

WITH

MASER CONSULTING
53 FRONTAGE ROAD
CLINTON, NJ 08809

The original of this report was signed and sealed
In accordance with N.J.A.C. 13: 41-1.3



John Madden, AICP
Professional Planner
NJ License #1452

Table of Contents

	Page
Acknowledgments	1
Introduction	2
Goals and Objectives	3
Regional Location	14
Housing and Population Element	18
Circulation Element	36
Natural Resources Element	45
Farmland Preservation Element	81
Historic Preservation Element	84
Open Space and Recreation Plan Element	96
Existing Land Use Element	98
Proposed Land Use Element	101
Comparison to Other Plans	112

Exhibits

	Page
Regional Location	16
Roadway Conditions	39
Physiographic Provinces	48
Topography and Steep Slopes	50
Geologic Timetable	54
Bedrock Geology and Mines	55
Glacial Sediment Deposits	59
Groundwater Recharge Rates	60
Aquifer and Public Wells	61
Soils Survey	62
Carrying Capacity and Township Area	69
Carrying Capacity Map	70
Surface Hydrology	72
Critical Wildlife Habitat	74
Natural Heritage Priority Sites	75
Archeological Sites	89
Existing Land Use	100
Surrounding Zoning	116

ACKNOWLEDGMENTS

The 2007 Master Plan represents a consolidation of adopted and proposed municipal planning policies that were prepared by a variety of professional planning and environmental professionals in cooperation with the members of the Planning Board, the Environmental Commission and the Farmland Preservation Commission and the Farmland Preservation Commission.

The Farmland Preservation Plan dated September, 2005 was prepared by the Morris Land Conservancy in consultation with the Farmland Preservation Commission.

The Open Space and Recreation Plan, dated February 2006 was prepared by the Morris Land Conservancy in consultation with the Township Environmental Commission.

Finally, The Master Plan elements other than Farmland Preservation and Open Space and Recreation Plan Elements are the work of professional planners Eric Snyder and John Madden. Mr. Snyder prepared all of the background information and most of the goals and policies set forth on the various plan elements. All maps with the exception of the land use plan maps and carrying capacity maps were prepared by Witte Environmental Services. Mr. Madden prepared revisions to the goals and policies, mainly in the land use plan element. Mr. Madden's work was a result of the 2005 Master Plan Reexamination report which was adopted by the Planning Board on October 17, 2005. The Reexamination Report recommendations for changes to the land use plan and zoning ordinance and map were based in part by on an updated nitrate dilution based carrying capacity assessment by the Hydro geological Group of Maser Consulting, dated September 7, 2005.

INTRODUCTION

The New Jersey Municipal Land Use Law, NJSA 40:55D-25 provides under the powers of the Planning Board that it shall have the power to prepare a Master Plan pursuant to the provisions of NJSA 40:55D-28. The section states at section A, the Planning Board may prepare and, after public hearing, adopt or amend the Master Plan or components parts thereof, to guide the use of lands within the municipality in a manner which protects public health and safety and promotes the general welfare. This section goes on to state that the Master Plan shall consist of at least a statement of objectives, principals, assumptions, policies and standards upon the constituent proposals for the physical, economic, and social development of the municipality based. This is to be coupled with a land use element and a housing element. These three mandatory elements of the Master Plan may be supplemented by other elements such as circulation, conservation, community facilities, historic preservation, farmland preservation along with appendices or separate reports containing the technical foundation for the master plan and its constituent elements.

The reason the adoption of a Master Plan is so important is that the Municipal Land Use Law at section NJSA 40:55D-62 states “The governing body may adopt or amend the zoning ordinance relating to the nature and extent of the uses of land that have building and structures thereon. Such ordinance shall be adopted after the Planning Board has adopted the Land Use Plan Element and the Housing Plan Element of a Master Plan, and all of the provisions of such zoning ordinance or any amendment or revision thereto shall be substantially consistent with the Land Use Plan Element and the Housing Plan Element of the Master Plan or designed to effectuate such plan elements;...” In other words, if a municipality wishes to regulate land use it must first adopt a Master Plan indicating the rational underlying the regulations to be adopted.

GOALS AND OBJECTIVES

GOALS AND OBJECTIVES

The Municipal Land Use Law at section 2 sets out the purposes of planning and zoning in New Jersey. These overarching principals serve as the foundation for all municipal action in land use regulation and are as follows:

- a) To encourage municipal activity to guide the appropriate use or development of all lands in this State, in a manner which will promote the public health, safety, morals, and general welfare.
- b) To secure safety from fire, flood, panic and other natural and manmade disasters.
- c) To provide adequate air and open space.
- d) To ensure that the development of individual municipalities does not conflict with the development and general welfare of neighboring municipalities, the county and the State as a whole.
- e) To promote the establishment of appropriate population densities and concentrations that will contribute to the well-being of persons, neighborhoods, communities and regions and the preservation of the environment.
- f) To encourage the appropriate and efficient expenditure of the public funds by the coordination of public development with land use policies.
- g) To provide sufficient space in appropriate locations for a variety of agricultural, residential, recreational, commercial and industrial uses and open space, both public and private, according to their respective environmental requirements in order to meet the needs of all New Jersey citizens.
- h) To encourage the location and design of transportation routes which will promote the free flow of traffic while discouraging location of such facilities and routes which result in congestion or blight.
- i) To promote a desirable visual environmental through creative development techniques and good civic design and arrangements.
- j) To promote the conservation of historic sites and districts, open space, energy resources, and valuable natural resources, in the State and to prevent urban sprawl and degradation of the environment through improper use of land.

- k) To encourage planned unit developments which will incorporate the residential, commercial, industrial and recreational development to the particular site.
- l) To encourage senior citizen community housing construction.
- m) To encourage coordination of various public and private procedures and activities shaping land development with a view of lessening the cost of such development and to the more efficient use of land.
- n) To promote utilization of renewable energy resources.
- o) To promote the maximum practicable recovery, and recycling of recyclable material from municipal and solid waste through the use of planning practices designed to incorporate the State Recycling Plan goals and to compliment municipal recycling programs.

In addition to the State adopted goals and objectives of planning, Frelinghuysen Township has adopted the following goals and objectives relating to its specific land use concerns.

Goal 1. To provide for the growth of the Township in such a way that its open rural character and natural beauty is preserved.

Objectives:

- a) Plan for densities appropriate to rural areas.
- b) Establish open space on private lands.
- c) Encourage the continuation of agricultural uses and allow for associated structures and operational considerations.
- d) Maintain the current general alignment and corridor of township roads.
- e) Protect historic sites, and buildings and encourage development that is compatible with and accentuates existing historic resources.
- f) Protect the visual resources of the community, in particular ridge lines.

Goal 2. To promote a land use pattern that is in harmony with the environmental features of the Township.

Objectives:

- a) Protect groundwater and surface water supplies.
- b) Insure that protection of natural resources is an integral part of the planning process.
- c) Provide for protection of critical areas, such as wetlands, steep slopes, floodplains and flood-prone areas including 100-year floodplains.
- d) Protect unique and distinctive natural features through establishment of conservation easements on private lands.
- e) Provide adequate public land for diverse forms of recreation, to conserve wildlife and protect unique and distinctive natural features.
- f) Minimize storm water runoff water quality impact for the Township's high quality surface waters.
- g) Recognize unique challenges to development presented by limestone features, such as sinkholes and caves.
- h) Establish zoning densities that are environmentally supported.
- i) Insure that approved building lots have adequate water supply and provide for adequate wastewater treatment.

Goal 3. To provide self-sufficient residential development in line with the Township's housing needs.

Objectives:

- a) Provide low and moderate-income housing consistent with legal mandates.
- b) Encourage affordable housing for first time buyers and for senior citizens.
- c) Promote efficient housing that conserves resources.
- d) Maintain existing density patterns, but allow for alternative residential development where it encourages land and resource conservation.

Goal 4. To provide adequate and convenient commercial development compatible with the character and resources of the community.

Objectives:

- a) Provide for appropriate commercial development within town centers, and existing corridors.
- b) Provide for home occupation, which are not disruptive of residential expectations.

Goal 5. Provide a circulation system to serve all properties in Frelinghuysen, safely and conveniently incorporating movement to and from employment, recreation opportunities, and commercial and institutional services.

Objectives:

- a) Develop an information base of existing local, county and State roads in Frelinghuysen using maps, traffic volumes, cartway and right-of way width, road conditions, traffic accident information and hazardous locations.
- b) Determine currently expected road improvements by jurisdiction.
- c) Evaluate current public transportation systems as to how they serve Frelinghuysen Township and project needs for the ten-year period.
- d) Identify road and traffic improvements and new roads needed to alleviate existing traffic bottlenecks and hazardous conditions, taking into consideration-anticipated traffic for the ten-year period.
- e) Prepare a circulation element of the Master Plan and a road and traffic improvement section of a Capital Improvements Program.
- f) Review the pattern of roads in the Township and suggest additional connections to facilitate access to all areas of the Township.
- g) Evaluate the road network, identifying all hazardous points and other portions in the road network which require improvements, i.e., deteriorated and otherwise inadequate pavement.
- h) Require, as appropriate, all development proposals showing new road construction to make interconnection with adjacent development.

- i) Incorporate separate ways and paths for pedestrians and bicycle passage in all new development.
- j) Investigate opportunities for construction of pedestrian paths, ways, and /or sidewalks where current usage is unsafe.
- k) Encourage development patterns which promote mass transit.
- l) Provide that any development plan, containing or abutting railroad rights-of-way, incorporate these in a manner consistent with their eventual rehabilitation and reuse.
- m) Encourage non-motorized transportation in conjunction with energy conservation objectives.
- n) Identify all streets and roads in the Township according to their classification in the circulation network hierarchy.
 - 1. Limit access to arterial and collector roads to those points of access which are absolutely necessary to provide safe ingress and egress to property.
 - 2. Utilize the local road network, both existing and proposed as the primary focus for access to the vehicular circulation system.
- o) Encourage the design of roadways so as to make them self policing as to speeds by emphasizing a curvilinear design over "flat, straight and wide roadways".
- p) Ensure the retention of natural features along roadways (e.g. stone rows, hedge rows, historic elements).
- q) Secure drainage easements for all cross drains in the municipal road network.
- r) Evaluate the safety of the existing road network for pedestrian and bicycle traffic. Create where appropriate designated pedestrian and bike ways.
- s) In cooperation with state and county authorities, work to improve the safety of various intersections and points of hazard along the existing road network.
- t) Encourage construction of roadways which accommodate existing terrain to the greatest extent possible avoiding unnecessary land disturbance and allowing for points along the road which may exceed general grade standards as an alternative to excessive clearing and regrading.
- u) Incorporate the scenic road designations for all roadways, including County roads, so identified in the Environmental Resource Inventory prepared by the

Township Environmental Commission.

- v) Encourage localized recreation opportunities so as to minimize the need for children to utilize unsafe bicycle and pedestrian routes.
- w) Identify and prepare a priority list of roads to be speed zoned.
- x) Inventory all unimproved streets to determine the need to improve them.
- y) Review all vacated streets and reestablish the same where public safety and convenience would be enhanced.
- z) Permit the use of private roads as an option to encourage reduced density development.

Goal 6. Maintain a balanced Open Space Program.

- a) Support protection of current open space resources and additional resources where appropriate.
- b) Support the retention and continued viability of farm and forest activities and resources.
- c) Provide for recreation and cultural facilities, providing a variety of programs to meet the levels of community interest.

Objectives:

- a) Incorporate the Open Space Plan developed by the Environmental Commission, as information, planning, and capital programming source.
- b) Evaluate the Open Space Plan in the context of the overall projections, needs and public fiscal resources for Frelinghuysen Township.

Goal 7. Maintain and improve the level of contact and response in regard to adjoining municipal, county and State development and planning activities and their impact on the community.

Objectives:

- a) Review the Master Plan, development ordinances, and other relevant documents and activities of adjacent municipalities, Warren County and the State of New Jersey and the Highlands Area Regional Planning Council to determine their impact on Frelinghuysen Township.

- b) Encourage continuing dialogue with officials from the municipalities, the county and the State in order to mitigate conflicts in existing and proposed land development circulation and transportation, and community related activities, and to foster cooperation and coordination of public activities wherever economically and practically feasible.

Goal 8. Support increases of safety and health related activities such as fire, emergency squad, police protection and public health in order to meet and improve service to the community.

Objectives:

- a) Evaluate safety and health facilities, and their levels of activity, which are located or serve Frelinghuysen Township, and evaluate their effectiveness in relation to generally recognized norms.
- b) Indicate where corrective measures may be needed to serve Frelinghuysen community.

Goal 9. Identify and protect lands which may be needed to located or expand public facilities, or to protect for future expansion of open space and recreation lands.

Objectives:

- a) Prepare an Official Map identifying existing and proposed location of public facilities including, roads, right of way widths, drainage basins and drainage rights-of-way and their widths, the location of existing and proposed public buildings, and existing proposed open space and recreation lands.

Goal 10. Encourage the concept of a community identity for Frelinghuysen.

Objectives:

- a) Investigate those elements of community activities, which foster a sense of identity within Frelinghuysen i.e. history, town-side activities, government.
- b) Suggest types of activities where the Township can foster community identification and cohesion such as architectural and site design standards, and streetscape and signage measures in commercial areas, and improved pedestrian circulation.

Goal 11. Maintain a high level of performance and economy in the provision of municipal services.

Objectives:

- a) Evaluate present activities in the provision of municipal services.
- b) Project the level of services which may be needed in the ten-year target period.
- c) Project staffing and capital needs in order to meet service needs.
- d) Suggest alternate means of service provisions.

GOAL 12: Preserve and Enhance the Architectural and Historical Integrity of Johnsonburg.

Objectives:

- a) Evaluate the adequacy of the township zoning provisions for the Village Neighborhood zone to insure they protect the National and State Historic Site of Johnsonburg.
- b) Undertake a streetscape design study to be used in conjunction with any future public improvements.
- c) Consider as part of the overall land use planning and design of the Johnsonburg Historic District the establishment of open space buffers around the perimeter of the village through either township acquisition or conservation/historic preservation easement.

GOAL 13: Preserve and Enhance the Architectural and Historical Integrity of Marksboro.

Objectives:

- a) Consider development and submission of an application to the National Park Service for registration of Marksboro as a National Historic District.
- b) Evaluate township zoning provisions for the Village Neighborhood zone.
- c) Undertake a streetscape design study to be used in conjunction with any future public improvements.
- d) Consider as part of the overall land use planning and design of the Marksboro area the establishment of open space buffers around the perimeter of the village.

GOAL 14: Preserve and enhance the architectural and historic integrity of the Bending Brook area.

Objectives:

- a) Consider development and submission of an application to the National Park Service for registration of the Bending Brook area as an Agricultural and Industrial Historic District.
- b) Consider revision of the township zoning provisions to protect and enhance the historic and archaeological resources of the area.
- c) Consider other means of action to aide in the area's preservation.

GOAL 15: Preserve historic resources through municipal regulatory means.

Objectives:

- a) Update the historic sites survey and identify all architecturally/historically significant resources using the Cultural and Visual Resources chapter of the Environmental Resources Inventory, the Frelinghuysen section of the Warren County Cultural Resources Inventory, and other information sources.
- b) Consider creation of a Historic Preservation Commission.
- c) Review and consider the types of actions that can be taken by a Historic Preservation Commission regarding development review and the legal effect of these reviews.
- d) Evaluate the economic effect of historic designation.

Goal 16: Protect and enhance all Historic Resources within the Township

Objectives:

- a) Evaluate township codes with respect to their ability to bring about rehabilitation of historic structures, while still maintaining those necessary for general health and safety.
- b) Promote the availability of federal investment tax credits and other state and local actions favorable to rehabilitation efforts.
- c) Establish a plaque program for historic sites.

- d) Publish the results of the state-funded survey of historic resources of Frelinghuysen Township and make available to the public.
- e) Develop and publish a brochure for walking/windshield tours of the township historic sites.
- f) Promote consciousness of historic preservation within the local school system.

Goal 17: Protect all Significant Archeological Sites within the Township

Objectives:

- a) Revise township ordinances to insure they consider protection of archeological sites during development.
- b) Ensure the township protects archaeological sites in carrying out its responsibilities.

REGIONAL LOCATION

REGIONAL LOCATION

Frelinghuysen Township is located in northern Warren County adjacent to the Sussex County boundary and bordered in part by the Paulenskill. It lies adjacent to the Sussex County municipalities of Green, Fredon and Stillwater and the Warren County municipalities of Allamuchy, Hardwick, Blairstown, Liberty and Independence.

Frelinghuysen comprises 23.55 square miles and has a population density of 88.9 persons per square mile. This lightly settled municipality lies generally between Blairstown Township in Warren County and the Town of Newton in Sussex County as the principal economic centers. Lying along Route 94 and within relatively close proximity to Interstate 80, Frelinghuysen combines the conveniences of connection to the larger markets and population centers with its strong rural and agricultural character. (See Exhibit 1, Regional Location)

EXHIBIT 1
REGIONAL LOCATION



10 0 10 20 Miles

REFERENCES & NOTES:

State, County and Municipal boundaries taken from NJDEP GIS database.

This map has been prepared as a guide for the Frelinghuysen Township Master Plan. Data on this map should not be relied upon for individual lot planning.

This map was developed using NJDEP & NJGS Geographic Information System digital data, but this secondary product has not been verified by the NJDEP or NJGS and is not State - authorized.

Regional Location Map

**Municipal Master Plan
Township of Frelinghuysen
Warren County, NJ**

Scale: 1" = 10 miles

Date: 11/19/03

ERIC K. SNYDER & ASSOCIATES, INC.
LAND DEVELOPMENT AND COMMUNITY PLANNING CONSULTANTS

185 Spring Street
Newton, NJ 07860

(973) 300-5600
Fax (973) 300-1524

HOUSING AND POPULATION ELEMENT

HOUSING AND POPULATION ELEMENT

Introduction

Over the past twenty years, the courts and legislature in New Jersey have wrestled with the question, "What is the municipal obligation to provide affordable housing for its current and future citizens?" After the New Jersey Supreme Court's 1983 ruling that municipal zoning must provide realistic opportunities for low and moderate income housing, the State Legislature passed and the Governor signed, the Fair Housing Act (Chapter 222, Laws of 1985).

The act establishes a nine member Council on Affordable Housing (COAH). The Council is directed to promulgate a set of procedures and guidelines to assist municipal governments in meeting their responsibility under the Act.

In order to provide structure to the Fair Housing Program, the COAH divided the State into six housing regions. The regions are defined by tying residential areas to the predominant employment centers for residents of those areas. The Township of Frelinghuysen lies within the Northwest Region as defined by COAH. This region includes Warren, Union, Morris and Essex Counties.

Through a consideration of the residential, commercial and industrial growth through 1999, a total housing shortfall for low and moderate income households of 10,616 units must be satisfied in the region. Of this total, Frelinghuysen has been assigned nineteen (19) units.

The Fair Housing Act requires each municipality to provide an opportunity, through its land use controls, for the market to meet this obligation.

Under the Fair Housing Act and the Municipal Land Use Law, each municipality has the obligation to prepare a Housing Element as part of its Master Plan.

The regulations promulgated by COAH require that the Housing Element cover the following:

- An inventory of the municipality's housing stock by age, condition, purchase or rental value, occupancy characteristics, and type, including the number of units affordable to low and moderate income households and substandard housing capable of being rehabilitated.
- A projection of the municipality's housing stock, including the probable future construction of low and moderate housing stock, for the next six years, taking into account, but not necessarily limited to, construction permits issued, approvals of applications for development and probable residential development of lands.

- An analysis of the municipality's demographic characteristics, including but not limited to, household size, income level and age.
- An analysis of the existing and probable future employment characteristics of the municipality.
- A determination of the municipality's present and prospective fair share for low and moderate income housing and its capacity to accommodate its present and prospective housing needs, including its fair share for low and moderate income housing.
- A consideration of the lands that are most appropriate for construction of low and moderate income housing and of the existing structures most appropriate for conversion to, or rehabilitation for, low and moderate income housing, including a consideration of lands of developers who have expressed a commitment to provide low and moderate income housing.

1. HOUSING INVENTORY

The Township of Frelinghuysen, as of the 2000 Census, contained 755 housing units. This includes attached units and mobile homes, as well as single family detached homes. Since that time (3/2000 to 9/2004) additional development has occurred as shown below.

**TABLE 1
HOUSING GROWTH**

<u>2000 TOTAL</u> <u>UNITS</u>	<u>UNITS ADDED</u>	<u>UNITS</u> <u>DEMOLISHED</u>	<u>2004 TOTAL</u> <u>UNITS</u>
755	36	3	788

Source: 2000 Census; Municipal Construction Reports (N.J.)

As with any municipality, the housing stock of Frelinghuysen is a mix of old and new, single and multiple family, owner and renter occupied. Tables 2 through 7 outline the makeup of the housing stock as it existed in 2000. Some totals may be different as some questions on the census were sample questions which were then projected to a component total.

**TABLE 2
HOUSING UNITS BY TENURE**

OWNER	641
RENTAL	81
VACANT	<u>33</u>
<i>TOTAL</i>	755

Source: 2000 Census

Tables 3, 4, and 5 outline the general age distribution, pace of development and type of housing in the Township.

TABLE 3
AGE OF STRUCTURE

<u>YEAR BUILT</u>	<u>NUMBER OF UNITS</u>
1999 – 3/2000	14
1995 - 1998	79
1990 – 1994	47
1980 – 1989	209
1970 – 1979	79
1960 – 1969	35
1950 – 1959	45
1940 – 1949	22
1939 or earlier	<u>225</u>
<i>TOTAL</i>	755

Source: 2000 Census; NJ Department of Community Affairs (DCA), Division of Codes and Standards

TABLE 4
ANNUAL AVERAGE OF HOUSING UNITS BUILT
(by decade)

	<u>NUMBER OF UNITS BUILT</u>	<u>ANNUAL AVERAGE</u>
1999 – 3/00	14	11.2
1995 – 1998	79	19.8
1990 – 1994	47	11.4
1980 - 1989	209	20.9
1970 – 1979	79	7.9
1960 - 1969	35	3.5
1950 – 1959	45	4.5
1940 - 1949	22	2.2
1939 or earlier	225	

Source: 2000 Census; DEC Division of Codes and Standards

TABLE 5
TYPES OF STRUCTURES BUILT

<u>TYPE</u>	<u># OF STRUCTURES BUILT</u>	<u>PERCENTAGE</u>
Single, detached	726	96.2
Single, attached	8	1.1
Duplex	13	1.7
Three or more units	4	.5
Mobile homes or trailer	4	.5
Other	<u>0</u>	<u>0.0</u>
TOTAL	755	100.0

Source: 2000 Census; DCA Division of Codes and Standards

As can be seen in Table 3, a high percentage of housing in Frelinghuysen (22.5 percent) was built prior to 1940. The remainder, over 77 percent, has been built since 1940. More units were added to the housing stock from 1970 through March 2000 (429) than remains from the almost 200 years of settlement up to 1940 (225).

Table 4, an evaluation of information from the 2000 Census, shows that there has been a rapid increase in the pace of housing construction in Frelinghuysen. The annual average of housing added to the housing stock increased from 2.2 units in the decade from 1940 through 1949 to 11.6 units in the period from 1980 through March 2000. The Census was taken on April 1, 2000. For the four and one half years since April 1, 2000, 36 housing units have been added, an average of 8.22 units per year.

In addition to the structural character of housing, the value of the unit is important in determining its availability to various segments of the housing market. Tables 6 and 7 provide the market value of owner occupied structures and the value by contract rent of renter occupied units.

TABLE 6
OWNER OCCUPIED UNITS BY VALUE

<u>HOUSING UNIT VALUE</u>	<u>NUMBER</u>	<u>PERCENTAGE</u>
Less than 50,000	0	0.0
50,000 - 99,999	15	2.3
100,000 - 149,999	89	13.9
150,000 - 199,999	145	22.6
200,000 - 299,999	256	40.0
300,000 - 499,000	107	16.7
500,000 – 999,999	28	4.4
1,000,000 or more	<u>1</u>	<u>0.1</u>
TOTAL	641	100.0
Median Value	\$224,300	

Source: 2000 Census

TABLE 7
RENTER OCCUPIED UNITS BY RENT PAID

<u>CONTRACT RENT</u>	<u>NUMBER</u>	<u>PERCENTAGE</u>
Less than \$200	0	0.0
200 – 299	0	0.0
300 – 499	15	27.3
500 – 749	13	23.6
750 – 999	11	20.0
1000 – 1499	12	21.8
1500 or more	0	0.0
No cash rent	<u>4</u>	<u>7.3</u>
TOTAL	55	100.0
MEDIAN CONTRACT RENT	\$ 619	

Source: 2000 Census

Housing conditions are not defined solely by cost or type and age of structure. Standard housing must have complete plumbing facilities, heating plant, be in a reasonable state of repair, and not be overcrowded. Also included as an indicator is housing age, but only as a target indicator in combination with the other indicators.

Overcrowded and substandard housing conditions include:

Year Structure Was Built - prior to 1940
Room Occupancy of 1.01 persons or greater; an index of overcrowding
Inadequate Plumbing Facilities; lack of exclusive use or incomplete plumbing facilities
Inadequate Kitchen Facilities; indicated by shared use, or non-presence of a sink with piped water, a stove or a refrigerator
Inadequate Heating; indicated by the use of coal, coke, wood or no fuel for heating
Inadequate Sewer Services; indicated by lack of public sewer, septic tank or cesspool
Inadequate Water Supply; indicated by either lack of city water, drilled well or dug well

A housing unit meeting any two of the above criteria is considered substandard.
Tables 8 and 9 show the condition of occupied units as of 2000.

TABLE 8
LACKING COMPLETE PLUMBING
FOR EXCLUSIVE USE

Owner Occupied	4
Renter Occupied	0
Vacant	2

Source: 2000 Census

TABLE 9
OCCUPIED HOUSING UNITS BY TENURE
BY PERSONS PER ROOM

	<u>TOTAL</u>	<u>OWNER</u>	<u>RENTER</u>
0.50 or fewer	591	526	65
0.51 – 1.00	129	113	16
1.01 - 1.50	2	2	0
1.51 – 2.00	0	0	0
2.01 or more	0	0	0

Source: 2000 Census

The above data indicates that there are few households which are overcrowded and/or lack complete plumbing facilities for their exclusive use.

