

Town of Pelham, NH



Master Plan 2002



**Approved by the
Pelham Planning Board
August 5, 2002**

Prepared by the



Nashua Regional Planning Commission

Town of Pelham, NH

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Prepared by the



Nashua Regional Planning Commission

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CHAPTER I INTRODUCTION, GOALS AND OBJECTIVES

A. INTRODUCTION

The 2002 Master Plan update is the product of sixteen months of data collection, analysis, public input and review. This chapter provides an overview of the plan and the various methods of public involvement, and a series of goals and objectives for each plan topic. The goals and objectives were developed from the perceptions and concerns of the Master Plan Committee and the Planning Board, and the results of the 2001 Community Opinion Survey and the 2002 "Community Profile" event. The Master Plan is designed to guide growth and development in Pelham over an eighteen year period. However, changing conditions will require an update of the Plan's basic components at five year intervals.

I. Purpose



Prepared in accordance with New Hampshire RSA 674:1 through 674:4, the 2002 Pelham Master Plan is a policy statement for guiding local land use regulation, transportation improvements, environmental protection and capital improvements for the 2002 to 2020 period. The Plan is also a resource for Pelham citizens, private business and for state and regional officials. The chapter topics include: 1) Population and Housing; 2) Existing Land Use; 3) Natural Resources; 4) Transportation; 5) Community Facilities; 6) Historic Resources; and 7) Future Land Use and Recommendations. Each chapter contains data and analysis, information from a variety of sources presented in tables, illustrations or maps, and specific policy recommendations.

As a political entity, the Town of Pelham does not exist in isolation, and must therefore consider the external forces which influence the community. Wherever possible, the information presented for Pelham in the document is done so within the context of the Nashua Regional Planning Commission region, Hillsborough County, the State of New Hampshire and other areas or regions as appropriate. The Master Plan represents a consensus of the community for addressing the issues and concerns which confront Pelham today and are anticipated to do so in the future. The document represents the final result of the

Town's long-term planning efforts for the 2002 to 2020 period.

2. Community Opinion Survey

For a Master Plan to be effective, it is essential to provide for the participation of Town residents in its development. To ensure public participation, a community opinion survey was conducted in 2001. The results of the community opinion survey were utilized throughout the planning process. The Town mailed out 4,494 surveys, or one for each US Postal Service address in Pelham, in September 2001. In addition, an opportunity was afforded to pick up questionnaire forms for those residents who did not receive one through the mail or when more than one adult per mailing address wished to complete a survey. The survey was also posted on the web site at www.pelham-nh.com. Of the 4,494 surveys sent out, 950 were returned. This is a 21% return and is accepted as a statistically valid response to the survey. The results of the 2001 community survey, as they apply to various chapters of this master plan, can generally be summarized as follows:

a. Population and Housing

When asked “*which statement best characterizes Pelham’s rate of residential growth,*” an overwhelming majority responded “*Pelham is growing too quickly.*” Similarly, an overwhelming majority responded that they “*very much dislike*” the rate of residential growth.

When asked their opinion about which types of housing they wished to see in Pelham, a majority responded that they did not want any more 3 & 4 bedroom apartments or mobile homes. A majority responded that there was not enough elderly housing (age 62 or higher).

b. Natural Resources

When asked about the importance of preserving natural resources, the highest response for the protection of each of: agriculture; groundwater; wetlands; wildlife; forests; open fields; historic buildings; conservation lands; scenic vistas; and trail systems was “*extremely important.*” A majority responded that they would support zoning restrictions to protect all of these resources. A majority responded that taxes should be used to protect conservation lands, forests, groundwater, wetlands and wildlife, but did not support using taxes to protect the remaining listed natural resources.

When asked about various aspects of Pelham, a majority responded that “*Pelham’s rural lifestyle*” very much appeals to them.

When asked about land protection, a majority responded that they would support a land conservation fund if the tax impact were found to be modest.

c. Transportation

When asked about Route 38, Mammoth Road and Windham Road, a majority responded that bike lanes should be added and rural character should be preserved.

When asked about secondary roads, a majority responded that a pedestrian trail system should be created, non-resident traffic and speeds should be reduced and rural character should be preserved. A majority did not support adding sidewalks or an ATV trail system to the local road system.

d. Community Facilities

When asked about additional services, support was given for an outdoor public ice skating rink and a youth recreational facility if the tax impact were found to be minimal. Support was not indicated for an outdoor public swimming pool.

e. Historic Resources

When asked about protecting historic resources in the Town Center, an overwhelming majority responded that they would “*support a program to preserve its historic significance*” and “*support a program to increase the ‘common’ green area and work to beautify and preserve the center’s public space.*”

f. Future Land Use

When asked about what types of commercial activities should be encouraged, a majority responded that the Town should discourage auto repair, gas stations, hotel/motels, junk yards and tattoo parlors. In general, support was given for antique shops, banks, bed and breakfasts, childcare facilities, elder care, garden shops, medical offices and restaurants.

When asked about zoning restrictions, an overwhelming majority supported further restrictions on residential growth and commercial signs. A majority also supported further restrictions on commercial and industrial growth and lighting in the residential district. A majority supported encouraging home businesses within the home but not within accessory buildings.

When asked about rates of industrial and commercial growth, a majority responded that Pelham should “*encourage more light industry.*” An equal number responded that Pelham should “*encourage more commercial*” and “*be cautious about encouraging more commercial.*”

A copy of the actual survey and the raw results are provided in Appendix A. The surveys themselves are stored at the Town of Pelham Planning and Building Department for individuals wishing to review the returns. Many of the goals and objectives of the Master Plan update reflect the results of the community survey.