In order to see, on average, what housing was available to persons of low or moderate income, we need to look at value, rent, and income. The following outline shows a significant segment of the population with incomes in 1999 which were not sufficient to secure housing at the median value.

Median Value Home	\$ 224,300
Down Payment (10%)	22,430
Mortgage	201,870
Monthly Mortgage, Taxes and Insurance at @ 7.88% Interest*	\$ 2,160

* Housing payment should be no more than 28% of gross income.
 $\$2,160 / .28 = \$7,714 \times 12 = \$92,560$ per year

The median household income in 1999 was \$72,434. Approximately 33 percent of the households in Frelinghuysen could afford the median priced home based on a payment of 28 percent of gross income.

Median rent in 1999 was \$619 in Frelinghuysen. USHUD and NJCOAH have set a guideline for rentals that not more than 30% of gross income be used for shelter, the median rental opportunity would be available to households with an income of \$24,760 or more.

Using the COAH guidelines, an average household (2.81 persons) of low income (50 percent of the median income of \$72,434 = \$36,217), could not afford the median rental. The average sized moderate income household at 50-80% of median income could afford rentals plus insurance from \$905 to \$1,449 per month at 30% of gross income.

Of 55 households renting, 23 are paying 30 percent or more of their income for gross rent. Of these, 17 households are paying gross rents of 35 percent or more of their income.

Of the 483 reporting households in owner occupied dwellings, 129 (26.7 percent) are paying 30 percent or more of their income for Selected Monthly Owner Costs (mortgage, utilities, taxes, etc.); 91 households (18.8%) are paying 35 percent or greater.

From the above, the Township does appear to have a need to provide housing opportunities to some of its current residents (indigenous need). COAH has estimated that Frelinghuysen has an Indigenous Need of 16 housing units of Affordable Housing, part of its Calculated Need for 1999 of 19 units.

Table 10 shows the percentage of the population of families and non-family households at or below the poverty level.

TABLE 10
PERSONS AND FAMILIES BELOW POVERTY LEVEL

<u>FAMILIES</u>	<u>PERCENT</u>	<u>NON-FAMILY HOUSEHOLD</u>	<u>PERCENT</u>
6	1.18	3	2.2

Source: 2000 Census

TABLE 11
FAMILIES AND MEAN FAMILY INCOME
BY NUMBER OF WORKERS IN FAMILY, 1999

<u>Number of Workers</u>	<u>Families</u>	<u>Mean Income</u>
No workers	34	\$ 55,653
1 worker	167	70,745
2 workers (husband & wife worked)	261	98,805
2 workers (other)	26	71,638
3 or more workers(husband & wife worked)	72	108,336
3 or more workers (other)	8	78,913

Source: 2000 Census

Statistics provided by the real estate industry indicate the median closing price of a house in this area in 1999 was \$250,000. Rental data from the same source indicates that new leases are now averaging \$800. Incomes, particularly those of low and moderate income households, have not kept pace with the increases in housing costs.

2. PROJECTED HOUSING STOCK

Municipal zoning, market conditions, availability of sewer and water facilities and adequate transportation are among the components which will influence future residential development in Frelinghuysen Township.

Changes in the zoning ordinance of Frelinghuysen Township resulting from changes in this Master Plan will lead an increase in the minimum required lot size in most of the Township.

Frelinghuysen lies some distance from the existing major transportation routes. New Jersey Route 94 is the major state road which traverses the Township. This north-south route does not provide convenient access to the east-west arterials and freeways, such as I-80, which leads to the major employment centers of the New York-Northern New Jersey Region. I-80 does cut across the southern-most part of the township, but there are no interchanges in the Township and the nearest access to I-80 is on narrow, twisting local roads.

Currently, there is no local or interurban public transportation. However, there is an abandoned railroad right-of-way which passes through the Township and is close to the Village of Johnsonburg. The New Jersey Department of Transportation (N.J.D.O.T.) has performed initial feasibility studies regarding reestablishment of commuter rail service along this right-of-way, and has condemned the right-of-way.

The Township has little control over market conditions other than to attempt to provide or encourage the adoption of the abovementioned incentives. The State Development and Redevelopment Plan, adopted in 1993, projected population to increase in Warren County by about 10,500 over a twenty year span between 1990 to 2010. Frelinghuysen, with its low existing population, a high level of undeveloped land and prospective rail transportation could expect to attract 10 percent to 15 percent of the County's population projection, (1,050 to 1,575 additional people) by 2010. This would mean somewhere between 350 and 525 housing units constructed over the twenty year span or 18 to 26 units on an average, per year.

According to the 2000 census, Warren County had a population of 102,437. The latest population projections developed by Warren County show an increase of 14,521 by 2010, 29,103 by 2020, and 42,900 by 2030. Frelinghuysen is projected to increase population by 224 by 2010, 513 by 2020, and 784 by 2030. Under the county's scenario, Frelinghuysen's proportion of increase is 10.75 percent by 2010, 12.53 percent by 2020, and 10.44 percent by 2030. This is around the same as the 10 to 15 percent used with the State projections. The county projection translates into 80 units from 2000 to 2010, an average of 8.0 units per year, 103 units from 2010 to 2020, an average of 10.3 units per year, and 97 units from 2020 to 2030, an average of 9.7 units per year. This seems reasonable given the rate of growth experienced over the past two decades.

3. POPULATION AND HOUSEHOLD EVALUATION AND PROJECTIONS

The population of Frelinghuysen, as of the 2000 Census, consisted of 2,083 persons. For the purposes of this element, the 2000 Census data gives an adequate picture of the characteristics of the population of Frelinghuysen.

TABLE 12
PERSONS BY SEX AND AGE

<u>Age</u>	<u>Total</u>	<u>%</u>	<u>Male</u>	<u>Female</u>
0 – 4	132	6.3	71	61
5 – 9	148	7.1	84	64
10 – 14	158	7.6	72	86
15 – 17	105	5.0	55	50
18 – 19	43	2.1	19	24
20	10	0.5	5	5
21	15	0.7	6	9
22 - 24	31	1.5	12	19
25 – 29	76	3.6	39	37
30 – 34	126	6.0	63	63
35 – 39	188	9.0	90	98
40 – 44	202	9.7	84	101
45 – 49	206	9.9	103	103
50 – 54	173	8.3	94	79
55 – 59	139	6.7	70	69
60 – 61	42	2.0	20	22
62 – 64	59	2.8	32	27
66 - 66	18	0.9	6	12
67 - 69	26	1.2	16	10
70 – 74	60	2.9	23	37
75 – 79	53	2.5	24	29
80 – 84	30	1.4	9	21
85+	<u>43</u>	<u>2.1</u>	<u>14</u>	<u>29</u>
TOTAL	2,083	100.0	1,028	1,055

Source: 2000 Census

The population group 20-29 years show a relatively low percentage as compared to the next two older age groups, 30-34 and 35-39. Most of the "twenties" are "out of the house" and on their own. But if they grew up in Frelinghuysen there probably are no local affordable housing or nearby job opportunities. Beyond this, the population distribution is fairly typical for this area. The median age of all males was 39.9; of all females was 40.5; of all persons was 40.3 years. This is slightly higher than that of the State (36.7 years), or Warren County (37.6 years).

Table 13 shows the distribution of income by family and household as of 1999. As might be expected, family incomes were somewhat higher than household incomes. Non-family households tend to have fewer wage earners than families. Table 14 shows that the mean income of renter households was 56.0 percent of the mean income of owner households.

TABLE 13
HOUSEHOLD, FAMILY, AND NON-FAMILY
INCOME IN 1999

<u>Income</u>	<u>Households</u>	<u>Families</u>	<u>Non-family Households</u>
Under \$9,999	18	6	11
\$ 10,000 - 14,999	14	4	14
\$ 15,000 - 24,999	35	13	9
\$ 25,000 - 34,999	21	18	0
\$ 35,000 - 49,999	96	76	3
\$ 50,000 - 74,999	181	150	9
\$ 75,000 - 99,999	145	130	14
\$100,000 - 149,999	135	115	1
\$150,000 - 194,999	45	41	2
\$200,000 or more	23	15	0
 TOTAL	 713	 568	 63
Median Income	\$72,434	\$78,464	\$26,500
Mean Income	\$79,912	\$61,006	\$41,525

Source: 2000 Census

TABLE 14
MEAN HOUSEHOLD INCOME BY TENURE

Owner Occupied	\$79,897
Renter Occupied	\$44,750

Source: 2000 Census

In order to further develop an understanding of the population of Frelinghuysen, Table 15 outlines the sources and average amounts of income received during 1999.

TABLE 15
HOUSEHOLDS AND MEAN HOUSEHOLD INCOME IN 1999
BY INCOME SOURCE

	<u>HOUSEHOLDS</u>	<u>MEAN INCOME</u>
Wage or salary income	604	\$ 77,376
Self-employment income	141	28,431
Interest, dividend, or rental income	361	9,376
Social security income	146	12,590
SSI Income	11	6,109
Public assistance income	11	3,836
Retirement income	127	21,265
Other type of income	77	6,477
With earnings	635	
No earnings	78	

Earnings = wage & salary + self-employed

Note: Many households received income from more than one source

Source: 2000 Census

It is very clear that Frelinghuysen is no longer a farm community. Only 4 persons reported farming as an occupation.

Between 1990 and 2000 the population of Frelinghuysen Township increased by 304, from 1779 to 2083, an increase of 17.1 percent. This is slightly less than the 24.0 percent for the 1980 - 1990 period. The percentage increase for Frelinghuysen for the 1990 - 2000 period was generally in line with the neighboring municipalities of Green (18.0%), Hardwick (16.7%), and higher than Fredon, (3.5%), Blairstown (7.8%), Hope (10.0%), and Allamuchy (11.3%), and substantially lower than Independence (44.2%).

The growth rates for the Green and Hardwick and Frelinghuysen was greater than that of Warren County which grew from 91,607 in 1990 to 102,437 in 2000, and 11.8 percent increase. The rest of the above municipalities had less of an increase.

Based on the August 2004 population estimates prepared by the Warren County Planning Department, the increase from 2000 for Frelinghuysen was 5.2 percent. This was substantially lower than in Hardwick, 10.1% and slightly higher than Independence, 3.9%; Blairstown, 4.9%, Hope, 3.9%, and Allamuchy, 4.2%. The growth rate for the County was 8.4%.

The State Planning Commission in the Development and Redevelopment Plan, adopted in June, 1993, has projected Warren County's population to be 102,000 in 2010, an 11.3 percent increase over the 1990 population. The Warren County Planning Department has also projected population for its constituent municipalities for 2010, 2020 and 2030.

These figures for Frelinghuysen Township are a projected population in 2010 at 2,307, 2,596 in 2020, and 2,867 in 2030, and an estimated population in July 2005 of 2,215.

Although there was a slightly negative growth rate for Phillipsburg from 1990 to 2000 (-3.75%), the County's major center, the county is projecting a significant portion of the county's growth will take place in Phillipsburg. The rest of Warren County's municipalities with buildable land and direct or close access to major transportation facilities, will feel development pressures greater than those communities less well situated. Frelinghuysen fits into the latter category and should continue to experience growth at a rate greater than that of the County as a whole, but less than more accessible municipalities.

Therefore, the population projections for Frelinghuysen Township, produced by the Warren County Planning Department for 2000 and 2030, appear to be valid and the 1997 estimates are in line with the projections.

4. EMPLOYMENT CHARACTERISTICS

Frelinghuysen Township has not directly shared in the economic growth in the region to any significant extent. This fact is reflected in the relative lack of new non-residential development described earlier and the fact that in excess of 61.2% of the Frelinghuysen workforce works out of Warren County. Still others (25.8%) are employed out of town but within Warren County. The following tables describe the labor force in Frelinghuysen.

TABLE 16
LABOR FORCE STATUS

	<u>TOTAL</u>	<u>MALE</u>	<u>FEMALE</u>
Persons 16 years and over	1,594	763	831
Labor force:			
Armed forces	0	0	0
Civilian employed	1,046	591	455
Civilian unemployed	36	13	23
Unemployment rate	3.3%	2.2%	4.8%
Not in labor force	512	159	353

Source: 2000 Census

TABLE 17
PLACE OF WORK, RESIDENTS OF FRELINGHUYSEN

<u>Place of Work</u>		<u>Percentage</u>
Frelinghuysen	133	13.0
Rest of Warren County	265	25.8
Rest of New Jersey	578	56.3
Outside of New Jersey	<u>50</u>	<u>4.9</u>
Total Reported	1,026	100.0

Source: 2000 Census

Given the fact of the rural nature of Warren County, a relatively high percentage (38.8%) of Frelinghuysen's labor force works in the county, but only a relatively small proportion (13.0%) in the Township. Ninety-five percent of the labor force works in New Jersey.

5. PRESENT AND PROSPECTIVE FAIR SHARE

The Council on Affordable Housing (COAH) in the First and Second Rounds (1987-1999) determined that Frelinghuysen Township had a fair share obligation of nineteen (19) affordable housing units. This obligation was defined as an indigenous need of fifteen (15), an estimate of low and moderate income households living in Frelinghuysen in housing indicated to be substandard and seven (7) units of reallocated present regional need and one (1) prospective need unit (1993-1999). These were offset by four (4) credits involving two (2) for spontaneous rehabilitation and two (2) for "filtering" yielding the net obligation of nineteen (19) affordable housing units.

According to COAH's records (Appendix B Third Round Regulations) Frelinghuysen Township has met all but two of its Mt. Laurel housing requirements from Rounds 1 and 2. All but two units of its indigenous need were met by rehabilitating poor housing stock. In 1994, the Township applied for and received a grant of almost \$146,000 from the New Jersey Department of Community Affairs Small Cities Community Development Block Grant Housing Rehabilitation Program. These funds were to be used to rehabilitate nine substandard housing units owned and occupied by qualified low and moderate income households. Though interest was expressed by a number of the Township's residents prior to the application submission, only eight (8) applicants were funded.

There are currently three agencies which have facilities which house developmentally disabled people. The Matheny School and Hospital has two residential buildings on one site which houses six (6) adults with physical and mental disabilities. The REM Agency serves four (4) developmentally disabled older women. The Center of Humanistic Change has a facility which houses four (4) elderly adults who are developmentally disabled. This brings the total to fourteen (14) lower cost bedrooms at three (3) sites in Frelinghuysen.

There will be the need for a new Housing Plan Element and Fair Share Plan for Frelinghuysen Township which will involve calculating the municipal Mount Laurel housing obligation for the period January 1, 2004 to December 31, 2014. As of February 1, 2007, it is uncertain how the preparation of the Housing Plan Element and Fair Share Plan as the result of the Appellate Court decision, In the Matter of the Adoption of N.J.A.C.5.94 and 5.95 by the New Jersey Council on Affordable Housing announced on January 25, 2007. In that decision, the Appellate Court rejected how the Council on Affordable Housing (COAH) calculated housing need, the allocation of that need and compliance mechanism and gave COAH six months to correct these deficiencies. The court found that COAH had undercounted the amount of affordable housing needed in the State by an over reliance on the process of filtering of old homes to create affordable housing opportunities. The court asked COAH to assign the allocation of affordable housing need to the growth areas proposed in the State Plan as a means of continuing down-zoning to avoid growth and affordable housing. Finally, the court rejected COAH's reliance on affordable housing methods which offered no incentive or density bonus to builders to construct affordable housing. The court also cut back of allowable

percentage of age-restricted affordable housing from 50% to 25% of a municipality's fairshare plan. The concept of growth share was not wholly rejected but the court required COAH to justify this approach consistent with the court's findings in the rest of this decision.

Regarding the Third Mt. Laurel Round's growth share approach, the now rejected COAH regulations would have required an affordable housing program for between 8 and 12 units based on the projected growth in Frelinghuysen Township over the 2004 and 2014 period and 80 new homes and 53,000 square feet of non-residential floor area. The Township cannot proceed with the preparation of a new Housing Plan Element and Fair Share Plan until the new COAH regulations are formulated and adopted.

CIRCULATION ELEMENT

CIRCULATION ELEMENT

INTRODUCTION

The circulation plan consists of recommended changes and improvements that will help foster safe, efficient and energy saving travel within and through the Township. The Circulation plan will also provide the foundation for an official map indicating those areas where new roads should be constructed, existing roads extended or abandoned. The road network within Frelinghuysen Township is generally adequate to meet the current need.

The Township must set standards for improvements to the existing road network as well as for construction of new roads within that network. An important element in this process is the standards promulgated by the Site Improvements Standards Committee created pursuant to the Uniform Site Improvement Act. Those standards will supersede municipal standards.

The Township should prepare a road improvement program focusing on those roads which have the greatest traffic volume and which are deficient as to width or alignment. In order of priority, Greendell Road, Lincoln Laurel Road, Lanning Road, and Ackerson Road should be addressed.

REGIONAL PERSPECTIVE

The Township of Frelinghuysen is located in east central Warren County adjacent to Sussex County municipalities of Fredon, Green and Stillwater. Warren County is served by a diverse transportation network, consisting of federal, state, county and local roadways, limited commuter rail service and freight rail service. This network links Warren County and its municipalities with New York City as well as employment centers in eastern and central New Jersey.

The extension of Interstate 80 through northern New Jersey and on into Pennsylvania has had a significant impact on the rate and pattern of growth in the northern part of the state. Areas once accessible via two lane state highways (U.S. 206, 46, N.J. 94) may now be reached via a six and eight lane highway. Although Warren County has developed with its own regional centers, such as Phillipsburg, Belvidere, Hackettstown, the principal residents employment acts as its focus south and east of Warren County. The continued growth of Warren County and in particular Frelinghuysen Township will continue to be a function of the increased accessibility of this area and its attractiveness as a place of residence.

As with Warren County, Frelinghuysen Township is served by a variety of roadways. Although Interstate 80 passes through the southwestern corner of the Township, there is no direct access to Frelinghuysen from Interstate 80. Principal roadways serving Frelinghuysen Township are N.J. Route 94, a two lane highway as well as primary

Warren County Route 519. Other county roads, classified as secondary roads are County Routes 661, 612 and 608.

Route 94, the only state highway serving Frelinghuysen, is a relatively lightly traveled secondary road in the state system. It originates at the intersection of Routes 46 and I 80 in Columbia and connects this point with regional centers in Blairstown, the Town of Newton and Vernon Township in Sussex County, continuing north into New York State.

COUNTY ROADS

Warren County roadways compliment N.J. 94 and function as the remaining arterial streets within the Township. Warren County Route 519 connects the County Administration Complex in White Township with Interstate 80, U.S. 46 and the regional center, the Town of Newton in Sussex County. Silver Lake Road connects I-80 with N.J. 94 at its terminus at Marksboro. Ramsey Road serves to form part of an arterial pair with Allamuchy Road connecting N.J. 94 with Warren County Route 517 in Allamuchy which provides immediate access to Interstate 80.

EXISTING ROAD CONDITIONS

Exhibit 2 (Roadway Conditions) describes the width of right-of-way, width of the cartway (the actual paved portion of the roadway) for all roads within the Township. Additionally, all intersections within the Township have been surveyed and the degree to which sight distances are limited has been indicated.

Road rights-of-way vary widely throughout the Township. The original road widths were determined at the time of the colonial survey being either two rods (33 feet) or the original Great Roads with a four rod right-of-way (66 feet). Subsequently, a municipal standard of 50 feet has been employed. This is the maximum permitted pursuant to the Municipal Land Use Law for municipalities. The county has continues to adhere to the original 66 foot right-of-way. The state highway system looks to greater rights-of-way as the through traffic function becomes more greatly emphasized. Rights-of-way up to 80 feet exist on some parts of the state highway system. However, in Frelinghuysen Route 94 has a right-of-way of only 50 feet.

Most of the roadways within the Township are far narrower than called for in the Township Code. That does not mean that all of the roads in the Township are dangerous because they fail to meet the width standards adopted after they were constructed.

The width of the cartway has a much greater effect on the passage of vehicles than does right-of-way width. Cartway widths within the Township range from a low of 13 1/2 feet at the Paulinskill Bridge on Hess Road and Pippin Hill Road to a width of 32 feet on Route 94. There are numerous municipal roads with widths less than 20 feet, among those are Golden Chain Road, Hess Road, Pippin Hill Road, Lincoln Laurel Road, Heller Road, State Park Road.

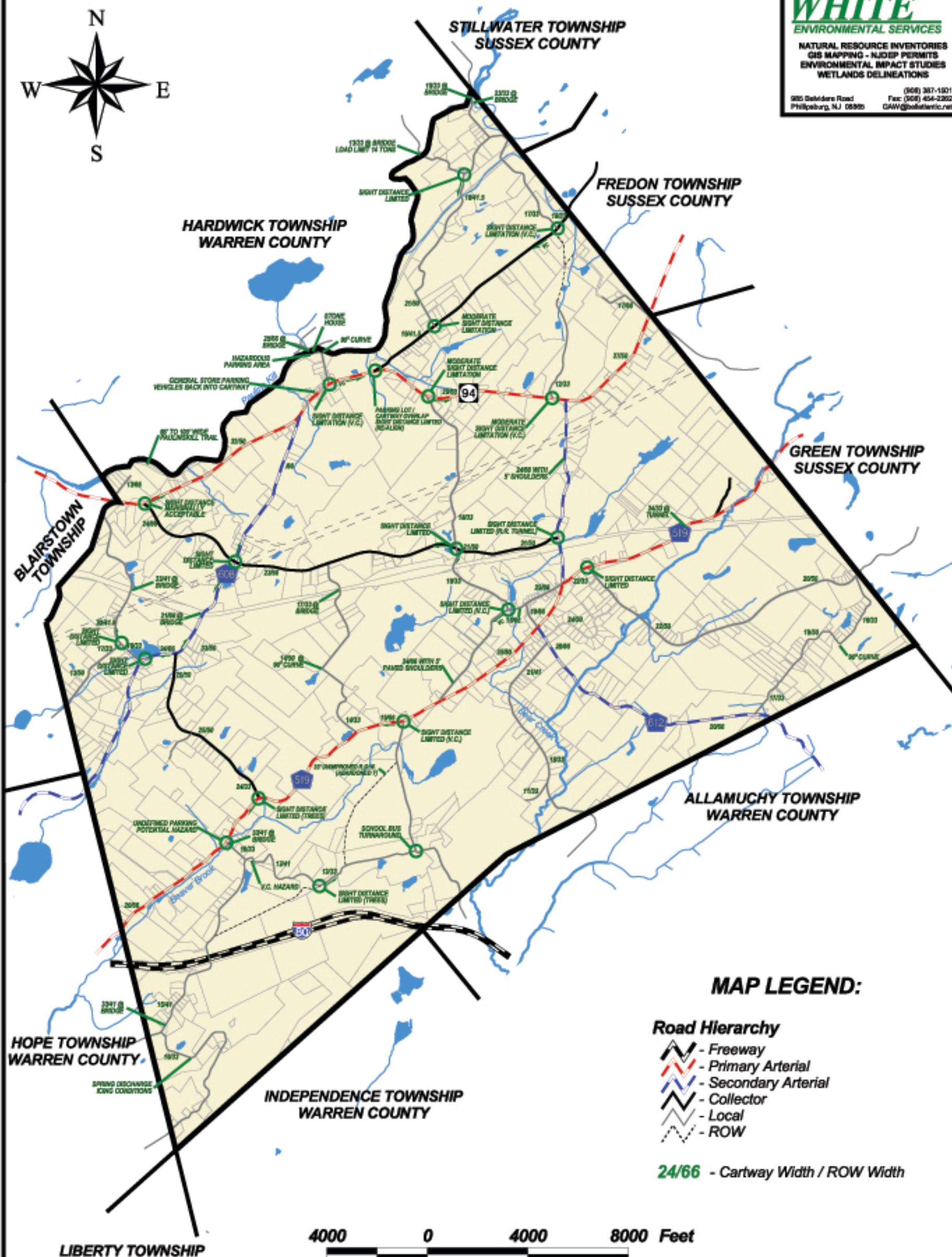
EXHIBIT 2
ROADWAY CONDITIONS



WHITE
ENVIRONMENTAL SERVICES

NATURAL RESOURCE INVENTORIES
GIS MAPPING - NJDEP PERMITS
ENVIRONMENTAL IMPACT STUDIES
WETLANDS DELINEATIONS

925 Solvidere Road (908) 387-1901
Phillipsburg, NJ 08860 Fax: (908) 454-2202
GAW@solvidere.net



REFERENCES & NOTES:

Road widths and hazards based upon "Roadway Conditions, Township of Frelinghuysen, Warren County, New Jersey", by Eric K. Snyder & Associates, Inc., May 15, 1995.

Road Hierarchy based upon "Circulation Plan / Roadway Hierarchy, Township of Frelinghuysen, Warren County, New Jersey", by Eric K. Snyder & Associates, Inc., May 10, 1995.

Property boundaries were taken from a composite tax map of Frelinghuysen Township and adjusted accordingly.

Lakes and Streams based upon NJDEP GIS database.

This map has been prepared as a guide for the Frelinghuysen Township Master Plan. Data on this map should not be relied upon for individual lot planning.

This map was developed using NJDEP & NJGS Geographic Information System digital data, but this secondary product has not been verified by the NJDEP or NJGS and is not State - authorized.

Roadway Conditions

Municipal Master Plan

Township of Frelinghuysen

Warren County, NJ

Scale: 1" = 4000'

Date: 10/21/04

ERIC K. SNYDER & ASSOCIATES, INC.
LAND DEVELOPMENT AND COMMUNITY PLANNING CONSULTANTS

185 Spring Street
Newton, NJ 07860

(973) 300-5800
Fax: (973) 300-1524

The State of New Jersey, in the Site Improvement Standards Act, has taken a wide ranging look at street standards and made a number of recommendations for change. The principal impact of these recommendations is that local roads will be constructed to widths more in line with those now in existence.

ROAD HIERARCHY

An important key to understanding a roadway network is the road hierarchy. This basically sets up an ordering system for roadways which defines roadways according to their function and their place in the overall system. All roadways do not serve the same function. In fact, if all functions were merged the hazards involved in utilizing the road system would be far greater than they are. The road network can be visualized in much the same way as a stream and river system with small streams meeting larger streams which eventually flow into the largest rivers. In the hierarchy, roads are classified as follows:

Arterial. An arterial is a high-volume street that should have no residences on it. Its function is to conduct traffic between communities and activity centers and to connect communities to major state and interstate highways.

Collector. As the principal traffic artery within residential or commercial areas, the collector carries relatively high traffic volumes and conveys traffic from arterial streets to lower-order streets. Its function is to promote the free flow of traffic; as such, communities should not encourage parking or residences along a collector. The collector's secondary function is to serve abutting land uses.

Access Street. Sometimes called a place or lane, the access street is designed to conduct traffic between dwelling units and higher-order streets. As the lowest-order street in the hierarchy, the access street usually carries no through traffic and includes short streets, cul-de-sacs, and courts. The cul-de-sac, a dead-end street with a turnaround area at the end, is used extensively because it provides a quiet, low-traffic environment, eliminates through traffic, and permits the efficient use of land. While some observers classify residential streets as either collectors or locals. Local streets may be subdivided into subcollectors and access streets because of the desirability of distinguishing between the function and needs of these two significantly different street types. Access streets are noteworthy for their complete lack of through traffic and for the fact that they serve only a few dwelling units. Subcollectors usually serve more dwellings and carry a small volume of through traffic to one or more access streets.

Streets serve various functions based on their location and endpoints, not according to their widths or geometric configurations. In other words, if a street which is wide, flat and straight has numerous points of direct access on it, it will serve both a local access street function as well as an arterial through traffic function. In much the same way a narrow, winding road connecting two or more important points, will serve an arterial

function even if it is too narrow or is lined with residential driveways. It is very important, to the extent possible, that the functions of the various roadways be kept separate.

The function of intermediate roads in the road hierarchy, those which are secondary arterial or principal collector roads, is mixed and because of this may be ambiguous. Arterial highways have the function of relatively rapid through traffic accommodation. Local streets serve as the initial point of access to the road system. Those roadways in the middle of the spectrum share the characteristics of both to one extent or another, depending on their location and relationship to other roads in the network. It is important that direct access from individual land uses to collector and arterial roads be limited so as to reduce the conflict between initial entry and through traffic. By the same token, collector streets should be designed so as to be clearly differentiated from arterial streets. Effective means of accomplishing this purpose are the introduction of stop signs and forcing offsets in road intersections.

Exhibit 2 indicates the classification of the roadways in the Township. These should be given careful consideration when land use regulations are considered which could affect the need for access to the road network.

MASS TRANSIT

The Erie Lackawanna Cutoff, abandoned as part of the Conrail consolidation, has been repurchased by the State of New Jersey. This right-of-way is proposed for reactivation for passenger rail by the year 2010. A return of passenger rail service to the Johnsonburg area will provide a much needed alternative to the motor vehicle for commuter traffic and will facilitate tourist travel to this area.

ALTERNATIVE TRANSPORTATION

One of the objectives outlined at the beginning of this section is specifically to foster alternatives within the transportation system which are pedestrian friendly and make it possible for cyclists, horseback riders and the like to travel safely between destination points within the Township. These alternatives will have the immediate effect of reducing air and water pollution and bringing back the sense of place which is lost to the driver of a motor vehicle.

There is no provision in the township (other than in a portion of Johnsonburg) for pedestrian, bicycle, horseback or any other kind of non-motorized transportation. Notwithstanding this lack, people are using the roadways now in existence for these purposes. This creates hazardous conditions which should be systematically eliminated. A specific program should be begun to identify those roads most commonly used for pedestrian, bicycle and equestrian travel and a concerted effort made, in conjunction with Warren County, to insure that any road improvement projects taken within the Township take into account the need to provide a safe area for non-motorized travel. The most easily realized provision could simply be the provision of a wider shoulder along at least one side of a roadway along with signage indicating that motorists should exercise

caution and be alert to the presence of pedestrians, bicyclists, etc. Where necessary, guiderail or other barriers should be installed.

In the case of local streets, regulations should be strengthened so as to require that provision be made for off street pedestrian and bicycle access wherever possible. Where this is not possible, some means by which pedestrians, etc. may be separated from traffic flows should be investigated. Other possibilities include provision of a marked and paved shoulder area for non-motorized traffic.

In addition to providing access ways along streets, the Township should investigate means by which open space parcels may be connected by pedestrian pathways so as to permit residents not wishing to use their cars to gain access to these parcels by foot or by bicycle. Of particular concern is the recreation area at Frelinghuysen school. This area could serve a greater range of needs, particularly in the summer, if provisions were made to provide safe access. Perhaps a formal cross walk, blinker light or some other signage could be requested from NJDOT.

PROPOSED ADDITIONS TO THE CIRCULATION SYSTEM

The road network in Frelinghuysen Township developed over many years in response to local and regional needs. Those needs remained fairly constant for much of the Township history and safe access to the regional transportation network has been available. Minor changes have been made to the road system in the Township through the construction of new subdivision streets but these have been of little impact.

The Township is in the position to look back over some of the actions taken with regard to streets and determine whether or not those actions should be reversed.

Muller Road and Kerr Road were once connected to Lincoln Laurel Road. These interconnections should be reestablished. There should be a Township policy established which would discourage the vacating of existing roadways. The principal result of vacating an existing road is that the time required for emergency vehicle access to various areas in the Township will increase where an interconnection is removed. Where undeveloped streets are vacated, the Township loses the opportunity to reduce response time. Only where development of a mapped street is not feasible should it be vacated.

Consideration should also be given to expanding the road network through the general mapping of arterial and collector streets. This will enable the Township to reestablish control over some local streets which may be serving a higher level function and redirect traffic more appropriately. (See Exhibit 2)

As a general policy, all subdivision roads and cul-de-sacs should show a section dedicated for future extension thereby creating loops in the road network. These need not be constructed at the time the subdivision is occupied. However, in the event that public safety considerations warrant the extension, it is important that the right-of-way be available.

DESIGN STANDARDS

As indicated earlier, the New Jersey Site Improvement Standards Act has resulted in the recommendation to the Commissioner of the Department of Community Affairs of various road design standards which will supersede the municipal regulations. These standards, which apply to only to new residential streets, parking facilities, etc. are similar, for the most part, to the regulations now in place in the Township. These new regulations will not have any direct effect on Warren County road standards. It is the County roads along with existing municipal streets, that determine the character of a municipality such as Frelinghuysen. Accordingly, it is extremely important to work with the County as much as possible to avoid the removal of hedge and tree lines and stone rows and to alter the consideration of roadways as functioning only to convey of motorized traffic. The aesthetic function, the conveyance of pedestrian and bicycle traffic ought to be formally included along with considerations of motorized traffic safety in any County or local efforts to alter the character of a particular road.

The Institute of Transportation Engineers publishes various volumes regarding roadway design, traffic safety and the like. From Residential Street Design and Traffic Control, the following statement is instructive:

"It is an internationally accepted rule that motorized traffic must drive slowly in a residential district. An emergency stop at 35 miles per hour takes a stopping distance ranging from 115 to 165 feet for an automobile. This distance is not acceptable so long as drivers can be faced, at any moment, by children or pets playing or suddenly crossing the road.

Moreover, research has shown that pedestrians are not seriously injured when hit by a car traveling less than 20 miles per hour at the time of impact. If impact speeds are between 20 and 35 miles per hour injuries are usually serious while above 35 miles per they usually endanger life or are fatal."(page 64)

In rural areas like Frelinghuysen, design speeds for local roads should be between 20 and 30 miles per hour where the terrain is "mountainous" and between 20 and 40 miles per hour where the terrain is rolling. This concept is distinctly different from traditional design theory which would design for fifty mile per hour speeds in rural areas. Designing roadways to limit the speeds at which prudent drivers will be comfortable is an important element in retaining a safe, convenient, and aesthetically pleasing transportation network.

NATURAL RESOURCES ELEMENT

NATURAL RESOURCES ELEMENT

Introduction

The natural resource base of a community is one of the most critical elements of its identity. The topography of an area (rolling hills, flat lands) not only provides visual points of identification but also has a significant effect on settlement patterns. Geology, both surface and subsurface, greatly affects the ability of land to provide water, the degree to which the soils which develop from parent rock are fertile, as well as structural issues which arise as they relate to actual development. The character of municipalities in the northern part of the State, partly rural, partly agricultural, is in large part a function of soils, rainfall patterns and surface hydrology.

Wildlife habitat, and the plants and animals are integral parts of that habitat are not only interesting identifiers of an area but are also significant indicators of the health of the local ecosystem. They act to identify the pressures exerted upon the local environment by development and other external sources. Taken together, the natural base serves as the platform on which human activities take place.

Natural resources are, to a certain extent, exploitable. We mine sand and gravel and in some areas we mine stone, and in some we mine water. We use the natural fertility of the soils to raise crops and try to avoid overloading air and water with noxious pollutants. With all this, natural systems are remarkably resilient. Rivers that were so polluted that they caught fire, air that was visible, soils poisoned by chemicals all can and have been rehabilitated. However, the costs of rehabilitation and the interim social costs of pollution are far greater than the short-term benefits to polluters.

Philosophy of Land Use

Land use philosophy has changed greatly over the past 25 years. Swamps used to be worthless; therefore they were great places to put garbage. Rivers, because they came up over their banks, were great places to dump waste and to wash away piles of unwanted materials, some toxic. Sinkholes were useful as waste disposal areas as they seemed to have infinite capacity. Resources were to be used and when exhausted, simply abandoned. We now are beginning to understand that we have to be stewards of the land. We do not own the land, we only hold it in trust for future generations.

As a result of the greater understanding of natural systems, land use approaches have begun to change. We now perform carrying capacity analyses. These analyses are carried out to see to what extent natural systems can assimilate pollution without having a significant impact on the plant and animal populations. Animal populations include people. The idea that land and resources are available for exploitation is now understood to have significant limits.

This revision in the approach of resource management includes all industries, including the agricultural industry. Farmers have altered their practices over the years from the

movement toward contour plowing, significantly reducing soil erosion, to minimizing the application of fertilizer and pesticides which maximizes efficiency of dollars spent, and manages the nutrient grading of streams, ponds, and lakes. We now vehemently oppose public utility projects which pollute air and water.

What is the resource base in Frelinghuysen Township? The following sections will address topography, geology, soils, hydrology, wildlife habitat, and will define the platform on which activities within the Township rest.

Physiography

Frelinghuysen Township lies within the Reading Prong of the New England Highland physiographic province. The physiographic province is an area exhibiting a like history and composition as recorded in the rock structure. The Reading Prong of the New England Highland runs roughly from northeast to southwest and comprises the south and eastern portions of Frelinghuysen Township. The Highlands are characterized by rock of great resistance to weathering. This distinguishes this province from the Ridge and Valley province. The Ridge and Valley province comprises the majority of Frelinghuysen Township. It is located in the center of the Township and runs west to the Delaware River. (See Exhibit 3, Physiographic Provinces)

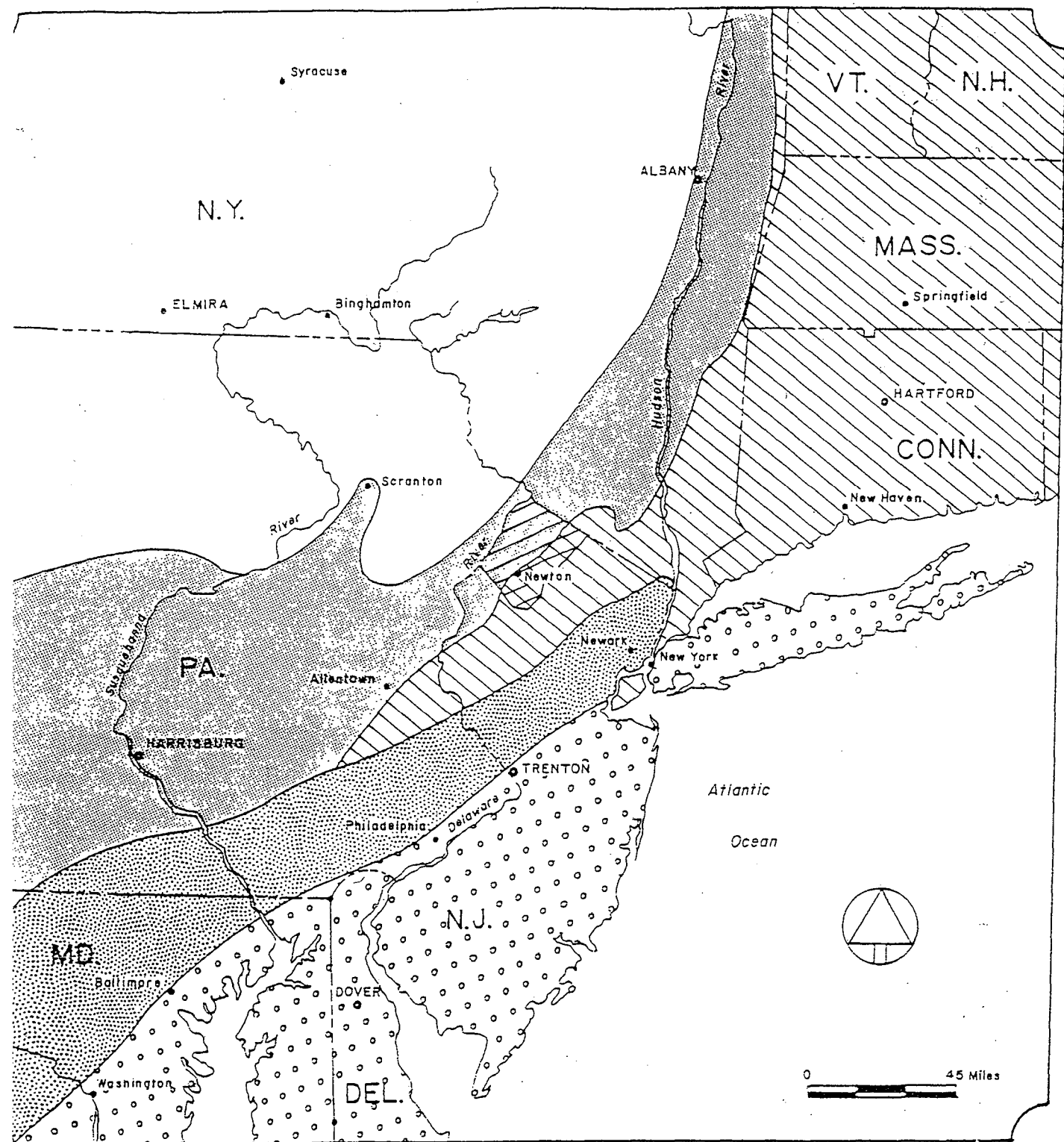
Description of Provinces

The New England Highlands are principally composed of granite and gneiss. The Highlands are collectively known as the Pre-Cambrian crystallines, having been laid down during the middle and late proterozoic era. This period was approximately 1.4 to 0.9 billion years ago. The most salient feature of the highlands in the vicinity of Frelinghuysen Township is Jenny Jump Mountain and High Rock. These salient features stand as they do, as they are highly resistant to weathering.

The Ridge and Valley province, which runs to the west of the Highlands, is characterized by both highly weathered and soluble rocks of the Kittatinny Supergroup as well as the resistant rock of the Shawngunk. The rocks of the Ridge and Valley Province were laid down during the Cambrian and Ordovician periods. The most prominent member of this particular region is the Martinsburg Shale. It is an intensely crumpled and faulted sequence of slate, shale, sandstone, and calcareous siltstone. A resin element, the Jacksonburg Limestone, is found as a narrow belt of rock running along the border of the Kittatinny Supergroup of formations.





Finally, the Kittatinny Supergroup was laid down approximately 560 to 420 million years ago and consists of relatively young formations.

EXHIBIT 3
PHYSIOGRAPHIC PROVINCES



PHYSIOGRAPHIC PROVINCES OF THE REGION

LEGEND

-  APPALACHIAN PLATEAU PROVINCE
-  RIDGE & VALLEY PROVINCE
-  HIGHLANDS PROVINCE
-  PIEDMONT PLATEAU PROVINCE

Topography

Topographically, Frelinghuysen Township exhibits a wide range in elevations. (See Exhibit 4, Topography and Steep Slopes) Topography was significantly affected by various glaciations, the last of which was the Wisconsin Glaciation which was approximately 10,000 years ago. Looking at the topographic map we can see that running roughly northeast/southwest, consistent with the division between the New England Highlands and the Kittatinny Ridge and Valley Provinces, there is Jenny Jump Mountain which begins roughly at the common boundary between Allamuchy, Independence and Frelinghuysen Townships and runs southwest from that point.

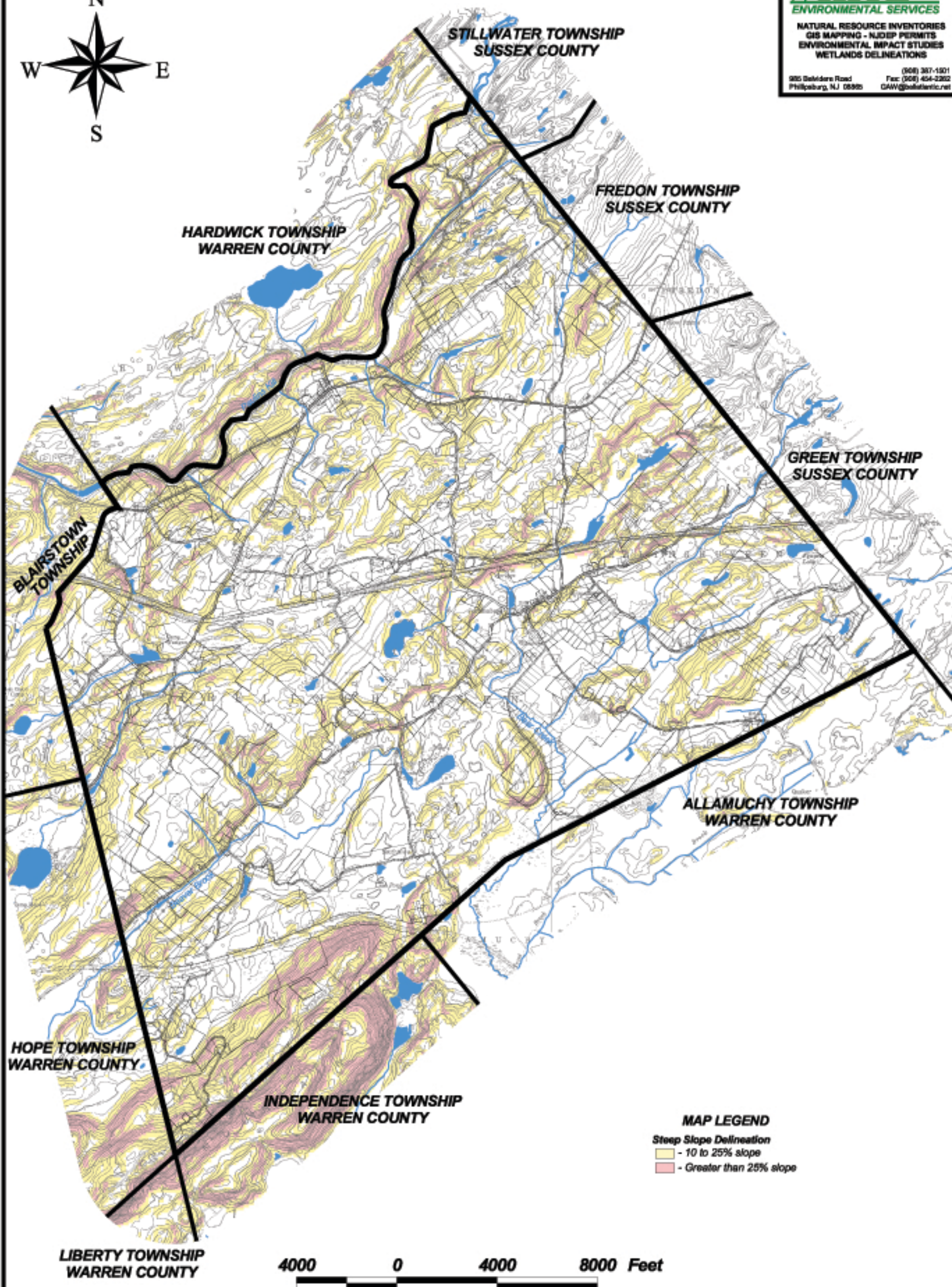
The range in elevations in Frelinghuysen Township is 1,135 feet above mean sea level at the Jenny Jump Mountain down to approximately 475 feet above mean sea level intersection of the Paulinskill River with the Blairstown Township boundary. The Highlands area is a relatively small portion of the southerly corner of the Township is an intensely folded and varied terrain. North of this point running towards the Paulinskill River is the Kittatinny Valley sequence. The valley is broad and flat and in such is home to most of the development of the Township.

Topography is very important as it has directed the developed road network and has an impact on future interconnections. Further, it greatly affects the degree and severity of stormwater runoff and soil erosion. Together, these affect the rate and type of soil formation. For purposes of regulations of land use activities it should be noted that the New Jersey State Planning Commission and the State Development and Redevelopment Plan have indicated that steep slopes are those slopes in excess of 20%. Fifteen percent slopes are areas where the rise in elevation over a 100 foot distance is 15 feet. All of these features have a direct impact on land development and occupancy.

EXHIBIT 4
TOPOGRAPHY AND STEEP SLOPES



WHITE
ENVIRONMENTAL SERVICES
NATURAL RESOURCE INVENTORIES
GIS MAPPING - NJDEP PERMITS
ENVIRONMENTAL IMPACT STUDIES
WETLANDS DELINEATIONS
(908) 387-1901
985 Delvidere Road
Phillipsburg, NJ 08865
Fax: (908) 454-2352
GHW@whiteenv.com



REFERENCES & NOTES:

Property boundaries were taken from a composite tax map of Frelinghuysen Township and adjusted accordingly.

USGS Quadrangle Maps supplied by NJDEP.

Lakes and Streams based upon NJDEP GIS database.

This map has been prepared as a guide for the Frelinghuysen Township Master Plan. Data on this map should not be relied upon for individual lot planning.

This map was developed using NJDEP & NJGS Geographic Information System digital data, but this secondary product has not been verified by the NJDEP or NJGS and is not State - authorized.

Topography & Steep Slopes Municipal Master Plan Township of Frelinghuysen Warren County, NJ

Scale: 1" = 4000'

Date: 11/19/03

ERIC K. SNYDER & ASSOCIATES, INC.
LAND DEVELOPMENT AND COMMUNITY PLANNING CONSULTANTS

185 Spring Street
Newton, NJ 07860

(973) 300-5600
Fax: (973) 300-1524

Geology

The Township is divided between highly resistant rocks formed during the Pre-Cambrian era and rocks formed later on during the Cambrian and Ordovician periods. (See Exhibit 5, Geologic Timetable) The resistant granites and gneisses of the Highlands not only contribute to relief (the differences in elevation as well as the severity of those transitions) but also have a dramatic effect on water supply. Frelinghuysen Township is dependant entirely on subsurface supplies to support commercial and residential activities.

Given the lack of any surface impoundments (reservoirs), the sustained availability of subsurface supplies of potable water is critical to all activities within the Township. Available water supply in the Highlands is generally poor. The highly resistant granite and gneisses represent the least productive aquifer in the Township. The remainder of the Township is comprised of the Kittatinny Valley sequence and the Kittatinny Super Group. This is a group of formations consisting of the Beekmantown Group-Upper Part, Beekmantown-Lower Part, Allentown, Dolomite, Leithsville Formation, and the Hardyston Quartzite. The Kittatinny Valley Sequence, which also is divided into subsections, consists of the Ramseyburg Member, Bushkill Member, Jacksonburg Limestone, the Jacksonburg Limestone and sequence at Wantage undivided and the Wantage Sequence.

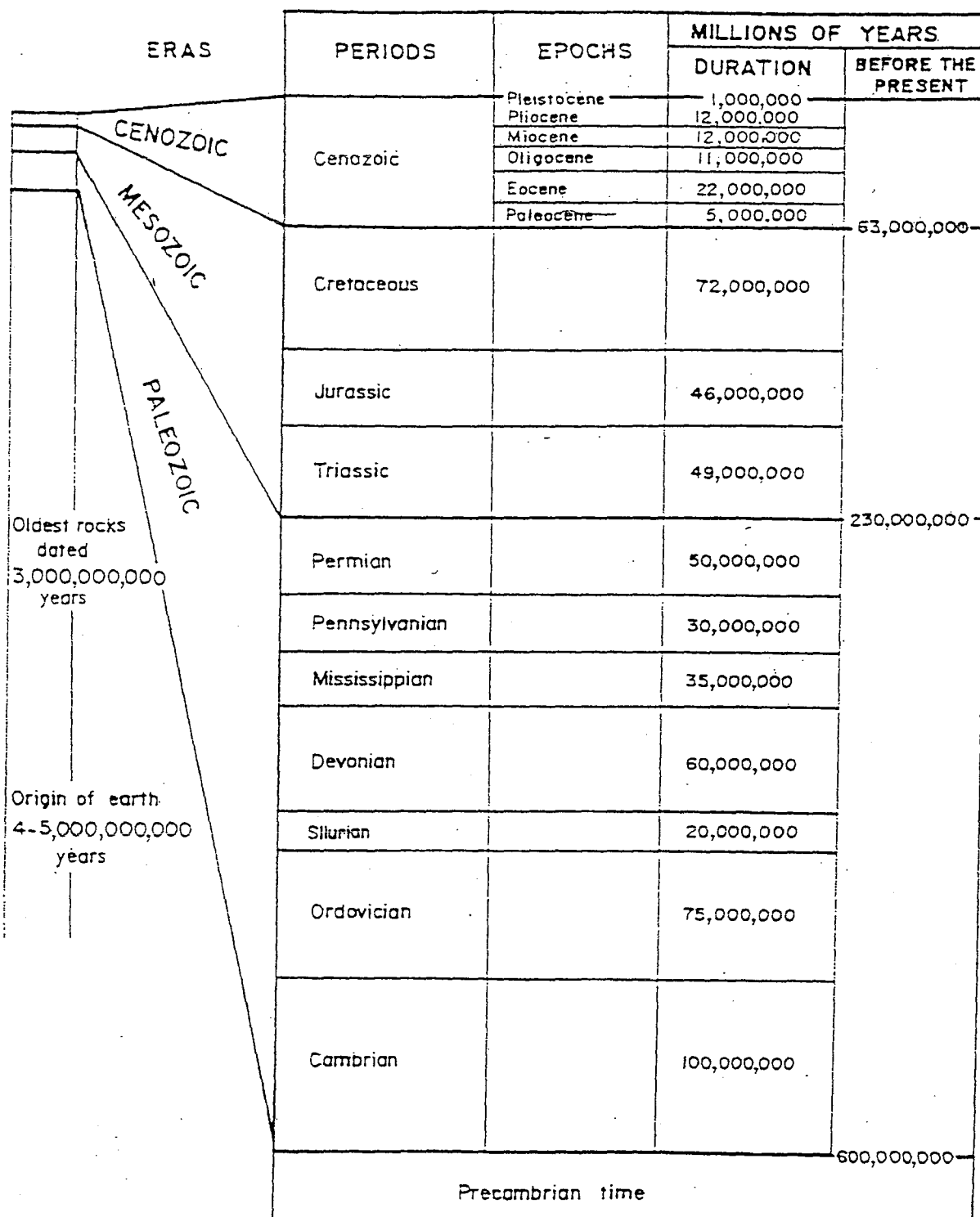
Inspection of Exhibit 6 provides a clear indication that the types and distributions of bedrock formations is highly variable and that the vast majority of the Township is made up of the Appalachian Valley and Ridge Province with only a small section located in southeastern most of Frelinghuysen belonging to the Highlands.

<u>Geologic Unit</u>	<u>Occurrence/Topography</u>	<u>Hydrologic Characteristics</u>
Martinsburg Shale (Omb)	Upper (Ramseyburg) member forms prominent ridges, with abundant rocks ledges, thin, coluviated soil cover, with isolated pockets of glacial drift. Valleys are usually long and narrow. Member forms smooth, rolling hills and underlies poorly drained valleys. Soil cover thin (less than 15 feet) to absent, with local deposits of glacial drift up to 50 feet thick.	Well yields generally prove to be adequate for domestic needs, with most wells exceeding 3 gpm. Yields often improve with proper well development or stimulation. Some very good well yields with poor drainage. Lower (Bushkill) near faults and near fold axes; yields of 100 gpm have been reported. Thick overburden may help contribute to good sustained yields. Most water-bearing streams shallower than 200 feet, with some streams up to 400 feet deep.

<u>Geologic Unit</u>	<u>Occurrence/Topography</u>	<u>Hydrologic Characteristics</u>
Jacksonburg Formation Ojb	Forms subdued topography between rock Kittatinny terrain and smooth, rolling Martinsburg terrain. Outcrops infrequent, but soil cover may be thin. May receive significant runoff from adjacent units. Locally thick deposits of drift up to 30 feet thick may occur.	Yields generally poor to moderate, 5 to 20 gpm, but generally adequate for domestic supplies; most wells exceed 10 gpm. Yields tend to be higher in lower part, with occasional yields of 100 gpm.
Ontelaunee Formation Oo	Forms an irregular, hummocky to rocky, terrain with bedrock exposures. Soil cover generally thin to absent, but thicker in depressions.	Yields poor to moderate, with better yields in lower member. Frequent dry holes and very marginal wells in upper (Harmonyvale) member. Yields may range from poor to fair (3 to 20 gpm) in lower.
Epler Formation Oe	Forms a steep, elevated rocky terrain with many bedrock exposures. Typical limestone “pinnacle-and trough” topography, with thin soil in shallow depressions and intervening rocky pinnacles.	Yields range from poor to fair, 1 to 20 gpm. Yields improve near top and bottom of formation, or where blue limestone faces is present. Yields particularly poor where strata are steeply inclined.
Allentown Formation Ca	Highly variable topography. Upper (Upper Allentown) member forms irregular, steep, rocky terrain with bedrock pinnacles and shallow soil cover in intervening depressions. Numerous small sinkholes may occur. Lower (Limeport) member forms benched topography, with lowest units underlying steam valleys or wetlands, and middle and upper units forming rocky terraces with shallow to moderate soil cover and subdued rocky exposures. Numerous large springs and sinkholes occur in lower member, with largest springs in state occurring here.	Yields highly variable. Yields in upper member poor to fair, 3 to 25 gpm, with occasional dry holes; most wells barely adequate for domestic needs. Yields in lower member good to prime, with most wells yielding between 10 and 50 gpm. Frequent wells in lower member in excess of 100 gpm, with some yields exceeding 500 gpm.

<u>Geologic Unit</u>	<u>Occurrence/Topography</u>	<u>Hydrologic Characteristics</u>
Leithsville Formation Cl	Variable topography. Upper (Wallkill) member underlies stream valleys and marshes. Soil cover shallow to deep, usually with shallow water table. Middle (Hamburg) member forms topographic high separating lower and upper members. Hamburg terrain often a prominent ridge, sometimes steep, with shaley rock exposures or thin soil cover on dip slope. Lower (Califon) member rarely exposed, forms shallow depression with moderate to deep soil cover. Many sinkholes in lower unit.	Well yields range from moderate to prime, depending on unit encountered. Yields in lower and upper members good to prime, with typical yields from 10 to over 1,000 gpm. Yields in middle member tend to be significantly lower, with some good yields of 50 gpm where conditions are favorable.
Hardyston Sandstone Ch	Forms smooth topographic bench at base of granitic uplands. Soil cover thin to moderate.	Well yields tend to be poor, with few wells finished in this unit.
Precambrian granitoid gneiss Pc	Forms prominent ridges with rocky prominences. Soil cover thin, often containing significant boulders. Colluvium is often thick on mountain flanks.	Well yields vary, depending on geologic unit encountered and geologic structure. Layered gneisses often more prolific than massive granitic units. Proximity to brittle faults may affect yield greatly.

EXHIBIT 5
GEOLOGIC TIMETABLE

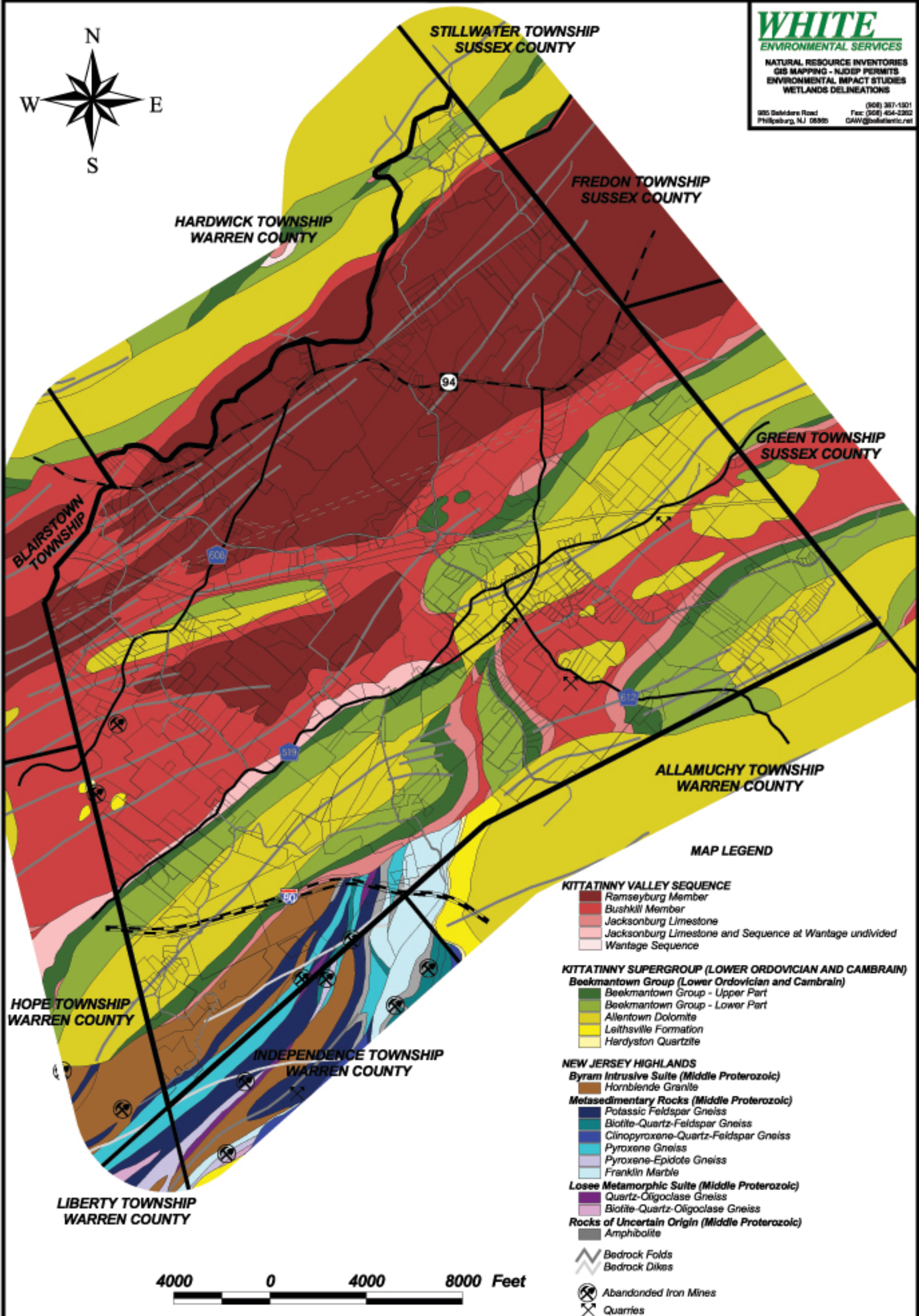


GEOLOGIC TIMETABLE

EXHIBIT 6
BEDROCK GEOLOGY AND MINES



WHITE
ENVIRONMENTAL SERVICES
NATURAL RESOURCE INVENTORIES
GIS MAPPING - NJDEP PERMITS
ENVIRONMENTAL IMPACT STUDIES
WETLANDS DELINEATIONS
(908) 387-1901
985 Solitaires Road Phillipsburg, NJ 08855 Fax: (908) 454-2262 GAW@bellatlantic.net



REFERENCES & NOTES:

Property boundaries were taken from a composite tax map of Frelinghuysen Township and adjusted accordingly.

Bedrock Geology based upon NJGS GIS database "The Bedrock Geology of New Jersey", 1999.

This map has been prepared as a guide for the Frelinghuysen Township Master Plan. Data on this map should not be relied upon for individual lot planning.

This map was developed using NJDEP & NJGS Geographic Information System digital data, but this secondary product has not been verified by the NJDEP or NJGS and is not State - authorized.

Bedrock Geology
Municipal Master Plan
Township of Frelinghuysen
Warren County, NJ

Scale: 1" = 4000' Date: 11/19/03

ERIC K. SNYDER & ASSOCIATES, INC.
LAND DEVELOPMENT AND COMMUNITY PLANNING CONSULTANTS
185 Spring Street
Newton, NJ 07860
(973) 300-5800
Fax: (973) 300-1524

Within the Valley and Ridge Province there can often be ten members of the Kittatinny Limestone Supergroup. They can also be divided in terms of their solubility. From a planning standpoint, this is of far greater importance as the more soluble formations yield greater quantities of water, are most susceptible to pollution and also exhibit karst features such as sinkholes, disappearing streams, and caverns. The least resistant formations include the Leithsville and Allentown Dolomites. These areas lie in the central valley running generally from Dark Moon Road at the Green Township boundary to Interstate 80 at the Hope Township boundary along with pockets along the Allamuchy Township boundary and a small portion adjacent to Stillwater Township are bounded by the more extensive Ramseyburg, Beekmantown Members. Portions of the Wantage Sequence and Jacksonburg Limestone and sequence may also be found.

In the 1970s and 1980s bedrock geology was considered a critical element in determining appropriated densities for development based on their presumed safe sustained yield of water supplies. Earlier studies, such as the Land Oriented Reference Data System (LORDS), prepared in 1974, stated as follows:

“Realization a few years ago that the earth was a space ship with finite resources started a surge of interest in what may loosely be called “environmental” and ecology.” The factors and interrelationships of these two disciplines, while known and studied for years by a few, now became matters of general interest. Two deficiencies then became apparent; there was a singular lack of specific data, particularly for the smaller areas and information sources available lacked the flexibility needed for quick recovery of information, rapid update of facts and changing emphasis of use.

The problem is particularly acute in that part of the earth known as New Jersey. With an average population density of 1,008 people per square mile only 19% is urban, nearly 45% of the state is forested, 9% is lakes, and 27% is suburban or agricultural, with a per acre dollar value for crops produced which for years has ranked either first or second in the nation. On the one hand, one municipality has over 10,000 people per square mile while another has less than four people per square mile. In rural New Jersey, 16 townships encompassing over 1,000 square miles, nearly 1/7 of the land surface of the state, has a population density of less than 100 people per square mile. Half of these townships have population densities of less than 50 people per square mile. There is an intense competition for land use of whatever kind whether for open space or urban, suburban or agriculture. Whether the open spaces shall be preserved or suburbs built has become an increasingly difficult decision for local officials.

The various national environmental protection laws have accentuated the need for factual data that is not only available but also relevant, adequate, and current. To meet this need, various public and private, national and state organizations have turned to the data bank and computer program as

a possible means of providing the vast amounts of factual data required for the wide variety of land use and environmental decisions which must be made.

Before discussing the development of the New Jersey Land Oriented Reference Data System, hereafter referred to as LORDS, four relationships with respect to the development of land use and environmental program should be emphasized. First, people attract people; second, geology, topography and climate determine where people will settle and what, in a general way, they may do; thirdly, the activity of people in the physical environment determines the character of the biosphere or the ecological conditions, and finally, many little wrong or adverse decisions may result in undesirable environmental, ecological, or socio-economic conditions beyond recovery.”

The LORDS study provided for minimum lot size where well and septic were used based on geology. Those minimum lot sizes were as follows:

Precambrian gneiss	3.0 – 4.0 acres
Franklin Limestone	1.5 – 3.0 acres
Kittatinny Limestone	1.5 – 3.0 acres
Martinsburg Shale	3.0 – 4.5 acres
Jacksonburg Limestone	1.5 – 3.0 acres
Triassic Diabase	2.5 – 3.0 acres
Quaternary Stratified and Unstratified Drift	1.0 – 1.5 acres

Accordingly, zoning during that timeframe utilized this environmental data in an attempt to bring natural systems and population/economic development into some degree of balance.

During the 1980’s, the Planning Board spent a considerable amount of time and provided expertise in the area of natural resources. From the discussions comes the following:

Frelinghuysen also has significant areas of glacial sediments (see Exhibit 7, Glacial Sediment Deposits) located generally along Allamuchy Johnsonburg Road and within the Village of Johnsonburg itself. Note that the recommended densities at that time were for 1.0 to 1.5 acres per unit.

Recently, however, the New Jersey Department of Environmental Protection and specifically the New Jersey Geologic Survey, have put a great deal of effort into an analysis of the recharge capabilities for various areas within the state basing the safe sustained yield of water for consumption on the amount so water which actually infiltrate the soils and could be expected to reach the aquifer for later withdrawal. This is being coupled with a renewed understanding and concern of

potential pollution of these subsurface aquifers (see Exhibit 8, Groundwater Recharge Rates and Exhibit 9, Aquifer and Public Wells).

Soil is the product of a living environment and a vital factor in the productivity and sustainability of any region. Soil, along with water and air, are the precious commodities that give life to our planet. Soil purifies our water, it sustains green plants which are at the foundation of our food chain, and which provide oxygen and filter pollutants from the air. Though it can take a thousand years for decomposing leaf litter to produce one inch of topsoil, and many thousands of years of weathering processes on rocks to fragment soil particles to soil size, the leaching and erosion tendencies of soils can deplete an area of nutrients and materials in a matter of a few seasons. This points out the need for careful management and protection of soils; once depleted or eroded, soils will not regenerate in a lifetime.

Soil types control natural drainage, stoniness, soil erodability, engineering properties such as the ability to support the weight of buildings and roads, available water capacity, runoff potential, and natural fertility. It is more effective and more economical in planning to pay attention to the natural limitations imposed by different soils than to try to attempt to modify soils or remedy problems created by improper land use. Since experience has shown that most problems from erosion occur during the initial stages of the development process, the Planning Board should ensure that all subdivision and site plans contain adequate designs to minimize damage from soil erosion and sedimentation.

Freshwater wetlands play an integral part in maintaining the quality of life by providing a natural means of flood and storm damage protection, serving as a buffer zone to prevent erosion of sediments to streams, and by providing essential breeding, spawning, nesting and wintering habitats for a major portion of the township's fish and wildlife, including migrating birds, endangered species, and commercially and recreationally important wildlife.

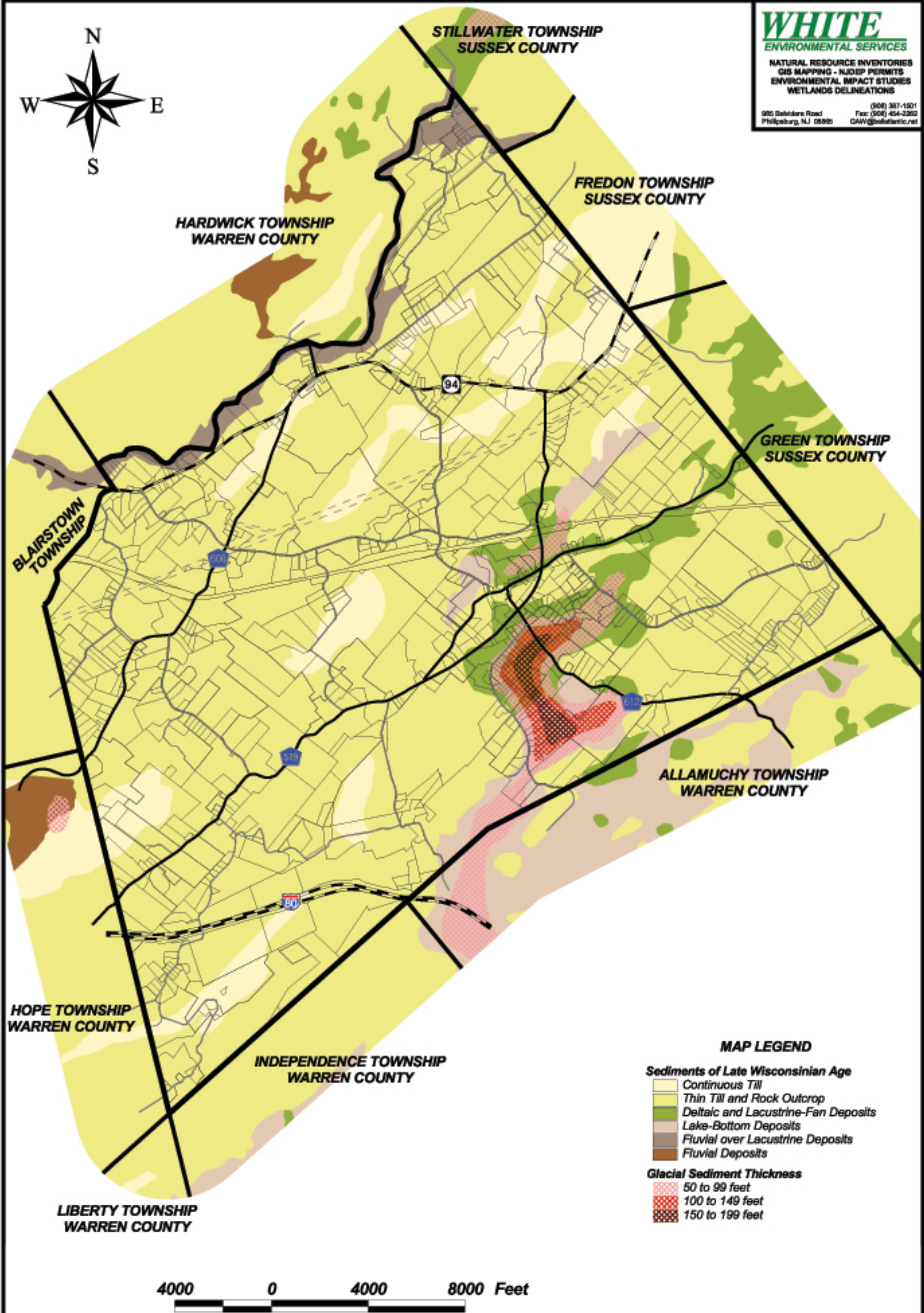
Wetlands are scattered throughout the township, including large areas along some of our major waterways such as Bear Creek and Trout Brook. The Frelinghuysen Township Planning Board and Committee recognized the value of freshwater wetlands to the quality of life by incorporating a wetlands ordinance into the revised Land Development Ordinance, adopted in May 1987. As of May 16, 1988, freshwater wetlands are protected and regulated by law in New Jersey (N.J.A.C. 7:7A).

The United States Department of Agriculture Soil Conservation Service in the early 1970s prepared a soil survey of Warren County (see Exhibit 10, Soils Survey). This information first thought to be particularly useful farmers and is somewhat ancillary value to developers has received much greater attention in recent years. A general description of the various soils in Frelinghuysen Township is provided in Appendix A.

EXHIBIT 7
GLACIAL SEDIMENT DEPOSITS



WHITE
ENVIRONMENTAL SERVICES
NATURAL RESOURCE INVENTORIES
GIS MAPPING - NJDEP PERMITS
ENVIRONMENTAL IMPACT STUDIES
WETLANDS DELINEATIONS
(908) 387-1901
985 Solitaires Road Phillipsburg, NJ 08855 Fax: (908) 454-2262 GAW@whiteenv.com



MAP LEGEND

Sediments of Late Wisconsinian Age

- Continuous Till
- Thin Till and Rock Outcrop
- Deltaic and Lacustrine-Fan Deposits
- Lake-Bottom Deposits
- Fluvial over Lacustrine Deposits
- Fluvial Deposits

Glacial Sediment Thickness

- 50 to 99 feet
- 100 to 149 feet
- 150 to 199 feet

REFERENCES & NOTES:

Property boundaries were taken from a composite tax map of Frelinghuysen Township and adjusted accordingly.

Glacial Deposits taken from NJGS GIS database, "Glacial Sediments of New Jersey", 2003.

This map has been prepared as a guide for the Frelinghuysen Township Master Plan. Data on this map should not be relied upon for individual lot planning.

This map was developed using NJDEP & NJGS Geographic Information System digital data, but this secondary product has not been verified by the NJDEP or NJGS and is not State - authorized.

Glacial Sediment Deposits Municipal Master Plan Township of Frelinghuysen Warren County, NJ

Scale: 1" = 4000'

Date: 11/19/03

ERIC K. SNYDER & ASSOCIATES, INC.
LAND DEVELOPMENT AND COMMUNITY PLANNING CONSULTANTS

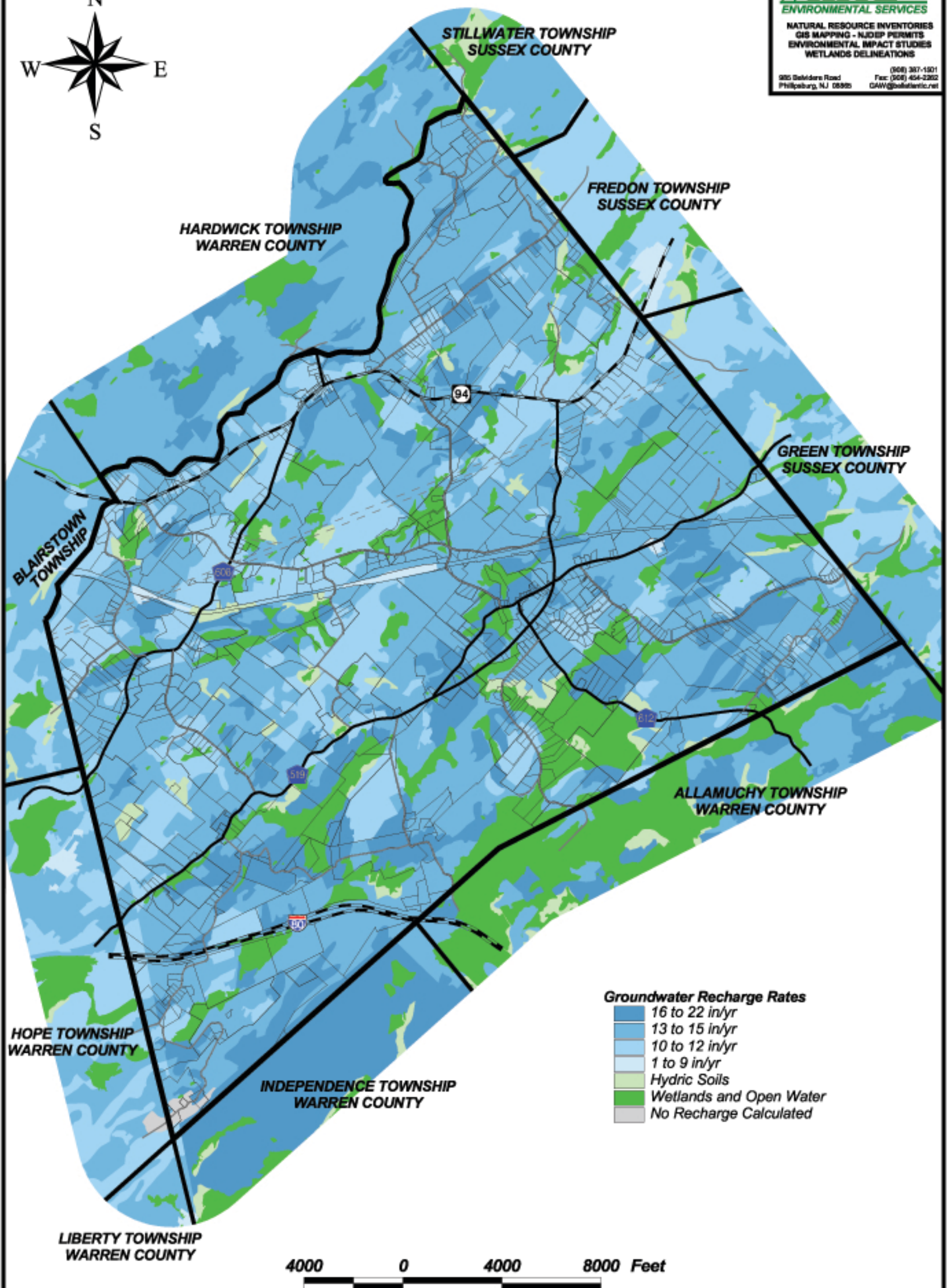
185 Spring Street
Newton, NJ 07860

(973) 300-5800
Fax: (973) 300-1524

EXHIBIT 8
GROUNDWATER RECHARGE RATES



WHITE
ENVIRONMENTAL SERVICES
NATURAL RESOURCE INVENTORIES
GIS MAPPING - NJDEP PERMITS
ENVIRONMENTAL IMPACT STUDIES
WETLANDS DELINEATIONS
(908) 387-1901
995 Delvidere Road
Phillipsburg, NJ 08865
Fax: (908) 454-2352
GAW@ballistic.net



Groundwater Recharge Rates
16 to 22 in/yr
13 to 15 in/yr
10 to 12 in/yr
1 to 9 in/yr
Hydric Soils
Wetlands and Open Water
No Recharge Calculated

REFERENCES & NOTES:

Property boundaries were taken from a composite tax map of Frelinghuysen Township and adjusted accordingly.

Groundwater Recharge Rates based upon NJGS GIS database "DGS02-3: Ground-Water Recharge for New Jersey", 2002.

This map has been prepared as a guide for the Frelinghuysen Township Master Plan. Data on this map should not be relied upon for individual lot planning.

This map was developed using NJDEP & NJGS Geographic Information System digital data, but this secondary product has not been verified by the NJDEP or NJGS and is not State - authorized.

Groundwater Recharge Rates Municipal Master Plan Township of Frelinghuysen Warren County, NJ

Scale: 1" = 4000'

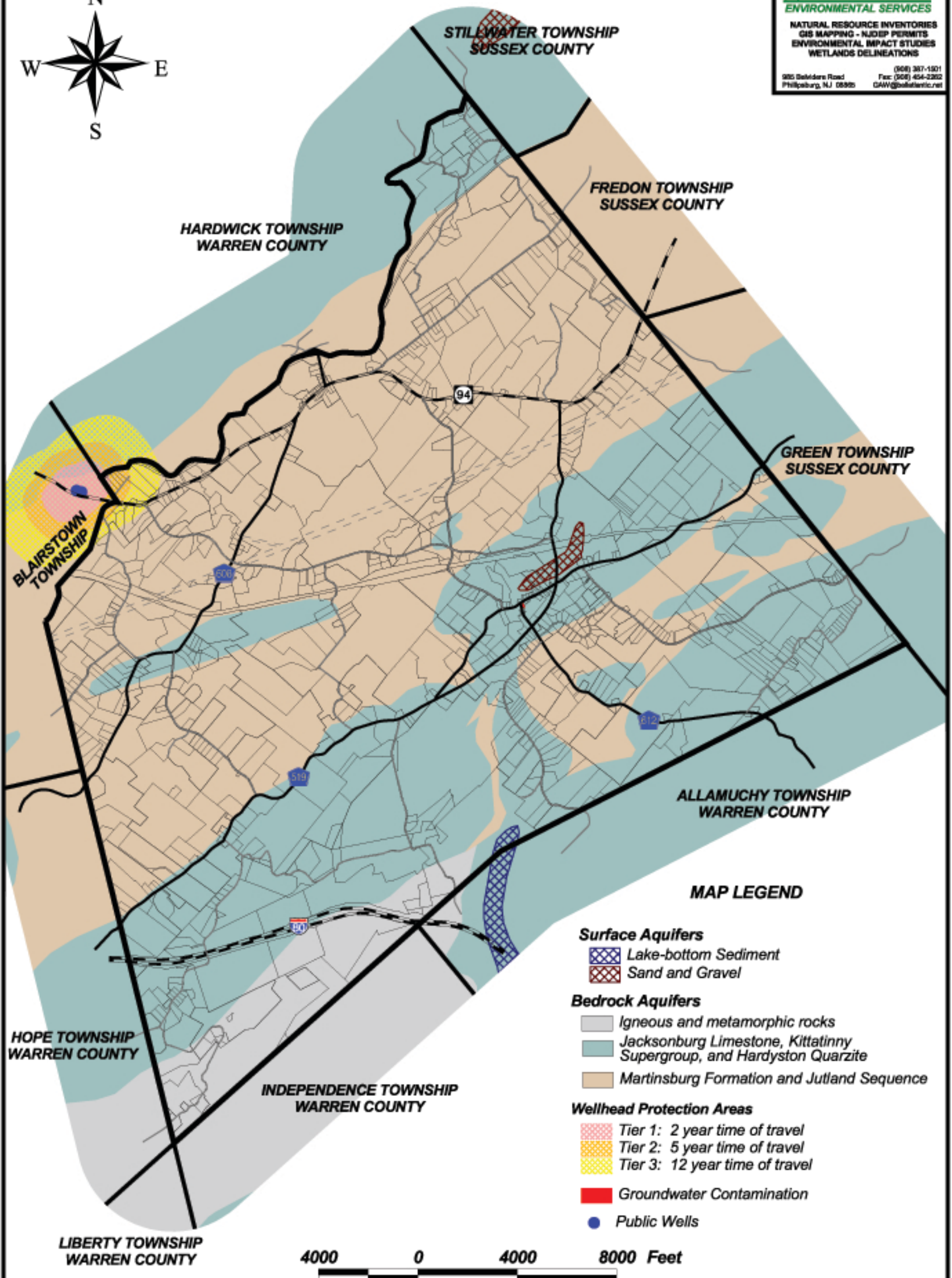
Date: 11/19/03

ERIC K. SNYDER & ASSOCIATES, INC.
LAND DEVELOPMENT AND COMMUNITY PLANNING CONSULTANTS

185 Spring Street
Newton, NJ 07860

(973) 300-5600
Fax (973) 300-1524

EXHIBIT 9
AQUIFER AND PUBLIC WELLS



REFERENCES & NOTES:

Property boundaries were taken from a composite tax map of Frelinghuysen Township and adjusted accordingly.

Bedrock and Surface Aquifers based upon NJGS DGS98-5 "Aquifers of New Jersey", 1998.

Public Wells and Wellhead Protection Areas based upon NJGS "DGS02-2 Geographic Information System Coverages of Public Community Water Supply Well Head Protection Areas for New Jersey", 2002.

Groundwater Contamination Areas based upon "NJDEP Currently Known Extent of Groundwater Contamination (CKE) for New Jersey", 2001

This map has been prepared as a guide for the Frelinghuysen Township Master Plan. Data on this map should not be relied upon for individual lot planning.

This map was developed using NJDEP & NJGS Geographic Information System digital data, but this secondary product has not been verified by the NJDEP or NJGS and is not State - authorized.

Aquifers & Public Wells Municipal Master Plan Township of Frelinghuysen Warren County, NJ

Scale: 1" = 4000'

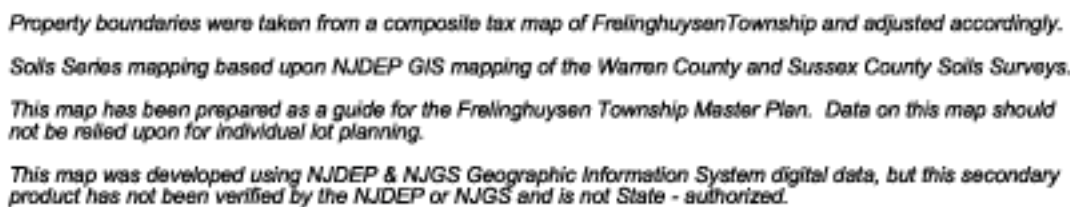
Date: 11/19/03

ERIC K. SNYDER & ASSOCIATES, INC.
LAND DEVELOPMENT AND COMMUNITY PLANNING CONSULTANTS

185 Spring Street
Newton, NJ 07860

(973) 300-5600
Fax: (973) 300-1524

EXHIBIT 10
SOILS SURVEY



(973) 300-5600
Fax: (973) 300-1524

An understanding of the natural physical setting in Frelinghuysen is important in determining the capability of the land in the township to support development. Natural processes which continually change the surface of the earth have occurred since the beginning of time and will continue to do so, with or without our presence. Hazards to safe and economic development may result from preexisting natural conditions or they may occur as a direct result of human activities.

The geologic processes that formed the rock formations which occur in the area have produced an environment with great variety, and one that shaped human habitation of the region. Deep, rich limestone soils; steep, rocky, cavernous limestone outcrops; cool springs and perennial swamps; and rolling, thinly veneered hills of shale are all the product of the township's unique geologic history. Each one of these environments presents "built-in" limitations to human exploitation.

For planning in rural areas, the most important aspects of geology include the stability of geologic formations and the availability of ground water. Soils, rocks, climate, vegetation, elevation and slope all affect hydrology, the movement and presence of water above and below the surface in the township. Land use affects the flow of water through a watershed - whether above or below ground - and its quality. A stream that drains an undeveloped watershed or one which has been carefully developed will be in balance with normal amounts of rainfall and flood only occasionally. Changes in drainage patterns brought about by improper development can create downstream flooding and ponding in areas previously dry. Diverting streams, draining wetlands and paving for roads and parking lots, changes the location and amount of water absorption and eventually the recharging of the aquifer.

Frelinghuysen is host to deposits of cavernous limestone, which bring with them unique planning challenges. The limestone formations are prolific aquifers and have a great number of caverns, sinkholes, springs, bedrock pinnacles and other "karst" features thereby making limestone valleys a very sensitive environment. Land subsidence which may occur in areas of limestone. Sinkholes are of concern because their collapse usually happens suddenly, often causing property damage and, sometimes injuries or even death to humans and animals.

BEDROCK GEOLOGY AND LAND USE

Bedrock is a general term for the rock which is usually solid and underlies the soil or other unconsolidated surface material. If it is exposed on the surface, it is referred to as "outcrop". Basic rock strata that can be separated from other types by their age and composition are usually named after the locality where they are first found, such as the Allentown Formation, first identified in Allentown, Pennsylvania.

Exhibit 6, Bedrock Geology also shows faults, a structural characteristic of rocks that is formed when breakage and movement occur. There are many faults in Frelinghuysen, most of which are inactive at this time. Active faults are found in

the region though, as evidenced by the many small earthquakes recorded in the surrounding areas, such as near Tranquility to the east.

In terms of land use, bedrock geology is important in that it controls where ground water occurs and determines stability of the environment. For instance, there are many unstable features associated with the Kittatinny Limestone, such as sinkholes and caves, that are the result of chemical and physical weathering. Bedrock geology thus helps us plan where to locate wells for water supply and where to exercise caution in undertaking construction.

The chemical characteristics of the various bedrock types are important because they control the quality of the ground water found in them, and other important factors such as the occurrence of radon gas. The latter is usually associated with Precambrian granitic rocks, but is known to occur in the limestone and shale in other areas of New Jersey.

PLEISTOCENE SURFICIAL DEPOSITS

The bedrock surface of the township has been modified by glaciation, as described above, Exhibit 7, Glacial Sediment Deposits, shows the various types of glacial drift left by the advance and retreat of the last glacier to occupy New Jersey, the Wisconsin Ice Sheet.

Glacial deposits, or drift, are categorized on the basis of their dominant texture which are a function of the processes that formed the deposits. Meltwater carrying rock particles from the retreating glacier deposited coarse sediments, known as stratified drift, in high-energy environments such as streams and deltas, and fine-grained sediments in low-energy environments such as lakes, ponds and swamps. Deposits laid down directly by the ice in the absence of meltwater are heterogeneous and are labeled glacial till.

Stratified drift deposits are well sorted, tend to lack clay and silt, and are well drained. These deposits form prolific aquifers where they are sufficiently thick. Stratified drift permits good infiltration of water and serves to store ground water, often contributing large volumes of high quality recharge to underlying bedrock aquifers. The well drained soils in the township are most often developed atop stratified drift deposits. The water table is often moderately deep in these deposits. The most significant deposits of stratified drift are found in the Paulins Kill Valley, and in the central part of the township in the vicinity of Johnsonburg, where they overlie limestone.

Poorly drained glacial drift includes glacial lake-bed deposits, glacial till and swamp deposits. Glacial lake-bed sediments are deposited downstream of melting ice, in low-energy environments where the fine silt and clay were permitted to settle out. These fine lake-bed sediments often underlie better drained stratified drift deposits, which often cause springs to form at the base of

the sand and gravel deposits. The fine sediments also underlie the larger swamps in the region. Although thick in places, glacial lake-bed deposits do not constitute prolific aquifers but may supply water to some wells. Ground water in these sediments is often of objectionable quality due to a high content of organic material as well as high iron and sulfur concentrations in lake-bed sediments.

Glacial till is material deposited by gravity from the glacier as debris. Till deposits in the township are usually thin, although, in places, till may reach 25 feet in thickness. Till generally has a high clay content and, usually, a high percentage of gravel. The high clay content and poor grain-size sorting within the till reduce its permeability. This causes poor internal drainage and, often, a shallow seasonal water table within a few feet of ground surface.

<u>Unit</u>	<u>Description</u>	<u>Hydrologic Characteristics</u>
Qsd	Glacial outwash, deposited mostly as deltas in glacial lakes (glaciolacustrine deltas), or between the glacier and the valley walls, (kame terraces) or in channels within the glacier. Consists of cobbly pebble gravel, pebble gravel, pebble sand, coarse sand and, sometimes, silty sand. Usually well-sorted and stratified. Generally 20 to 50 feet thick, may reach thicknesses of up to 100 feet. Forms significant terraces in Paulins Kill valley. Forms isolated moderate to low profile landforms elsewhere. Often deposited atop finer glacial lake bed sediments (Qlb below).	High to moderate permeability. Constitute aquifers suitable for community and/or domestic needs where significantly thick. Provide significant storage and recharge for underlying bedrock aquifers.
Qlb	Glacial lake bottom deposits, composed of laminated sand, silt and clay. Very flat surfaces, generally covered by peat. Generally 30 to 50 feet thick, but may exceed 100 feet in places	Very low to low permeability. Constitute confining bed for underlying aquifers. Suitable for domestic needs on very limited basis, but few wells finished in this unit.
Qt	Glacial till, interpreted to be basal till, deposited directly by ice. Moderately to highly compacted. Low to moderate content of cobbles and boulders. Silty to silty sand matrix. Clasts and matrix derived primarily from the local bedrock. Usually occurs as a veneer up to 10 feet thick.	Moderate to low permeability. Generally too thin and discontinuous to form notable confining bed.

<u>Unit</u>	<u>Description</u>	<u>Hydrologic Characteristics</u>
Qs	Swamp and bog deposits, consisting of peat and muck with silt and clay. Generally 5 to 20 feet thick, but may be thicker in some glacial lake basins.	Highly impermeable. Water table at surface, or local ponding above regional water table.
Qal	Alluvial deposits left by modern streams, consisting of silt, sand and boulder gravel, with peat and other organic matter on flood plains and along small streams. May contain minor amounts of swamp (Qs) deposits. Generally less than 10 feet thick.	Moderate to very low permeability, depending on organic content. Too thick to constitute aquifer or confining bed. Water table at or near surface most of the year.
Qc	Colluvial deposits on slopes, left by mass wasting of tills, alluvium, or glaciofluvial outwash aquifers. May aid aquifer recharge, where permeable, especially over poor aquifers or where other surficial deposits are thin or absent	Moderate to very low permeability, depending on clay content. Too thin and discontinuous to constitute aquifers may aid aquifer recharge where permeable, especially over poor aquifers or where other surficial deposits are thin or absent.

Other important surficial deposits within the township include post-glacial (or “Recent”) stream alluvium and swamp deposits. The alluvial deposits are sediments laid down in modern stream valleys. Alluvium has a variable composition depending on the terrain being drained by the stream. Alluvium may have a high silt content or a high percentage of organic material – both of which reduce permeability of the alluvial deposit. In most cases, the water table occurs at shallow depths within the alluvium. The deposits are usually thin.

Swamps are the remnants of glacial lakes and ponds caused by the melting of the glacier. Underlying glacial lake-bed sediments and/or impervious bedrock entrap surface drainage and form the swamp. The swamp deposits contain a very high percentage of organic material and the water table is at, or near, the surface most of the year.

From the realization that recharge and the vulnerability of aquifers to pollution are of great importance to the safe sustained yield subsurface water supply, an entirely new approach to evaluating appropriate development densities has been crafted and is now the recommended approach by the New Jersey Department of Environmental Protection.

This model, the Modified Nitrate Dilution Model, is based on the ability of soils to accept recharge and in that context to dilute the nitrate contained in human septic effluent. The Nitrate Dilution Model offers a method of establishing a carrying capacity of safe densities for development. As part of this Master Plan update, the Hydro-geologic Group of Maser Consulting prepared a nitrate dilution based carrying capacity assessment for Frelinghuysen Township.

Nitrate (NO₃) is a highly stable and mobile anion in shallow aquifer conditions. Namely, it tends to not readily decompose into other compounds and furthermore, is not readily bound by soil as are many other contaminants. Consequently, it has the ability to be long lived and travels at a similar velocity as that of the groundwater in which it is present. In undeveloped areas, nitrate concentrations are typically low (less than 1 mg/l) and serve as an excellent general indicator of human impact to natural resources.

Typical septic system discharges contain approximately 10 pounds of nitrate per person per year per system. At locations where housing densities exceed the capability of the environment to sufficiently dilute the concentration of septic discharged nitrates, potential health impacts can arise where domestic wells are employed as potable water sources.

As a result of the potential health impacts of excess nitrate in drinking water (e.g., methemoglobinemia commonly known as blue-baby syndrome), the U.S. EPA and has set a maximum contaminant level (MCL) of 10 mg/l for nitrate in potable water supplies.

Traditional methods used to assess domestic septic system suitability are effective tools to evaluate the ability of a specific site to hydraulically support an individual septic system. However, these methods do not address the cumulative effect of multiple septic systems to the local or regional groundwater quality. Thus, groundwater quality may potentially be degraded in areas having a high density of approved, properly functioning septic systems.

The objective of the Maser study was to utilize a nitrate dilution model in order to provide the Township with technical information for the Township's review and furthermore to act as technical justification for the possible development of residential density guidelines by the Township to mitigate potential groundwater degradation in non-sewered areas.

The New Jersey Geologic Survey adapted a technique to estimate carrying capacities based on septic system discharged nitrates. The technique requires inputs consisting of the soil type, the population density (residents per household), nitrate loading rate, and a target nitrate concentration that represents the maximum concentration of nitrate deemed to be acceptable by the governing body. Maser employed this technique to assess the carrying capacity of the

Township using a population density of 3.5 residents per household (the average density of a new single family detached residential unit for the State of New Jersey) and a target nitrate concentration of 2.0 mg/l.

The results of the study indicate that the carrying capacities of the Township range from a low of 5.0 acres per septic system to a high of 6.2 acres per septic system, with an area weighted average carrying capacity of 5.8 acres per septic system. (see Exhibit 11 & 12)

Land use densities are only one of a number of issues that may be evaluated using this information. Exhibit 9, Aquifer and Public Wells, also indicates the specific location of aquifers within the Township and wellhead protection areas including the three tier time of travel spectrum proposed by the NJDEP. There are no public wells within Frelinghuysen Township. However, it is well to be aware that development in the vicinity of public wells or concentrations of private wells must be carefully considered so as to avoid the degradation of those supplies.

The Kittatinny Valley, through which run the Pophandusing and the Pequest Rivers, is generally broad and flat. Available water is located not only within the underlying limestone aquifers but also within the overlying glacial deposits. Water supply from these formations varies widely, the greatest productivity being found in the most highly soluble limestones and in the sand and gravel aquifer.

The availability of water within the aquifer is not the only issue of concern relating to geology. With greater availability comes greater vulnerability to pollution. Water within the Pre-Cambrian Crystallines may move at rate of a few inches a day. In the highly productive sand and gravel and limestone aquifers, water may move at a rate of hundreds of feet per day. The rate of movement relates directly to the degree to which pollutants may be disseminated throughout the aquifer and the extent of the impact on the aquifer of a given pollution event.

EXHIBIT 11
CARRYING CAPACITY AND TOWNSHIP AREA

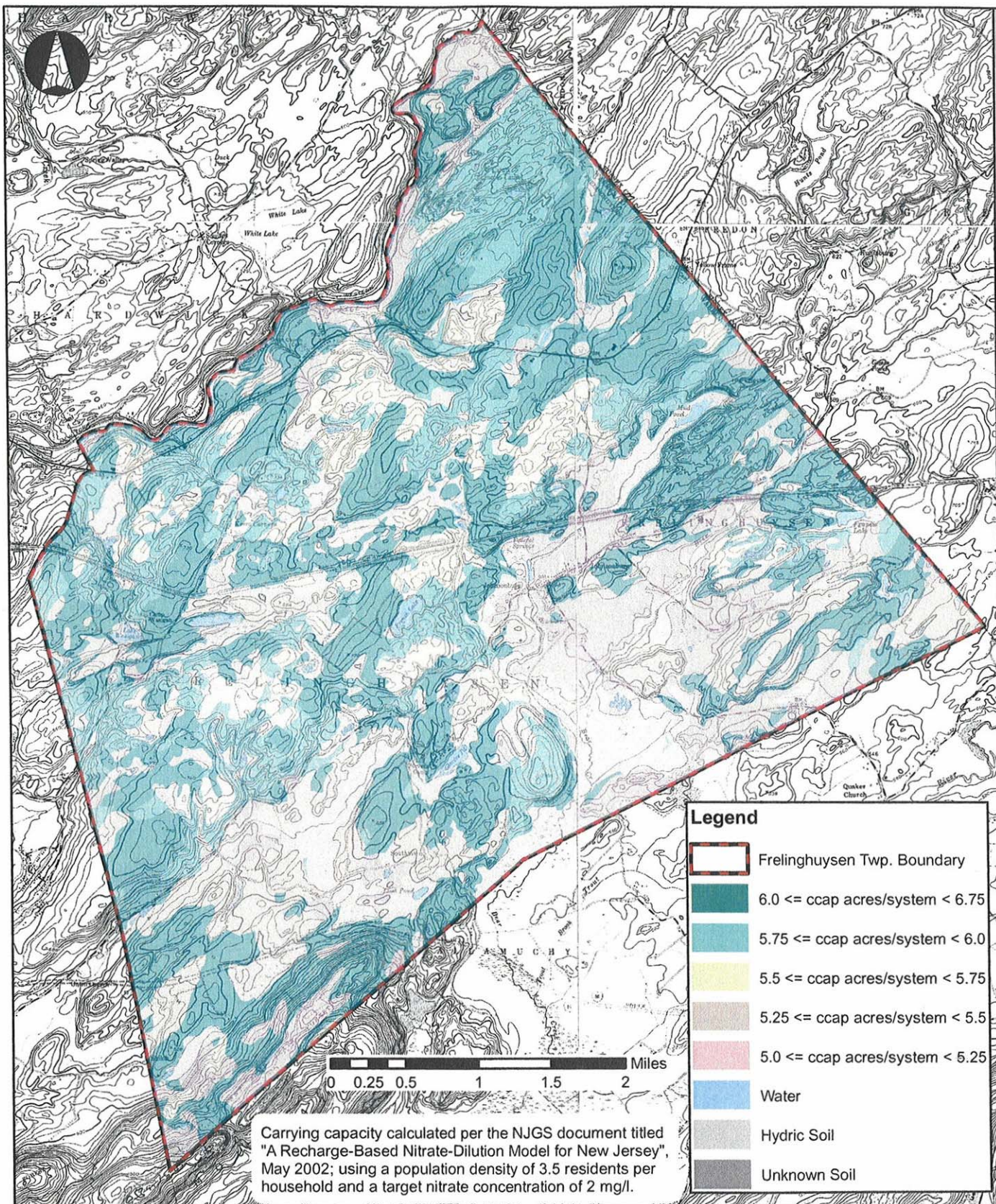
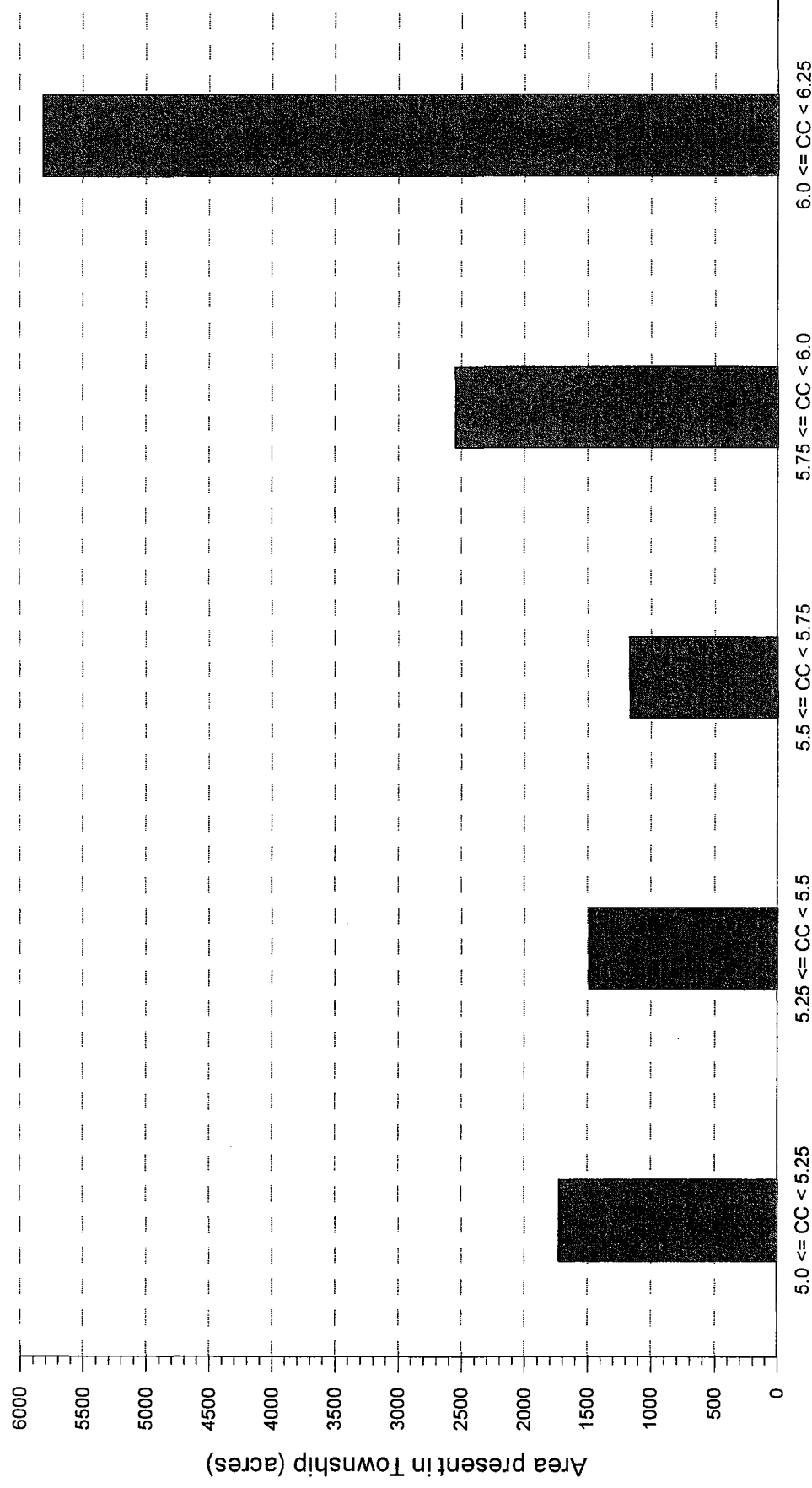


EXHIBIT 12
CARRYING CAPACITY MAP

Frelinghuysen Township, Warren County, New Jersey

Carrying Capacity and Township Area



Carrying Capacity Range (acres/system)

Note: Area weighted average carrying capacity = 5.8 acres per system.

Figure No. 2

Surface Hydrology

Frelinghuysen is home to numerous streams, ponds, and lakes along with the wetlands associated with those water features. Exhibit 12, Surface Hydrology, indicates that these features are present throughout the Township, are often associated with substantial wetlands.

The Township is subdivided into two watersheds, the Paulinskill and Pequest Watersheds. The Pequest comprises approximately three quarters of the Township while the Paulinskill occupies the northwestern quarter of Frelinghuysen adjacent to Hardwick and Blairstown Townships in Warren County and Stillwater and Fredon Townships in Sussex County. A watershed is defined as that area from which water falling runs to a particular stream. Consequently, activities within each watershed should be addressed on their potential impact to downstream areas.

A subset of the surface water features within the Township are the flood hazard areas as shown on Exhibit 13. However, the principal issue related to surface hydrology is that planning in large part has moved from planning based on municipal or county boundaries to planning based on natural boundaries and particularly on watersheds. As may be seen from Exhibit 13, the surface hydrology of Frelinghuysen Township, the Pequest and Paulinskill watersheds originate elsewhere and flow into other municipalities. Activities undertaken in Frelinghuysen Township, effect residents of Hope Township, Blairstown Township and Independence Township. Whereas activities in Green, Fredon and Stillwater Townships in Sussex County effect those in Frelinghuysen.

The NJDEP has actively encouraged watershed planning, designating watershed management areas. The Township of Frelinghuysen lies within WMA 1, the Upper Delaware Watershed Management Area. This area comprises those watersheds in subwatersheds which flow to the Delaware River in northwest New Jersey.

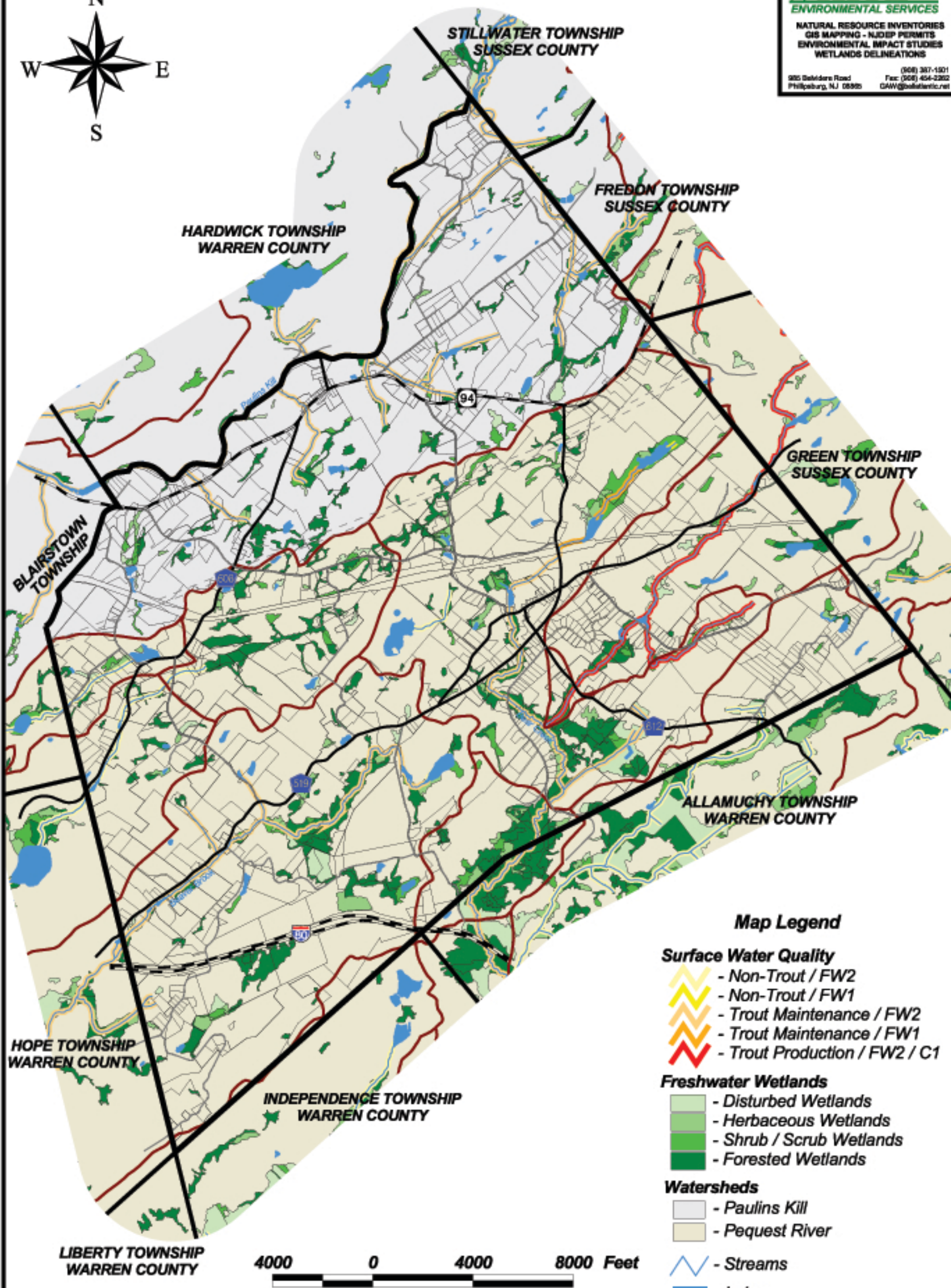
EXHIBIT 13
SURFACE HYDROLOGY



WHITE
ENVIRONMENTAL SERVICES

NATURAL RESOURCE INVENTORIES
GIS MAPPING - NJDEP PERMITS
ENVIRONMENTAL IMPACT STUDIES
WETLANDS DELINEATIONS

925 Selvidere Road
Phillipsburg, NJ 08855
(908) 367-1901
Fax: (908) 454-2352
GAW@whiteenv.com



Map Legend

Surface Water Quality

- Non-Trout / FW2
- Non-Trout / FW1
- Trout Maintenance / FW2
- Trout Maintenance / FW1
- Trout Production / FW2 / C1

Freshwater Wetlands

- Disturbed Wetlands
- Herbaceous Wetlands
- Shrub / Scrub Wetlands
- Forested Wetlands

Watersheds

- Paulins Kill
- Pequest River

- Streams

- Lakes

- Drainage Basins

REFERENCES & NOTES:

Property boundaries were taken from a composite tax map of Frelinghuysen Township and adjusted accordingly.

Freshwater Wetlands based upon the NJDEP Freshwater Wetlands Inventory, 1986.

Lakes and Streams based upon NJDEP GIS database.

Drainage Basins and Watersheds based upon NJDEP GIS Database, HUC14.

This map has been prepared as a guide for the Frelinghuysen Township Master Plan. Data on this map should not be relied upon for individual lot planning.

This map was developed using NJDEP & NJGS Geographic Information System digital data, but this secondary product has not been verified by the NJDEP or NJGS and is not State - authorized.

Surface Hydrology Municipal Master Plan Township of Frelinghuysen Warren County, NJ

Scale: 1" = 4000'

Date: 11/19/03

ERIC K. SNYDER & ASSOCIATES, INC.
LAND DEVELOPMENT AND COMMUNITY PLANNING CONSULTANTS

185 Spring Street
Newton, NJ 07860

(973) 300-5800
Fax: (973) 300-1524

Wildlife Habitat

Much has been made of the concern that the natural resource base be able to sustain the impact of development by human settlement. However, there is another substantial group of organisms affected by human activities and that is the plant and wildlife communities. Exhibits 16, Critical Wildlife Habitat and Exhibit 15, Natural Heritage Priority Sites indicate that Frelinghuysen is the home of State and Federal threatened and endangered species. These tend to be associated with surface water systems and the map in question is designed to provide general information to suggest that species of concern may lie within these areas. The State Natural Heritage Priority Sites and the mechanism of tracking of threatened and endangered species is general. In the case of wildlife, although it can be more particular in the case of plant life which is fixed.

The Natural Heritage Priority Sites located within Frelinghuysen are the Great Meadows Macrosite, Luse Pond, South Town Sinkhole, Bear Creek, Glovers Pond, Greendell Ridge, and various areas within the vicinity of Johnsonburg. It should be noted at this point that the Nature Conservancy has been active in securing the development rights to areas of particular concern, most particularly in the Johnsonburg areas so as to protect the limestone forest habitat.

NATURAL COMMUNITIES

Wildlife protection is of importance not only to Frelinghuysen Township and its immediate environs but also to the State of New Jersey. Exhibit 14, Critical Wildlife Habitat indicates that, within Frelinghuysen Township, there are various locations where threatened or endangered species are resident. Development of any kind within the Township will have an impact on wildlife populations.

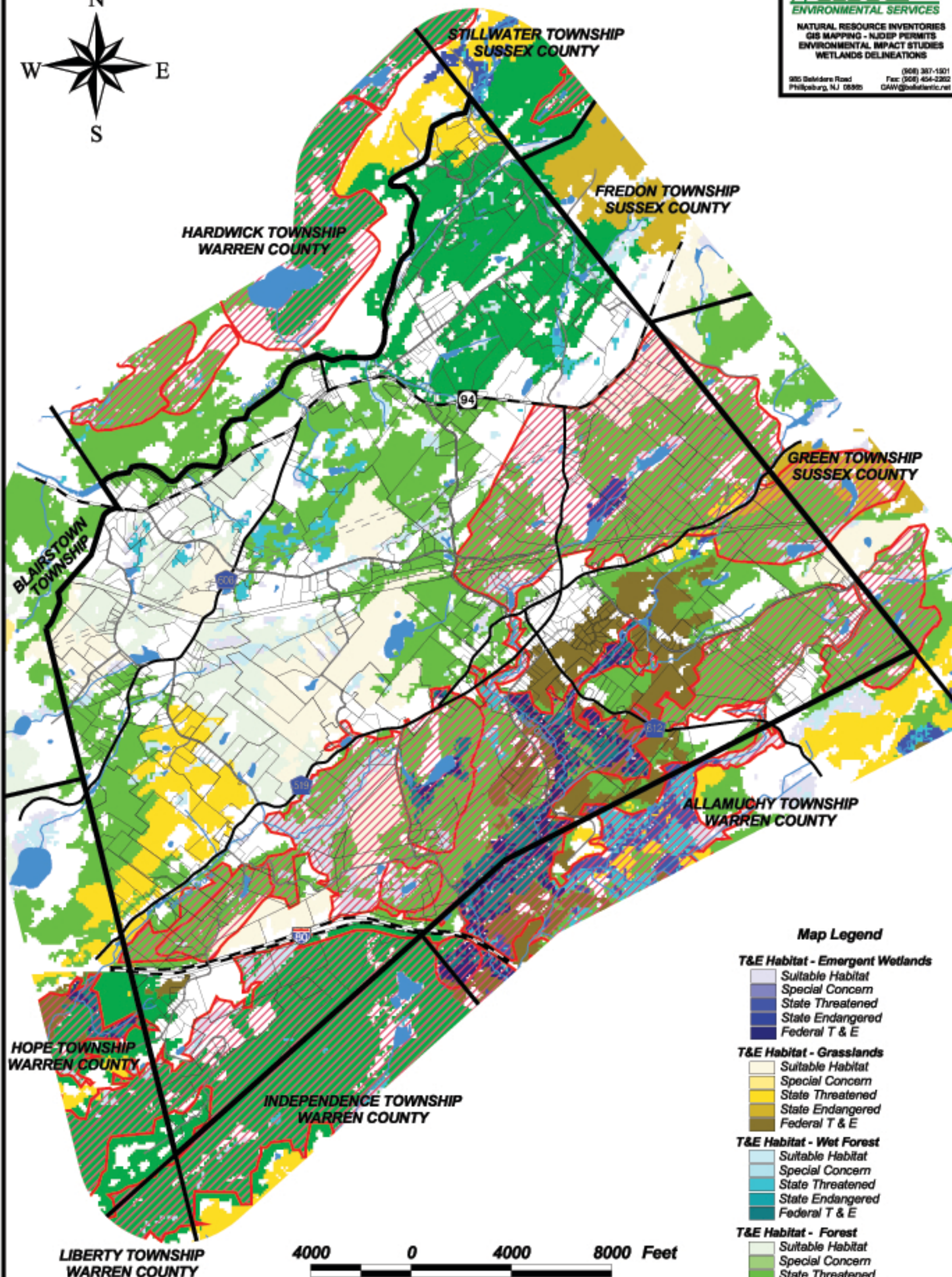
VEGETATION

In an area as large as Frelinghuysen, it is not practical to map the highly variable plant and animal communities found within the Township. Accordingly, a more generalized approach is taken in this document. It is recommended that language be included in subsequent development regulations include the requirement that concentrations of particularly important and protected species be shown in conjunction with development applications. The following are a series of habitat designations, with the plant species generally associated with them.

EXHIBIT 14
CRITICAL WILDLIFE HABITAT



WHITE
ENVIRONMENTAL SERVICES
NATURAL RESOURCE INVENTORIES
GIS MAPPING - NJDEP PERMITS
ENVIRONMENTAL IMPACT STUDIES
WETLANDS DELINEATIONS
(908) 387-1901
905 Delvidere Road
Phillipsburg, NJ 08865
Fax: (908) 454-2352
GAW@whiteenv.com



Map Legend

T&E Habitat - Emergent Wetlands

- Suitable Habitat
- Special Concern
- State Threatened
- State Endangered
- Federal T & E

T&E Habitat - Grasslands

- Suitable Habitat
- Special Concern
- State Threatened
- State Endangered
- Federal T & E

T&E Habitat - Wet Forest

- Suitable Habitat
- Special Concern
- State Threatened
- State Endangered
- Federal T & E

T&E Habitat - Forest

- Suitable Habitat
- Special Concern
- State Threatened
- State Endangered
- Federal T & E

Natural Heritage Sites

4000 0 4000 8000 Feet

REFERENCES & NOTES:

Property boundaries were taken from a composite tax map of Frelinghuysen Township and adjusted accordingly.

Threatened and Endangered Species Habitat based upon NJDEP Division of Fish and Wildlife's "Landscape Project", 2002.

Natural Heritage Priority Sites based upon NJDEP GIS Database, "NJDEP Natural Heritage Priority Sites", 2002.

This map was developed using NJDEP & NJGS Geographic Information System digital data, but this secondary product has not been verified by the NJDEP or NJGS and is not State - authorized.

Critical Wildlife Habitat Municipal Master Plan Township of Frelinghuysen Warren County, NJ

Scale: 1" = 4000'

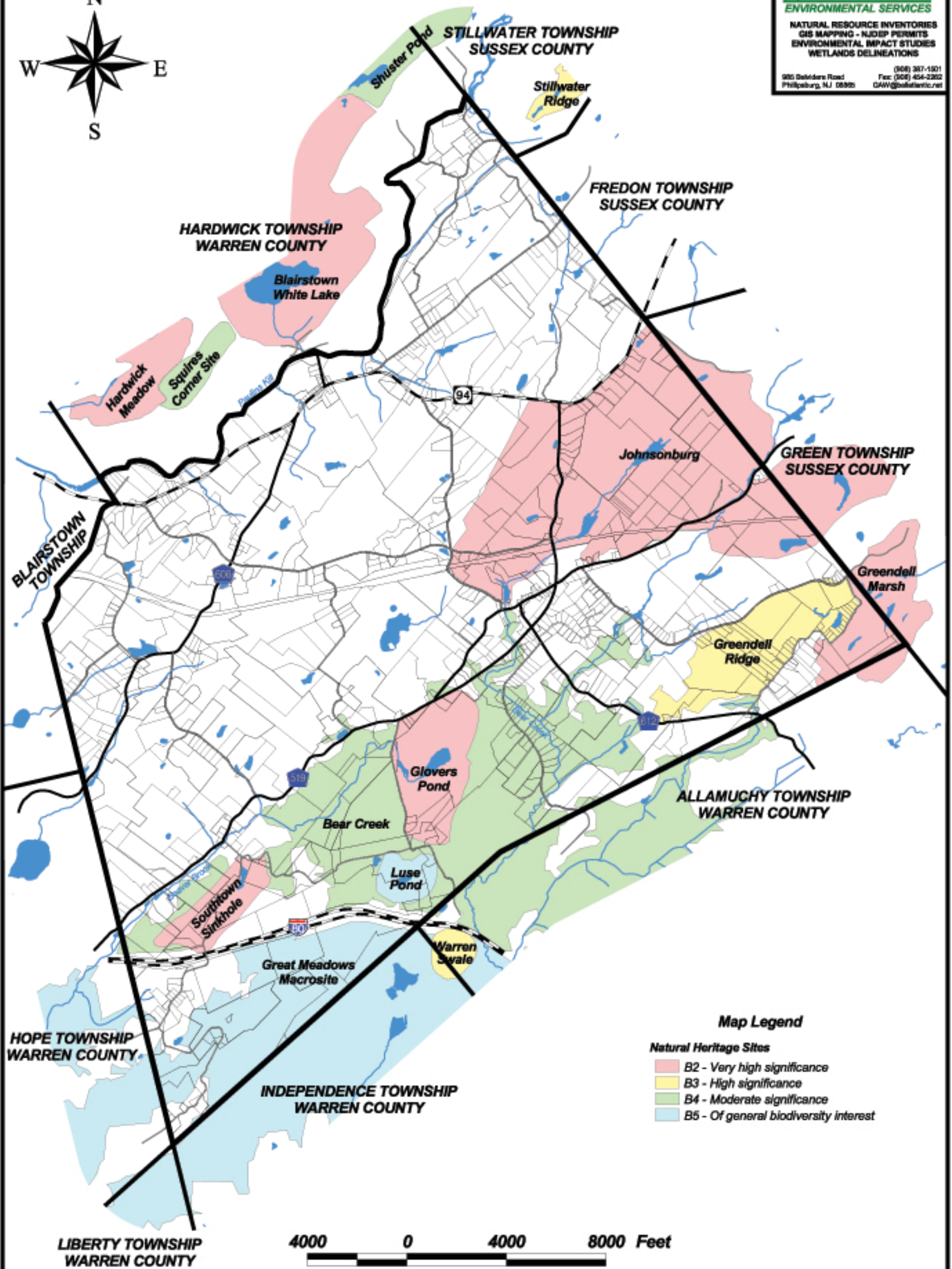
Date: 11/19/03

ERIC K. SNYDER & ASSOCIATES, INC.
LAND DEVELOPMENT AND COMMUNITY PLANNING CONSULTANTS

185 Spring Street
Newton, NJ 07860

(973) 300-5600
Fax: (973) 300-1524

EXHIBIT 15
NATURAL HERITAGE PRIORITY SITES



Map Legend

Natural Heritage Sites

- B2 - Very high significance
- B3 - High significance
- B4 - Moderate significance
- B5 - Of general biodiversity interest

REFERENCES & NOTES:

Property boundaries were taken from a composite tax map of Frelinghuysen Township and adjusted accordingly.

Natural Heritage Priority Sites based upon NJDEP GIS Database, "NJDEP Natural Heritage Priority Sites", 2002.

This map was developed using NJDEP & NJGS Geographic Information System digital data, but this secondary product has not been verified by the NJDEP or NJGS and is not State - authorized.

Natural Heritage Priority Sites Municipal Master Plan Township of Frelinghuysen Warren County, NJ

Scale: 1" = 4000'

Date: 11/19/03

ERIC K. SNYDER & ASSOCIATES, INC.
LAND DEVELOPMENT AND COMMUNITY PLANNING CONSULTANTS

185 Spring Street
Newton, NJ 07860

(973) 300-5600
Fax: (973) 300-1524

BOG COMMUNITY

Bogs differ from other wetlands in that there is no regular pattern of flooding, as in a marsh, and soils are highly acid and infertile. A bog is characterized by very poor drainage and incomplete decay of organic material. These conditions give rise to peat. Bogs are glacial offspring, depressions with no drainage. Plant life found in this habitat include:

Black Alder	Leather leaf	Sphagnum moss
Bog rosemary	Marsh, chain, and other ferns	Staggerbush
Fetterbush	Pitcher plant	Sundew
Herbs	Sedges	Swamp loosestrife
Huckleberry	Sheep laurel	Sweet Pepperbush
Labrador Tea		

Tree species include:

Black gum	Hemlock	White pine
Black spruce	Larch	Yellow bush
Cedar	Red maple	

MARSH, SWAMP AND FLOODPLAIN COMMUNITIES

Many of the swamps found in Frelinghuysen are the result of the glaciations which occurred twelve to fifteen thousand years ago; as former glacial lakes and ponds have been edged by swamp vegetation. In fresh water marshlands, which exclude aquatic plants found in open waters, the plant community typically is dominated by one of three plant species - reed grass, cattail, or wild rice.

Marsh plant species include:

Arrowarum	Sedges
Arrowhead	Spike rush
Blue Flag	Swamp loosestrife
Bulrush	Swamp milkweed
Bur weed	Touch-me-not
Cattail or Reed grass or Wild Rice	Water dock
Marsh fern	

Swamp plant species include:

Ash	Red maple
Basswood	Tulip
Black gum	Yellow birch

Shrub species include:

Alder
Buttonbush
Spirebush

Willow
Witch Hazel

Herbs include:

Sedges and mosses
Skunk Cabbage

Spring Herbs

MESIC UPLAND COMMUNITY

The habitat classified as Mesic Uplands lies between the wetter lowland bog and swamp environments, and the drier ridge top and rock face environments. Upland sites retain a good supply of soil moisture and nutrients. The following plant communities are generally those found:

<u>Community Structure</u>	<u>Mixed Oak</u>	<u>Sugar Maple - Mixed Hardwoods</u>
Tree Dominants	Red Oak White Oak Black Oak	Sugar Maple and many of
Other Typical Trees	Chestnut Oak Scarlet Oak Hickories Red Maple Sugar Maple Ash Beech Tulip Tree	Sweet Birch Yellow Birch Basswood Beech Ash Red Maple Red & White Oak Tulip Tree
Tree Understory	Dogwood Sassafras Hop hornbeam Ironwood	Hop hornbeam Dogwood Ironwood Sassafras
Shrubs	Viburnum Spicebush Others	Viburnum Spicebush Others
Herbs	Many spring & fall herbs	Many spring & fall herbs

HEMLOCK-MIXED HARDWOODS COMMUNITY

A third forest community, s known to exist only in undisturbed areas. The Hemlock - Mixed Hardwoods Community develops on cooler, north-facing slopes in well-drained soils. Once a hemlock stand has been disturbed, it does not regenerate. As a result, it is important that wherever such stands exist, they be delineated as a part of any

development proposal and every reasonable effort be made to protect them from disturbance. Other important species which should be identified and delineated and incorporated in landscaping plans include such species as dogwood, mountain laurel, holly and rhododendron. These can be most appropriately during the development review period. If for any reason, this type generally disappears, becoming Sugar Maple - Mixed Hardwoods. A general description of the community is as follows:

<u>Community Structure</u>	<u>Hemlock - Mixed Hardwoods</u>
Tree dominants	Hemlock and only a few of:
Other Typical Trees	Sweet Birch Yellow Birch Basswood Beech Red Oak Sugar Maple Red Maple
Tree Understory	Few
Shrubs	Few
Herbs	Few

SLOPE AND RIDGETOP COMMUNITY

A significant percentage of Frelinghuysen Township is steeply sloping, rock outcrops and ridge tops. These areas are drier than the mesic uplands for two reasons:

- a. Runoff is more rapid on steeper slopes and that which does penetrate through this soil will evaporate more quickly due to exposure to wind and sun.
- b. The soils themselves are thin and do not hold water well.

As a result of these characteristics, this is a harsh, infertile environment. Vegetation found in these areas is as follows:

<u>Community Structure</u>	<u>Chestnut Oak Forest</u>	<u>Plants Growing on Rocks</u>
Common Trees	Chestnut Oak Red Oak Scarlet Oak Sweet Birch White Oak	Lichen Moss Invasion: Crustose Lichens Foliose Lichens Mosses
Other Typical Trees	Black Oak Red Maple Hickory Black Cherry White Pine	Herb Invasion: Hair Grass Cinquefoil Sedges & Grasses Ferns

<u>Community Structure</u>	<u>Chestnut Oak Forest</u>	<u>Plants Growing on Rocks</u>
Understory	Chestnut Sprouts Laurel Blueberry	Shrub Invasion Blueberry, Huckleberry, Laurel
Herbs	Few: Wintergreen Wild Sarsaparilla	Tree Invasion: Pitch Pine Chestnut Oak Sweet & White Birch

WILDLIFE

Wildlife habitat in Frelinghuysen is varied, although less so than the plant communities. Animal species tend to be adaptable across habitats, particularly within the fairly narrow range of ecological conditions found in Frelinghuysen.

As a result of the above, the listing below is provided to give a feel for the diversity of species which may be found within the Northern New Jersey Area, and Frelinghuysen in particular.

WILDLIFE

Common Species

Black Bear	Woodcock	Porcupine
Muskrat	Swift	Beaver
Opossum	Downy Woodpecker	Raccoon
Weasel	Barn Swallow	Skunk
Eastern Chipmunk	Common Crow	Mole
Shrew	Catbird	Pine Mouse
White Footed Mouse	House Wren	Nuthatch
Mockingbird	Eastern Red Fox	Robin
Wood Thrush	Bank Swallow	Starling
House Sparrow	Goldfinch	Grackle
Black Bird	Broad Winged Hawk	Sharp Shinned Hawk
Cooper's Hawk	Black Vulture	Belted kingfisher
Green Backed Heron	House Finch	Rock Dove
Golden Crowned Kinglet	Ruby Crowned Kinglet	Field Sparrow
Chipping Sparrow	Carolina Wren	Cedar Waxwing
Tree Swallow	White Throated Sparrow	White Crowned sparrow
Brown Creeper	Evening Grosbeak	Red Bellied Woodpecker
Yellow Bellied Sapsucker	Rough Legged Hawk	Pine Siskin
American Woodcock	Rufous Sided Towhee	Purple Finch
Gray Catbird	Scarlet Tanager	Warbling Verio
Yellow Warbler	Common Yellow Throat	Eastern Kingbird
Bluewinged Warbler	Yellow Rumped Warbler	Hairy Woodpecker

Rose Breasted Grosbeak
 Blue Jay
 Deer Mouse
 Cardinal
 Flicker

Veery
 Phoebe
 Gray Fox
 Barn Swallow

Chickadee
 Orchard Oriole
 Song Sparrow
 Mourning Dove

WILDLIFE

Endangered Species

Timber Rattle Snake
 Bog Turtle
 Barred Owl

Long Tailed Salamander
 Wood Turtle

Great Blue Heron
 Red Shouldered Hawk

Additional wildlife which has been identified by Frelinghuysen residents is as follows:

<u>BIRDS</u>	<u>MAMMALS</u>
Owls - Barn, Great Horned, Screech Red-tailed Hawk Turkey Vulture Great Blue Heron Ring Necked Pheasant Quail, Bob White American Kestrel Egret American Coot Ruffed Grouse Swan Humming Bird Canada Goose Rail Tufted Titmouse, Bluebird, Indigo Bunting Scarlet Tanager Falcon Marsh Hawk Wild Turkey Pileated Woodpecker	Mink Coyote River Otter Northern Flying Squirrel Bobcat
	<u>REPTILES & AMPHIBIANS</u>
	Frog and toad Turtle - Box, Snapping Salamander Snake - Copperhead, Milk, Garter, Black
	<u>FISH & AQUATIC LIFE</u>
	Sunfish Crayfish Soft-shelled (fresh water) Mussel Pickerel Eel Trout Bass

FARMLAND PRESERVATION ELEMENT

The Farmland preservation Element of the Master Plan is the Farmland Preservation Plan, dated September 2005, prepared by the Morris Land Conservancy with the Frelinghuysen Township Farmland Preservation Commission. This document and its farmland preservation goals and policies was adopted by the Frelinghuysen Planning Board on September 7, 2005.

HISTORIC PRESERVATION ELEMENT

HISTORIC PRESERVATION ELEMENT

Introduction

An historic preservation plan is the first step toward effective preservation of Frelinghuysen Township's cultural heritage. The plan provides a perspective on the evolution of the township and the development of its community components. An historic master plan element provides the foundation for future growth to be consistent with historical patterns of settlement, consistency of architectural styles, and preservation of important historic sites during the development process.

Historic preservation elements are appropriate in accordance with the State Municipal Land Use Law. The New Jersey Statutes Annotated (C. 40:55D-28, b(10)) recommends recognition of historic sites and historic districts. By identifying the standards used to assess worthiness for historic site or district designation and analyzing the impact of the elements of the master plan on historic preservation Frelinghuysen Township will satisfy the intent of the statutes.

Another motive for a community to adopt an historic preservation element in its master plan is the potential for federal/state funding to rehabilitate and preserve recognized historic sites. Since its establishment by Congress in 1966, the National Historic Preservation Program has operated as a decentralized partnership between the federal government and the states. The federal government set up a program of identification, evaluation, and protection of historic properties based on the National Register of Historic Places. The program is carried out by the states, under the direction of the National Park Service. Participating states receive funding assistance in the form of annual grants from the federal Historic Preservation Trust Fund to support their efforts. Funds are normally used to support the staff of the State Historic Preservation Office. However, a portion of the funds may be granted in the form of sub-grants for survey and planning activities at the local level.

The success of this working relationship has prompted Congress to extend the partnership to provide for direct participation by qualified local governments. The National Historic Preservation Act Amendments of 1980 (P.L. 96-515) provide the legal basis for the new federal-state-local preservation partnership commonly referred to as the Certified Local Government Program. The amendments direct the State Historic Preservation Officer and the Secretary of the Interior to establish procedures for the certification of local governments to participate in this partnership. The Certified Local Government (CLG) Program permits the states to delegate limited responsibilities to local government that meet specific qualifications for certification and provide limited grant-in-aid funding to assist them in that process. One of the most fundamental criteria for CLG designation, and consequential funding, is an adopted historic preservation plan.

Scope of Historic Element

New Jersey's Municipal Land Use Law (MLUL, 1975) laid the foundation for State-orchestrated local planning. This legislation distinguishes between those elements mandatory for inclusion in a local master plan and those elements considered optional. The historic element is considered an optional element of the township master plan. The MLUL requires that the zoning ordinance be consistent with the objectives of the land use element and housing element of the master plan. The law allows for the designation and regulation of historic sites or historic districts, and provides for design criteria and guidelines, based upon identification in the historic preservation element, the land-use element, or community facilities plan element (see 40:55D-65(i), and 40:55D-65.1). Though no deadline exist for bringing local codes into compliance with the master plan, failure to comply could open the township to demands for development not in conformance with the plan. The importance of the township's history to its current and future patterns of growth make it imperative that historical preservation be an important consideration in the development of regulations governing land use.

Relationship to Township Land Development Ordinance

New development is one of the major causes of the destruction of historic resources. In the case of historic structures destruction is often intentional, while archeological sites are often destroyed by mistake. Two primary means for protecting historic sites from development are the use of land use zoning and site plan review. Historic sites have been identified and mapped under the township's Environmental Resources Inventory. Additional resources include the Warren County Cultural Resources Inventory, compiled in 1991, which identifies a number of historic properties and three areas suitable for historic district nomination in Frelinghuysen.

Zoning can be used many different ways for the protection of historic resources. One very direct measure is to apply an historic district designation to areas deemed eligible. Such designation provides for design review for any alteration or new development proposed for properties within the district, in order to maintain its historic character. Thousands of communities across the nation have enacted such controls. There is a need to take the initiative and adopt similar land use provisions which protect properties in Frelinghuysen. Individual historic site designations must meet with the agreement of the property owner. If designated as a National or State Historic Site, the owner agrees to certain restrictions regarding the site and its historic structures. The owner could also accrue certain advantages, particularly those related to property assessments.

As was previously described, two recently compiled sources of historic information regarding Frelinghuysen are the Cultural and Visual Resources chapter, Part III of the township Environmental Resources Inventory published in 1991 and adopted as part of the township master plan, and the Frelinghuysen section of the Warren County Cultural Resources Inventory, compiled in 1991. The county inventory describes 145 structures in Frelinghuysen, of which eight were considered worthy of intensive surveying. It also describes three districts it feels are eligible for inclusion on the National Register of

Historic Places. These two sources should be correlated with each other to provide a more complete picture of historic and archaeological sites in Frelinghuysen.

Conservation methods can be used to enhance historic districts in the township. Examples include open-space buffers, controls on building design and site developed within and adjacent to historic districts, and preservation of historic structures. For example, the township's Open Space Element calls for acquisition of the lands north of town hall for active and passive recreation. This would provide a natural buffer to the Johnsonburg Historic District. The Nature Conservancy, a nationwide conservation organization, has acquired considerable lands north of the Village, east of Ramsey Road, to be permanently set aside in a nature preserve and continues to explore further acquisitions in the area. Such acquisition would support this concept of buffering the Village with undisturbed open space.

Relationship to Circulation Plan

Changes in the circulation networks for transportation, such as new roads or width expansions, can also threaten historic resources. The razing of historic structures to accommodate roadway modifications was a common problem until historic sites were mandated as part of the evaluation process. Even bringing a new road within close proximity to a historic structure, or widening an existing road, can be detrimental. Not only can the site character and architectural/historical integrity be degraded by the presence of a roadway, but bringing roadways too close to historic structures can increase the chances of damage from auto accidents, subject fragile exterior materials to harmful auto exhaust, and cause differential settlement from traffic vibrations. Most proposals regarding new or expanded transportation routes must be addressed on a case-by-case basis.

Relationship to Building Codes

Building codes are often unsympathetic to the unique characteristics of historic structures. Frelinghuysen Township enforces the state-mandated code, based on the standard Building Official Code Administrator International, otherwise known as BOCA. Fortunately, BOCA is favorably disposed towards historic structures, as their renovation does not fall under the same stringent requirements as new structures, so long as the building is structurally sound and considered as safe. However, a structure determined by the building inspector as being unsafe for habitation or use must either be brought up to proper standards or be abandoned for occupation.

Other Threats to Historic Elements

Additional threats to historic sites include soil erosion, damage by lightning, and neglect. Soil erosion can cause irreversible damage to an archeological site.. Beyond the normal preventive measures taken for any structure (lightning rods, smoke detectors, etc.) , the same applies for natural hazards such as fires and windstorms. Neglect is sometimes

difficult to address. Other than enforcement of building codes, most measures to prevent demolition by neglect are incentive oriented, rather than regulatory.

Included as part of the Historic Preservation Element are attachments that can be found in Appendix B.

Brief History of Frelinghuysen

The following brief history of Frelinghuysen is taken from Snell's History of Warren and Sussex Counties, County Atlas of Warren, 1874, the Bicentennial Booklet of Frelinghuysen Township, and the Balsens of the Archeology Society of New Jersey, Number 40, 1986.

The area we now know as Johnsonburg was apparently first inhabited by Paleo-indians who arrived at the end of the Wisconsin Glaciation, approximately 10 to 12 thousand years ago. These Indians lived at the same time as did mastodon, caribou, elk, dire wolves, saber tooth cats.

Following the Paleo-indians, the archaic periods, early, middle, late, transitional, from approximately 8,000 to 1,000 years BC then ensued. The Archaic people were hunter/gatherer folk and were succeeded by populations who lived during the woodland periods which ran from 1,000 BC to 1600 AD. It was during these times when bow and arrow, substantial agricultural development, and semi-permanent villages were established. Frelinghuysen is home to many archeological sites which give evidence to early settlements. These generally located near water bodies, river and stream and also adjacent to farm fields.

In these times Frelinghuysen was part of an area occupied by the Lenape Indians and was populated by the Munsee Lenape, a subgroup of the larger Lenape tribe. Please see Exhibit 16 (Archeological Sites).

In more recent times Frelinghuysen was part of the land given to Lord John Berkley and Sir John Carteret in 1664 by the Duke of York following the English conquest of the Dutch and the Swedes. In 1676 the new colony of Nova-Caesaria (or New Jersey) was divided into east and west Jersey. The Lenape are also known as the Delawares. In 1610 when the Delaware River and Bay were named after Sir Thomas West, 3rd Lord DeLaWare, the Indians living in this area were then universally known as the Delaware Indians.

The Lenape periodically were involved in hostilities with the Iroquois confederacy and English colonialists, and generally did not fair well. By 1742 there were no more residing in Frelinghuysen. However, during the French and Indian Wars this tribe was part of those who fought until 1758 when the Treaty of Easton was signed between the Lenapes and the Colony of New Jersey at which time the Indians rights to this area were purchased by the colonists.

EXHIBIT 16
ARCHEOLOGICAL SITES

The area known as West Jersey became of Morris County in 1739. This area then contained all of Morris, Sussex and Warren Counties. Sussex County was struck off in 1753 continuing to contain what is now Warren County. The county seat of Sussex County at that time was Johnsonburg, known then as Log Gaol and pronounced Log Jail. Finally in 1825 Warren County was struck off from Sussex County with Belvidere being named the new county seat. The protected road marker on Allamuchy-Johnsonburg Road reads “2 LG” or 2 miles to the Log Gaol.

Johnsonburg in addition to being the county seat was a major stagecoach stop as can still be seen by the architecture in Johnsonburg. The old inn and others of the preserved and maintained structures in the village remind us of how important the village was in the late 1700 and early 1800s.

By the time the Civil War was fought, Johnsonburg was a predominantly agricultural community. Its character remained so until the late 1970s when it began to change for a dairy farming community to a bedroom community. Important reminders of the Township’s history remain. Many of those stone buildings found in the Village of Johnsonburg along with lime kilns, cemetery on Dark Moon Road, the Lackawanna Railroad Right-of-Way, purchased by the State of New Jersey program for reactivation, a considerable number of farms and country roads that still maintain their character.

The Warren County Architectural Survey, which itself depends in part on the County Atlas of Warren, New Jersey, includes a useful summary of some of the early of Frelinghuysen as it was incorporated on March 9, 1848. This is included as follows:

Setting

The township of Frelinghuysen was incorporated on March 9, 1848, with an area of 23.6 square miles and contains rolling hills of 550 to 700 feet above sea level. Its southwestern corner is bounded by Jenny Jump Mountain, rising to peaks of 1100 feet above sea level. It was taken from part of Hardwick Township, and named after noted statesman and educator Theodore Frelinghuysen (Mustin 1931:52). The township is bounded by Hardwick, Blairstown, Hope, Independence and Allamuchy Townships, as well as Sussex County.

Early History and Settlement

Samuel Green, Deputy surveyor, and his companions were probably the first Europeans to appear within Frelinghuysen Township, during their survey of May 1715. They were surveying a line along the Minisink Path from Allamuchy to “the cleft in the hill where the Minisink path goeth through”, thought to be near Millbrook (N.A. 1974). After the Indians abandoned the area (the last recorded in 1742), settlement occurred (N.A. 1974). On June 8, 1753, the General Assembly selected a little crossroads

hamlet in the center of what was then Sussex County to be the county seat. The hamlet became known as Log Goal because of the jail that was built there. However, the location became unfavorable for the county seat, and the public meetings were relocated in 1962 and begun in Newton (N.A. 1974).

Early settlers in the township included the Green, Armstrong, Kennedy, Thomson, and Vliet families (Snell 1881:684). Most of the township is agricultural, with small farming communities of Shiloh, Southtown and Ebenezer located at crossroads. It has never been a well-populated area of the county, but did have some important communities during the eighteenth and nineteenth centuries.

Several important Presbyterian churches were organized within the township. The Upper Hardwick Presbyterian Church was organized in the 1750s at Log Goal, and the parishioners erected a log meeting house near the village, and an adjacent cemetery. By 1780, the church decided to build a larger meeting house, and erected one at the intersection of Shaw's Lane with "the Great Road from Newton to Johnsonburg." At the corner of Frelinghuysen Township, Fredon and Green Townships, Sussex County (N.A. 1974). The Second Congregational Church of Hardwick was organized within the township on November 1, 1814, the first meeting of the church held in the upper rooms of the Shepard Tavern in Marksboro. It later changed to a Presbyterian form of government, and built the Marksboro Presbyterian Church within that community (Snell 1881:680).

During the twentieth century, there was some resort development in this township. Included in these areas were Lake Wasigan, a man-made lake on the old Van Horn farm, used as a summer camp for girls. In 1929, the Stevens Institute of Technology selected a 400 acres site adjacent to Clover's Pond for a summer school for civil engineering, for which the Steven's Institute erected a school building, mess hall and cabins. It became the Presbyterian Church Camp following World War II (N.A. 1974).

The completion of Route 80 in the 1970s did not bring in the expected industrial and residential growth into the township, although it did experience a slow population growth from 1,118 in 1970 to 1,435 in 1980 (Guiler 1988:34). During the past ten years, population in the township has grown 24%, to 1,770 persons in 1990.

Johnsonburg

This community is a linear community along Dark Moon Road near the center of the township. It is located in what was once virtually the center of old Sussex County, on the main stage line from Philadelphia to

Newburgh, New York. Early settlers established farms in the vicinity of Johnsonburg, among them the Green, Armstrong, Pettit, Dyer, Shaw and Everitt families. Dr. Samuel Kennedy located there, and became the first practicing physician in this part of the county (Snell 1881:864). Jonathan Pettit established a tavern along the stagecoach route prior to 1953. After the crossroads community was selected as Sussex County seat, frequent visitors caused the need for this tavern to be enlarged (Snell 1881:6850686).

Because of its setting along a main stagecoach lines and in the center of what was then Sussex County, it was chosen as the original Sussex County seat (Guiler 1988:32). Now known as Johnsonburg, this village was originally known as Log Gaol, when from 1753 to 1761 the Sussex County courts met here. The log jail was abandoned after prisoners found it easy to escape. Several structures from this period exist, including the Dr. Samuel Kennedy House in Allamuchy (ca. 1760), the Hart-Wilson House (ca. 1770s), and the Robert Blair homestead (1754) (N.A. 1974).

After the county seat was removed from this location, the community continued. The Van Ness House, a plain two story building, was built to square with the points on the compass and served as a Protestant Episcopal Church from ca. 1781 to ca. 1850, and is probably the oldest standing church edifice in the county (Works Progress Administration 1976:455). Jonathan Johnson served as its first postmaster from 1799 to 1814, and the name of the town was changed to honor him. During the early nineteenth century, a Christian sect was in the village (Works Progress Administration 1976:455). In 1834, Gordon described the village as containing churches for Episcopalians, Presbyterians and Christians, two taverns, two stores, a grist mill, artisan shops, and about twenty five to thirty dwellings (Gordon 1834:164), and by 1844 there was added to the community a tannery, and coach manufacturing company (Barber and Howe 1844:490).

Within this town is the second of two octagonal houses in the county, built during the late 1840s or 50s. Built of stone and covered with stucco, the interior has six rooms with as many as eight walls. The building is located on Route 519 in the town (Thatcher 1970). The Johnsonburg Presbyterian Church was built in 1851, and survives as the township municipal building. Other surviving buildings from the antebellum period include the Methodist Episcopal Church (2106:118), Drake & Mackley's Storehouse, the 1850s post office operated by Robert Blair, and the S.Y. Lewis House, used as a store later in the century (N.A. 1974).

By 1874, the village had reached its height, containing about fifty houses, a gristmill, a fanning mill, smithy shops, a school, several stores, a post office, and even a confectionery. Another important building in the

village was a three story brick structure with a store room in the first floor, a storage area on the second floor and a meeting hall on the third floor. It was converted into a gasoline station and dwelling after World War I (N.A. 1974). Johnsonburg serviced the surrounding farmland as the center of trade and social activities.

In 1918, this village of 150 persons was described as an agricultural community concentrating on truck farming and dairying (Bureau of Industrial Statistics 1918:284-285). In the 1930s, it was described as “today it has only summertime significance because of the nearby camp for field work by civil engineering students of Stevens Institute of Technology” (Works Progress Administration 1976:456). Until recently, Johnsonburg was the home of a milk producing company, Westbrook Farms (State Industrial Directory Corp. 1980:G-439). There were historic structures recorded in this community (2106.44-2106.52, 2106.120-2106.124).

Marksboro

The village of Marksboro is a linear community along Route 94, located in the northern part of the township on the slope of a hill above the Paulins Kill, and historically contains milling sites on the Paulins Kills in both Frelinghuysen and Hardwick Townships. It was possibly named after Colonel Mark Thomson, who operated a gristmill here before 1760 (Mustin 1931:52). The Thomson Mill has burned twice and been rebuilt. Known early millers at this mill included Jacob Van Horn, William Drake, and Fred Lanning. The mill was converted into a residence in 1972. Thomson’s house (2106.143), located next to the mill (2106.142), also survives and dates to 1758 (N.A. 1974).

During the late eighteenth century, merchant William Shafer located here. At the time there were only about five families in the town (Guiler 1988:33). In the early nineteenth century, an academy was located here, but not being successful, it was converted into a hotel and operated by a Mr. Sheperd in 1810. The hotel burned down in 1940 (N.A. 1974). Gordon described the community in 1834 as containing a Presbyterian Church, a grist mill, cotton manufactory, clover mill, and about twenty dwellings (Gordon 1834:174), and by 1844 mills had been built for lumber and plaster (Barber and Howe 1844:490-491).

By 1881, the village had prospered and included a hotel, two stores, town blacksmiths, a harness maker, one grist mill, a school, a Presbyterian church and a population of 150 (Snell 1881:688). A railroad station and creamery were added in the early twentieth century. By 1918, the population of this town was 200, with the main industry being agricultural,

growing grain crops, potatoes, corn, as well as dairy products (Bureau of Industrial Statistics 1918:338).

Little change has occurred within the community during the last fifty years. The Presbyterian Church burned down in 1943, but was rebuilt in 1950. The first store, railroad station and creamery have all deteriorated. Although Route 94 passes through the town, it remains much of its early houses and feeling (2106.62-2106.88). The village is mostly residential, with two antique shops, and a handful of other commercial establishments (N.A. 1974).

Other Communities

There were within this township four other small rural hamlets that were to both arrive and depart in the nineteenth century, Shiloh, Southtown, Kerrs Corner and Ebenezer. Situated in the southwestern part of the township, at the base of the Jenny Jump Mountain, is the hamlet of Shiloh at the junction of Howard and Shiloh Roads. In 1833, this village has a post office, distillery, saw mill, grist mill, and a few scattered dwelling. The Albertson Homestead, built in 1828, survives as the present Jenny Jump State Forest park headquarters (N.A. 1874). As late as 1874, both the grist and saw mills were still in operation, but there only existed a few dispersed residences. Presently only three houses remain in this portion of the township (2106.10-2106.12).

Another abandoned mining community located beneath Jenny Jump Mountain was Southtown. A dispersed community along the road to Shiloh, in 1874 there was a school and a few dwellings nearby. By 1885 a store had been added to the community. It also contained at one time a grist mill and saw mill. Much of the population of this community were employed as miners who worked in iron mines on Jenny Jump Mountain. The site of this community is presently woodland and grown over fields (N.A. 1974). Only one historic structure was recorded near this former hamlet (2106.23).

An intersection called Kerrs Corner, in a mountainous region at 680 feet above sea level, was once the site of several houses, was named for the prominent Kerr Family residing in the vicinity. The 1874 map depicts this crossroad as containing four houses and a blacksmith shop. The J. Kerr house survives, noted for a huge buttonball tree in its yard. The Locke family homestead, located nearby, was the birthplace of Ann Locke, wife of prominent entrepreneur John I. Blair (N.A. 1974). Several residences remains at this crossroads to mark its location (2106.100-2106.101).

The hamlet of Ebenezer is located in the western portion of the township, adjacent to Lake Wasigen, halfway between Hope and Marksboro. In 1859, the Ebenezer Methodist Episcopal Church was built. It was converted into a dwelling in 1949 (N.A. 1974). Several residences remain along the road to mark this locality, and nearby is Camp Wasigan, a girls camp. The former hamlet is marked by a single farm (2106.16).

***OPEN SPACE AND RECREATION
PLAN ELEMENT***

The Open Space and Recreation Plan Element of the Master Plan is the Open Space and Recreation Plan, dated February 2006, prepared by the Morris Land Conservancy with the Frelinghuysen Township Environmental Commission. This document and its open space, historic resources and outdoor recreation goals and policies was adopted by the Frelinghuysen Planning Board on April 3, 2006.

EXISTING LAND USE ELEMENT

EXISTING LAND USE ELEMENT

As indicated in the introduction and born out by the information preceding this section, Frelinghuysen is a relatively low density municipality with the vast majority of its land area in vacant land and farmland. Exhibit 17, Existing Land Use, depicts this and show that in addition to the minor areas developed for residential purposes, the township is generally preserved land, vacant and agricultural. This is a reflection of its geographic location and the general development philosophy which has been followed by the Township over the past several decades.

Frelinghuysen's two historic centers, Johnsonburg and Marksboro, lie at the intersections of a modest road network, Route 517 and Ramsey Road and Route 94 immediately adjacent to the Hardwick Road/Paulenskill intersection. In and around Johnsonburg there has been modest development over the years, turning farmland into suburban neighborhoods while in Marksboro there has been little development activity for a very long time.

<u>Land Use Category</u>	<u>Total Acres</u>
Vacant	753
Public/Non-Profit	1,689
Residential	2,182
Farm with Home	5,877
Open Farmland	4,351
Commercial/Industrial	<u>145</u>
<u>Total</u>	<u>14,997</u>

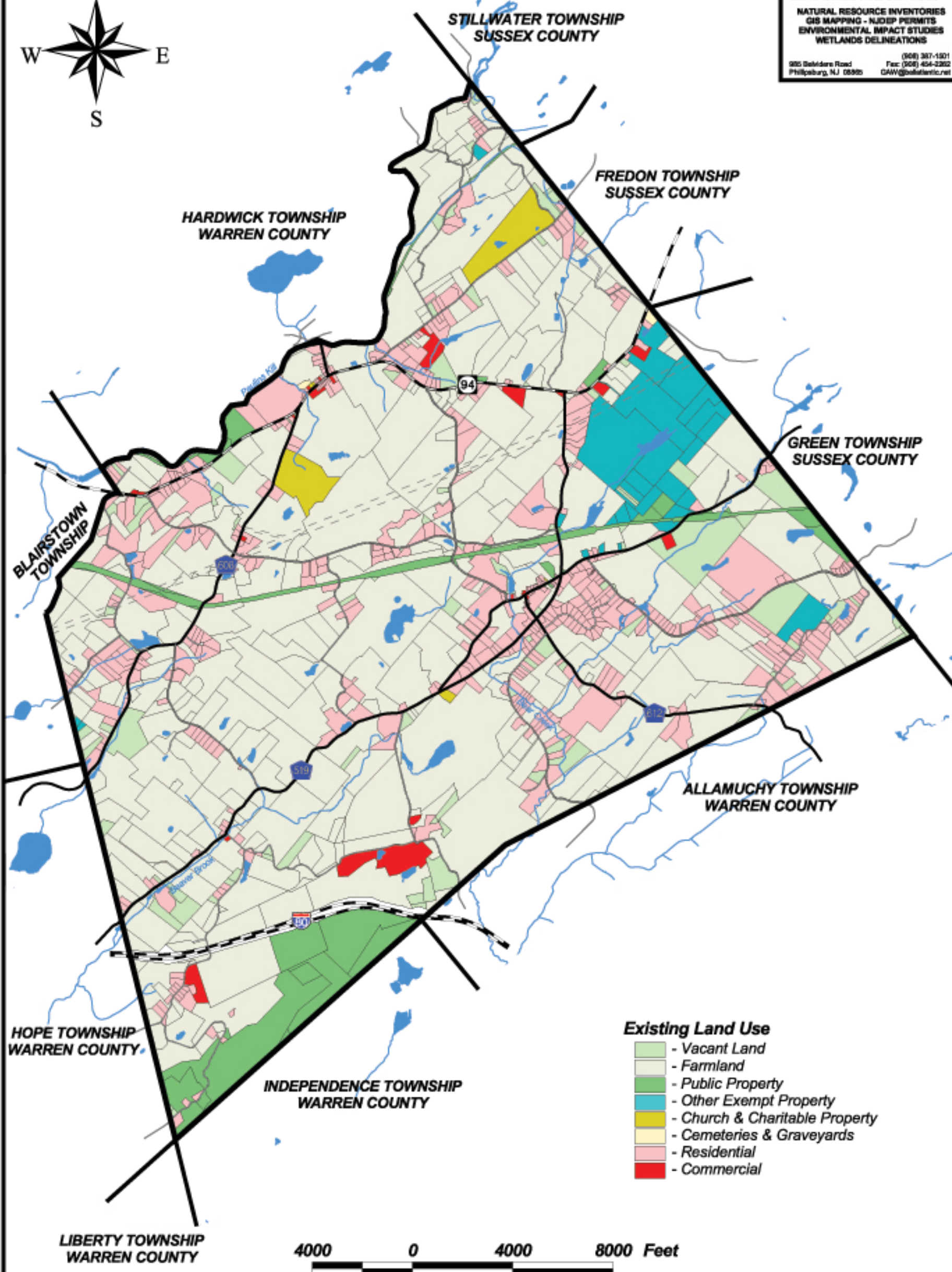
EXHIBIT 17
EXISTING LAND USE



WHITE
ENVIRONMENTAL SERVICES

NATURAL RESOURCE INVENTORIES
GIS MAPPING - NJDEP PERMITS
ENVIRONMENTAL IMPACT STUDIES
WETLANDS DELINEATIONS

(908) 387-1901
985 Delvidere Road
Phillipsburg, NJ 08865
Fax: (908) 454-2352
GAW@whiteenv.com



Existing Land Use

- Vacant Land
- Farmland
- Public Property
- Other Exempt Property
- Church & Charitable Property
- Cemeteries & Graveyards
- Residential
- Commercial

REFERENCES & NOTES:

Property boundaries were taken from a composite tax map of Frelinghuysen Township and adjusted accordingly.

Existing Land Use information based upon information supplied by Eric. K. Snyder & Associates, 2003.

Lakes and Streams based upon NJDEP GIS database.

This map has been prepared as a guide for the Frelinghuysen Township Master Plan. Data on this map should not be relied upon for individual lot planning.

This map was developed using NJDEP & NJGS Geographic Information System digital data, but this secondary product has not been verified by the NJDEP or NJGS and is not State - authorized.

Existing Land Use Municipal Master Plan Township of Frelinghuysen Warren County, NJ

Scale: 1" = 4000'

Date: 11/19/03

ERIC K. SNYDER & ASSOCIATES, INC.
LAND DEVELOPMENT AND COMMUNITY PLANNING CONSULTANTS

185 Spring Street
Newton, NJ 07860

(973) 300-5600
Fax: (973) 300-1524

PROPOSED LAND USE ELEMENT

PROPOSED LAND USE

The Proposed Land Use Element of a Master Plan, the third of the three required elements, is constructed on the foundation on the information laid out in previous plan elements from the goals and objectives through the physical characteristics, population characteristics and historic development patterns leading to the vision of what the municipality should look like in the future.

Frelinghuysen Township's land use planning philosophy continues to be: maintain the municipality as a low density, single family detached bedroom community with a strong agricultural and rural historical heritage. Protecting water quality and quantity has been the fundamental basis for land use planning here because Frelinghuysen Township is dependent on groundwater for its potable water supply and on its soil for septic effluent treatment. Concerned that the assimilative capacity of the soils for septic systems and the ability of aquifers to provide safe and sufficient potable water, the minimum required lot size was increased to four (4) acres in a substantial part of the Township in 1998. Soon after, the entire remaining AR Zone District was rezoned to four (4) acres. Further analysis of physical conditions undertaken during this Master Plan review process indicates that the residential density should be further reduced to one unit per six (6) acres.

Despite its location within the influence of northern New Jersey market forces, Frelinghuysen Township has essentially retained its rural land use character due to its distance from major transportation routes, its extensive critical environmental features and past regional market conditions. But, portents of change have become evident. During the 1980-1990 decade, the rate of housing development significantly increased in Frelinghuysen Township as the total number of housing units increased by 50 percent. In the past sixteen years (1990-2006), housing development has continued at this suburbanizing pace.

Emerging market conditions and regulatory activities at the municipal and state level will force a greater amount of unwanted development pressures on this rural municipality than previously anticipated. Most of the municipalities within a 20 mile radius of Frelinghuysen Township have significantly reduced permitted residential densities and nonresidential coverage in the last five years. The inevitable result will be a shift in development pressures, especially for New Jersey's unmet housing demand, pushing it further into rural municipalities like Frelinghuysen Township.

There has been considerable documentation by municipal and state sources of the rural historic heritage, agricultural, groundwater and surface water features of Frelinghuysen Township. Additional detailed information related to water supply provided by the Highlands Regional Planning Council attests to the need to protect the Township's water resources. There is sufficient knowledge to rationally guide adjustments to community planning policies and regulations in this Master Plan update. We know that Frelinghuysen Township has a highly variable physical landscape where critical environmental features are interlaced throughout the 23.5 square mile municipality:

Mountainous areas of limited water yields are separated by parallel valleys where groundwater yields can be abundant but highly susceptible to pollution, and fertile farmland soils are contrasted by bedrock outcroppings and perennial swamps.

Between 35 and 40 percent of the soils in this 23.5 square mile Township are characteristic of, and suitable for agricultural production (New Jersey Soils of Unique Importance, 1990). These soils are scattered throughout the Township, nestled among the wooded, rocky areas characteristic of the Ridge and Valley Region.

Most new residential development that has occurred in Frelinghuysen Township has a low density suburban character. Other than possessing a larger lot area and yards, the type of homes with their manicured lawns and prominent front-loaded two and three car garages are indistinguishable from those found in the more densely suburban communities east of Frelinghuysen Township. Recent development contrasts in appearance from the rural character which formed the predominate Frelinghuysen Township landscape prior to 1970 where homes, mainly farmhouses, are setback far from the public road across open fields or where natural vegetation especially along the public road is preserved to retain a rustic setting. Overtime, if left unchecked, the cumulative effect of low density suburban style development will be the predominant look of this municipality. Frelinghuysen Township will lose its rural identity and perhaps along with that its commitment to rural values such as preservation of farmland and the rights of farmers. Zoning and subdivision regulations are the primary cause of this suburban style development pattern; changes to these regulations proposed in the land use plan will foster a more rural design character for future development.

Proposed regulations for the Planning Area of the Highlands region where Frelinghuysen is entirely located are aimed at protecting sources of water supply and will likely emphasize much reduced land coverage, preservation of forested areas, limited disturbance of steep slopes and deep buffers to stream corridors and aquifer recharge areas. The Planning Board is concerned that a balance be found between preservation of water resources and the reasonable rights of property owners to use their land in a responsible manner.

It is the Planning Board's strong position that the low density rural land use policies in the Township's Master Plan and its implementing ordinances will effectively protect water resources in a manner consistent with established legal principles and case law.

The Frelinghuysen Township governing body authorized in 2005 the preparation of an updated nitrate dilution based carrying capacity assessment of Frelinghuysen Township by the Hydrogeologic Group of Maser Consulting. A target nitrate concentration of 2.0 mg/l was selected for use in the model based on the Township's desire to provide protection for both surface water and groundwater. Frelinghuysen Township is in close proximity to Category One, FWI surface waters or their head waters. A target nitrate concentration of .83 mg/l is proposed for use by the Highlands Regional Planning Council in its future regulations.

The results of the study indicate that the carrying capacities of the Township should range from a low of 5.0 acres per septic system to a high of 6.2 acres per septic system, with an area weighted average carrying capacity of 5.8 acres per septic system for the entire Township.

Besides establishing a defensible carrying capacity for septic density Frelinghuysen Township as determined that wetlands, water bodies, steep slopes, and areas of significantly high water table (defined as seasonal high water table less than one foot from the surface) are physical features which demand protection, care and consideration in determining appropriate zoning densities. The Board determines that these should be considered in determining the acceptable level of development in the municipality. The Master Plan update considered each of the following environmental features in making amendments to the township land use regulations.

Surface Water Bodies

Surface water bodies are the most vulnerable environmental elements to pollution. They are exposed at the surface, they support a unique life community, they are easily degraded, and they are often unprotected by other state and federal rules and to the extent that these rules exist could be in the opinion of the Township, better protected. Currently surface water bodies are protected by stream encroachment regulations and the Fresh Water Wetlands Act protections and the designation by the NJDEP of certain streams with Category I streams. These regulatory mechanisms work to avoid decreasing flood storage. They avoid, to varying extents, development to close proximity to streams and lakes. In the case of the Fresh Water Wetlands Act, in where a stream system bounded by wetlands has been designated as being of exceptional concern they are the subject of regulation unprecedented in the United States. The Township's objective is to provide reasonable assurance that all surface water quality be protected and as required, enhanced.

The Board feels that to require appropriate buffers along the boundaries of such water bodies will maintain stream quality and lake quality. Despite having one of the first ordinances to protect freshwater wetlands, the Township is currently prohibited from regulating wetlands as the state has completely preempted the field. The Board finds that the NJDEP Stream Encroachment Regulations are sufficient in regulating the potential impact of land development adjacent to flood plains.

The science of stream quality has been thoroughly explored. Data provided by the United States Natural Resources Conservation Service and the North Jersey Resource Conservation and Development Commission indicate that streamside protection is best accomplished through a streamside buffer which extends 150 feet from the top of bank from the surface water body. This is the rationale behind the 150 foot buffer for wetlands of exceptional resource value and behind the 150 foot buffer for streams within

watersheds of exceptional value. The additional 150 buffer promulgated by the NJDEP relates to wildlife corridors and is not an issue, in the opinion of the Township Planning Board.

Wetlands

Wetlands are currently regulated by the NJDEP under the Fresh Water Wetlands Act acting under the authority granted by the United States Army Corp of Engineers. The state has assumed primacy of Federal regulations in this matter. As such, additional buffering is not an option to the Township.

Steep Slopes

Steep slopes are currently regulated in Frelinghuysen Township, development being prohibited on slopes in excess of 25%. Lots created in Frelinghuysen should be such as to limit the impact of steep slope development in general. Steep slopes, however, are not considered to be as vulnerable to disturbance and the effects of development as surface water bodies and wetlands. There is an element of the arbitrary in this scheme. However, that is a characteristic of all zoning and it is not unreasonable to accord these areas substantial protection as disturbance of steep slopes leads to increased stormwater runoff, decreased recharge, decreased ability to sustain vegetative growth, increase erosion and sediment deposition in streams and on adjacent properties.

Agricultural Soils

In 1999, voters in Frelinghuysen supported the establishment of a Farmland Preservation Trust Fund with 230 (66%) votes in favor and 119 (34%) opposed. This fund created a tax that collected one cent (\$.01) per one hundred dollars (\$100) of assessed property value. In January, 2003, the Township increased the farmland preservation tax to two cents (\$.02), indicating the community's continuing strong interest in seeing its farmland preserved. This fund is used exclusively for the acquisition, development, maintenance and preservation of lands for the purpose of protection and/or maintaining farmland. The fund currently generates between \$30,000.00 to \$40,000.00 per year and had a balance as of June 2007 of approximately \$180,000.00. The name of this fund was amended in 2007 to Open Space and Farmland Preservation Trust Fund indicating the wider range of open space acquisition goals desired by the municipality.

Based upon an interpretation of the existing soils as identified in the *Soil Survey of Warren County*, the percentage of soil types in Frelinghuysen Township are as follows:

Prime Farmland Soils	20%
Soils of Statewide Importance	12%
Unique Soils	3%
Prime Farmland Soils if Drained	6%

Currently, over 10,150 acres in 387 parcels are under farmland assessment comprising 65 percent of the Township's land area. There are currently 13 preserved farms in Frelinghuysen totaling 1,163 acres or 12% of the total farmland assessed property in the Township.

The Farmland Preservation Commission has prepared a Farmland Preservation Plan with the Morris Land Conservancy which is part of this Master Plan. Five distinct farming areas with the highest choice for preservation and sustaining agriculture have been identified by the Farmland Preservation Commission and the Ridge and Valley Conservancy as priorities for preservation in the Township. These are:

- The Allamuchy Farmland Belt: Neighboring Allamuchy Township has 1,939 acres of preserved farmland on 28 properties within the Pequest River Valley. Extending northward into Frelinghuysen Township there is a belt of prime farmland soils and soils of statewide importance that provide a natural continuation of this preservation effort.
- Limestone Valley: Characteristic of the Ridge and Valley province is the limestone valley running through the Township surrounding Bear Creek and Trout Brook. The Nature Conservancy and the Ridge and Valley Conservancy have preserved several large properties within this project area. This is an opportunity to expand existing preserved lands targeting those properties with soils of agricultural significance.
- Martinsburg Ridge: Located along the watershed divide for the Paulins Kill and Pequest River, this project area will continue the preservation efforts of Genesis Farms, and the Bennett, Moore, and Young families. Continuity of farmland corridors will protect the existing infrastructure and land use for farm operations.
- Paulins Kill Valley: Farms located along the Paulins Kill are a mixture of woodlands and tillable soils. Many of the properties along the Paulins Kill have prime farmland soils and viable agricultural operations. Working with NJ Green Acres and the state farmland preservation program may maximize funding sources and preservation opportunities.

- Johnsonburg: Unique to Frelinghuysen is the quaint and historic village of Johnsonburg. Several small farming operations are centered around this community center and may not qualify for the traditional county or state farmland programs, but benefit greatly from a local farmland program focus. Small, local farming operations establish the character, charm and integrity of the overall farming community and are an opportunity to engage smaller, hard-working farms into the program.

Frelinghuysen Township's goals of environmental, farmland and historic preservation and low density are consistent with the State Development and Redevelopment Plan view of Frelinghuysen Township as a rural area. The goals of the State Plan for these areas support the preservation of the land and maintaining and improving the viability of the agricultural industry.

Recommended Land Use Policies

The Land Use Plan Element and the respective zoning regulations are revised to indicate the amendments of the entire AR-4 zone district as an AR-6 zone district requiring a minimum gross density of one (1) dwelling unit per six (6) acres. These Land Use Plan Element and zoning ordinance changes are being made to be consistent with the following planning studies and policy objectives:

- a. To implement the recommended average carrying capacity of 5.8 acres per septic system based on the findings of the Nitrate-Dilution Based Carrying Capacity Assessment for Frelinghuysen Township (2005).
- b. To implement a reduced residential density more consistent with the policy objectives of farmland preservation, environmental protection and rural heritage conservation of Frelinghuysen Township, water resource protection and the State Development and Redevelopment Plan.
- c. No zoning changes are recommended for VN-1, VN-2, NC, PO, ROM zone districts because these zoning districts comprise a small percentage of the Township's total land area and are substantially built-out.

A conservation design approach to new development is recommended in order to achieve the community's environmental, agricultural preservation and rural design objectives. Conservation designed development offers a different approach than conventional zoning and subdivision regulation. Conventional land use controls produce a predictable and often times "cookie cutter" appearance. While a formulaic approach is easy to administer, it does not always achieve a development design which capitalizes on a site's physical features or produce a rural appearance. Conservation design involves the subdivision applicant and the Planning Board in a four step process to identify the most significant natural and cultural resources on a given tract of land and thereby determine the most suitable "building envelopes" from a preservation viewpoint.

Step One: Identify All Potential Conservation Areas

This step identifies which areas of the tract are appropriate for development. First, “primary conservation areas”, which include wetlands, flood prone areas, soils inappropriate for septic systems, and steep slopes should be mapped as areas where development is not permitted. Second, “secondary conservation areas”, which include significant wildlife habitats, woodlands, prime farmlands, farmland of statewide importance, historic, archaeological and cultural sites, views into and out of the site (viewsheds), and aquifers and their recharge areas, should be mapped. Based on their importance to the Township, the secondary conservation areas should be considered for preservation.

Permitted density can be determined by a concept plan that would show that a residence can be built on all the proposed lots without a variance or total disturbance of any of the primary conservation areas for the placement of a residential structure and a suitable septic field and well location.

Step Two: Locate the House Sites

Locating the house sites prior to locating the lot lines and roads provides absolute flexibility in clustering homes where most appropriate, providing each house a view of the open space and avoiding development of the secondary conservation areas to the extent possible.

Step Three: Design Street Alignments and Trails

Streets and trails should be designed to conserve secondary conservation areas, such as mature woodlands, farmland and viewsheds, to the extent possible. Furthermore, streets and trails should be designed to connect with others on and off the site in an effort to avoid dead-ends.

Step Four: Draw in the Lot Lines

This final step is easiest. Lot lines should be drawn to provide each residence a shared boundary with common open space or a large lot area with deed-restricted open space, to the extent practical, and with the intent to provide each residence with the maximum amount of useable yard area. Conservation design can result in subdivision arrangements minimizing disturbance or clearance of wooded lots and encouraging an increase in forested area, retention of scenic road appearance and preservation of greenways or the creation of a potential trail system through easements or public ownership.

The Land Use Plan recommends Frelinghuysen Township adopt regulations which foster a rural appearance by: (1) preserving or enhancing the rural character of a development site, especially as it is viewed from the public road; (2) set back new development behind hills or retaining existing vegetation and adding landscaping if needed, to screen or soften the public view of new development; (3) arranging development to preserve significant scenic vistas, especially views of water or the edges of differing landscapes, and (4) discouraging the view of front-loaded two and three car garages through the use of garages served by rear access or side entry. (5) New homes or roads within 1000 feet of the Village of Johnsonburg and Marksboro should be required to be designed in a manner compatible with the historic architectural character found in those villages.

Revised Residential Zoning Options

1. Conventional Subdivision in the AR-6 Zone District

- a. One dwelling unit per six (6) acres, gross density and minimum lot size.
- b. All lots in a conventional subdivision shall be sufficient in area and its dimensions to accommodate a minimum lot circle with a diameter of 350 feet.
- c. Minimum frontage on a public street – 40 feet.
- d. Minimum building setback of 80 feet from the front lot line, 75 feet from rear lot line and 40 feet from side lot line.
- e. A conventional subdivision can employ a lotting arrangement using both flag lots and regularly shaped lots.

2. Hamlet Conservation Subdivision

A Hamlet Conservation Subdivision is an open space subdivision option permitted in all residential zone districts using the conservation design approach for the siting of residential units and the preservation of primary and secondary conservation features found on a property. The following minimum standards are recommended for a Hamlet Conservation Subdivision:

- a. A permitted gross density of one (1) dwelling unit per six (6) acres.
- b. Lot averaging or lot clustering would permit a minimum lot area of 1.25 to 2 acres not exceeding a gross density of .166 dwelling units per acre for the entire tract.
- c. Minimum of sixty-percent (60%) of the tract must be deed-restricted for open space, whether part of a deed-restricted lot of as common or public open space.
- d. A minimum of two and one-half (2 ½) acres should be preserved in a hamlet commons, with the remainder as natural open space or residential area.
- e. Storm water management may be located in open space areas, if designed and landscaped such that it has a natural or an aesthetically appealing appearance.
- f. Lot yield for a Hamlet Conservation development would be determined by preparing a concept plan based on the ordinance requirements for a conventional subdivision. Primary and secondary conservation areas must be mapped and the four part conservation design approach described above shall be used to prepare the Hamlet Conservation subdivision.

3. Farm Preserve Subdivision

For properties proposed for protection in the Farmland Preservation Plan, it is recommended that special land use controls be adopted as an overlay district in the AR-6 zone with the goal of maximizing the amount of farmland permanently set aside for preservation. The use of transfer of development should be considered along with the purchase of development rights as a technique to eliminate or reduce the number of residential units in a farm preserve area. The minimum requirements for a farm preserve subdivision would be:

- a. Farm preserve districts should correspond to the priority areas identified in the Farmland Preservation Plan prepared by the Morris Land Conservancy.
- b. Gross density of one dwelling unit per six (6) acres with mandatory clustering to 1.25 to 2 acres minimum lot area.
- c. Required seventy-five (75) percent open space preservation and block planning to encourage the arrangement of contiguous farm parcels.

- d. Transfer of development credit could be computed at a gross density of one dwelling unit per four (4) acres for farm preserve district properties as an incentive to use this technique. It is suggested that a receiving area site for the transfer of development credit be in the same watershed or within a quarter-mile of the preserved farm.
- e. Farm preserve tracts should also be permitted an additional accessory residence on a tract of thirty (30) acres or more.

4. Office/Farm Preserve

- a) The zoning ordinance should permit, as a conditional use, a development option in the AR-6 zone district, one (1) office building along with one residential unit to be located on a farm having a minimum tract area of twenty (20) acres, provided the remainder of the farm is deed restricted for agriculture or open space purposes.
- b) The size of an office building should be limited to no larger than 10,000 square feet.
- c) The office building should have a rural residential architectural style; it is preferable that farm structures be converted to an office use so that their residential and local architecture character may be preserved.

5. Country Estate Residence

The Country Estate Residence is a zoning option permitted in all residential zone districts intended to simplify and reduce the cost to process a subdivision application and reduce the improvement costs associated with subdivision development in exchange for choosing a lower residential density. The minimum standards for a Country Estate residential subdivision would be:

- a. A minimum gross density of ten (10) acres shall be required. Lot averaging can be used permitting a minimum lot area of four (4) acres as long as a gross density of one (1) unit per ten (10) acres is maintained in the overall subdivision.
- b. No natural resource mapping or site capacity calculations shall be required.
- c. The rural estate residence can have frontage on a private road, provided that the road meets the ordinance standards for private roads. The private road shall be in an easement which shall not be deducted from the minimum lot area or the required minimum gross density.

COMPARISON TO OTHER PLANS

COMPARISON OF MUNICIPAL ZONING

Development activities undertaken by one municipality has an impact on neighboring municipalities. Therefore, the Municipal Land Use Law requires that every Master Plan consider the impact of proposed land uses on existing and proposed land uses in adjacent municipalities. Frelinghuysen Township has common boundaries with Stillwater, Fredon and Green Townships in Sussex County; and Hardwick, Blairstown, Hope, Liberty, Independence, and Allamuchy Townships in Warren County. The entire boundary of Frelinghuysen Township is zoned AR-6. Therefore, the impact of the Land Use Plan of Frelinghuysen Township on adjacent municipalities is wholly consistent with existing zoning in all neighboring municipalities. (See Exhibit 18, Surrounding Zoning) Zoning in adjacent municipalities is as follows:

Hope Township, Warren County

Hope Township lies at the southern portion of the Township's western boundary. Zoning along this boundary is LDAR, Low Density Agricultural. This is a residential/agricultural district which has a five-acre minimum lot size.

Fredon Township, Sussex County

Fredon lies to the northeast in Sussex County. The zoning in Fredon along the entire boundary with Frelinghuysen is zoned AR-6, Agriculture/Residential. There is a six acre lot size minimum.

Green Township, Sussex County

Green Township lies along the northeast boundary with Frelinghuysen in Sussex County. The zoning in this area is AR-5/2, Agricultural/Residential. This zone has a maximum density of one unit per five acres.

Allamuchy Township, Warren County

Allamuchy abuts Frelinghuysen at the southeast boundary. Zoning at this location is RR, Residential. There is a four acre maximum density allowed in this zone.

Liberty Township, Warren County

Liberty just touches Frelinghuysen at its southern most point. Liberty zoning in this area is R-3, Residential. The zone allows for three acre density.

Blairstown Township, Warren County

Blairstown lies in the center of Frelinghuysen's western border. This area in Blairstown is Zoned R-5. Residential.

Hardwick Township, Warren County

Hardwick lies at the northern most portion of Frelinghuysen's western boundary. Zoning in this area of Hardwick is the LD Zone, low density zone.

Stillwater Township, Sussex County

Stillwater Township lies on the north east portion of the township's boundary. Zoning in this area is R-5, five acre residential. This zone allows for residential development at a density of one unit for every five acres.

Independence Township, Warren County

Independence Township lies at the southern most portion of the township's southeast boundary. Zoning in this area is R-2, Residential.

Zoning in all the towns which borders Frelinghuysen Township is residential. This is compatible with Frelinghuysen's zoning scheme as the entire boundary is zoned AR-6, Agricultural/Residential. This zone allows for residential development with a six acres minimum lot size.

Warren County

As part of Warren County, Frelinghuysen Township has the obligation to consider regional plans. Warren County is currently in the process of preparing a Countywide Strategic Plan. Current efforts include land use and zoning analysis and tentative build out calculations. The development scheme and approach proposed in Frelinghuysen is generally consistent with planning documents issued previously by Warren County. In the event the Countywide Plan raises issues which have not been considered or which suggests conflicts in development objectives and philosophy, Frelinghuysen Township will review these matters with the County and reconcile any which remain at issue.

New Jersey Development and Redevelopment Plan

This section considers planning efforts as outlined in the New Jersey Development and Redevelopment Plan. The Frelinghuysen Township Master Plan effort is generally consistent with the State Development and Redevelopment Plan (SDRP). The Township lies in planning areas PA-4, PA-4B, and PA-5 and their planning efforts are consistent with the State Plan. These planning areas are the rural planning area, environmentally sensitive rural planning area, and the environmentally sensitive planning area respectively.

Highlands Regional Planning Council draft Master Plan

The Highlands Regional Planning Council has released a draft regional Master Plan which is under study as of March 2007. Although Frelinghuysen Township was placed by law in the Planning Area section of the Highlands Region, the draft plan has proposed Frelinghuysen Township to be located in both the Protection Zone and the Conservation Zone. The effect of these new designations is unknown at the present time since basic information such as allowable septic density has not been determined for these new zones.

Frelinghuysen Township has made water conservation and water quality a major focus of its planning and land use control efforts. The Planning Board is concerned that excessive regulation by this new regional body may unnecessarily constrain the legitimate development rights of local property owners.

EXHIBIT 18

SURROUNDING ZONING