3. Pelham Community Profile

The Pelham “Community Profile” was held on January 25 and 26, 2002. It was facilitated by the University of New Hampshire (UNH) Cooperative Extension and was organized by a committee of Town residents in cooperation with UNH. The community profile is a process by which communities take stock of where they are today and develop an action plan for how they want to operate in the future. Over 300 Town residents participated in the two-day event. The community profile event begins with the identification of what residents like and dislike about their community, and a series of priorities are identified. These priorities are then brainstormed in break-out groups and solutions to the issues are developed and ranked in order of importance. The results of the 2002 Community Profile indicates that Town’s highest priorities are to:

1. Develop a community cultural/recreation center in the Town Center.
2. Improve, expand and increase the use of recreation facilities.
3. Hire a Community Information Coordinator to oversee all community events.
4. Manage growth and development by re-visiting and enforcing zoning and limit growth while respecting private property rights.
5. Establish public kindergarten.

A copy of the results of the community profile is available from UNH or their web site at: <http://www.pelhamweb.com/envisionpelham/>. Many of the goals and objectives of the Master Plan update reflect the results of the community profile.

B. GOALS AND OBJECTIVES

I. Overall Goals

1. Identify, protect and enhance the principal natural and man-made features of the Town, which, collectively, define the character of Pelham.
2. Direct change and promote development consistent with the goals of the community within the constraints of Pelham’s natural and man-made characteristics.
3. Foster and enhance a sense of community spirit within the Town.

2. Population and Housing

1. Provide for a moderate rate of growth, in keeping with the Town's capacity to provide for community facilities.
2. Accommodate the changing needs of Pelham's population due to changes in demographics (i.e. school age children, elderly, people with disabilities, etc.).

3. Accommodate the Town's fair share of the region's population growth.
4. Encourage high quality residential developments which maintain and enhance the natural character of the land and promote the health, safety and welfare of their residents.
5. Provide realistic housing opportunities for families of all income levels and household types (elderly, families without children, people with disabilities, etc.), where possible, within the natural and public facility constraints of the Town.
6. Maintain Pelham as a town of predominantly single-family housing units, while accommodating a fair share of the region's need for elderly and affordable housing.

3. Natural Resources

1. Preserve and protect the natural resources of the Town of Pelham in order to provide a safe and attractive community for current and future residents and to protect such resources from the adverse impacts of development. These natural resources include wetlands, floodplains, air, forest, soils, agricultural lands, wildlife habitats, open space, scenic vistas, ground and surface water and other sensitive resources.
2. Maintain and create a clean, unpolluted environment free of land, air, water, visual and noise pollution.
3. Preserve and enhance the Town's prominent natural features.
4. Protect the quantity and quality of the Town's water resources.

4. Transportation

1. Work with the State to maintain and improve the State highway network as it affects Pelham.
2. Encourage development that promotes both safety and the effective flow of traffic.
3. Encourage the development of a hierarchy of streets and roads to service local residential and non-residential development as well as through traffic.
4. Promote the high quality and safety of new roads and maintain and improve existing Town roads.
5. Provide safe facilities for alternative forms of transportation such as walking and bicycling.

5. Community Facilities

1. Provide cost effective, centrally located community facilities and services (including schools, recreation, fire, police, library and solid waste disposal) for Town residents consistent with both demand and the Town's ability to pay.
2. Encourage developers to pay their proportional share of public facility and road improvements made necessary by their developments.
3. Expand the Town's parks and recreational facilities to meet or exceed accepted minimum standards.
4. Consider in all planning actions, the property tax ramifications to the residents of the Town, keeping in mind that high property taxes result in less economic diversity and a

disproportional burden on the Town's lower income and elderly residents, and negate many of the goals contained in this plan.

5. Provide for public access, use, and enjoyment of the Town's great ponds and streams and other natural resources.

2. Historic Resources

1. Preserve, protect and enhance historic buildings, structures, sites and areas.
2. Preserve and enhance the open, rural character of the land as well as its natural, historic and scenic resources.
3. Protect archaeological sites.

3. Future Land Use

1. Promote the preservation, protection and enhancement of well-balanced land use patterns capable of meeting present and future community needs in an efficient, environmentally sound, economical, equitable and aesthetically pleasing manner.
2. Promote land use patterns based on the developmental limitations imposed by prominent natural and man-made facilities of the community whenever possible.
3. Provide for a diversity of zoning districts to meet the community's need to broaden the tax base while retaining the rural/residential character of Pelham.
4. Provide for a transition or buffer between incompatible land uses.
5. Encourage the preservation of active agricultural lands.
6. Discourage "strip development" and encourage non-residential design to be in keeping with Pelham's historic community character.
7. Discourage scattered or premature development.

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CHAPTER II POPULATION AND HOUSING

A. INTRODUCTION

To plan effectively for a community, an understanding of the size, composition and distribution of the existing population is essential. An effective master plan must also include an analysis of potential changes in future population size, composition and distribution as well as a description of past trends. In some cases, the factors that influence population change are beyond the control of the community. In other cases, the Town can influence or manage future demographic changes through the adoption of policies based on community goals.

A description and analysis of existing demographic data as provided by the US Bureau of Census, the NH Office of State Planning (OSP), and the Nashua Regional Planning Commission (NRPC) as well as background historical information from a variety of sources, is provided. While it is essential to review relevant demographic information and to include it in the Master Plan, it should be emphasized that all such information should not be taken at face value. This is particularly true for population projections. This chapter provides: 1) population trends, projections, density and composition; 2) housing units, types, affordability and sales; and 3) recommendations.

B. POPULATION

I. Historic Population Trends

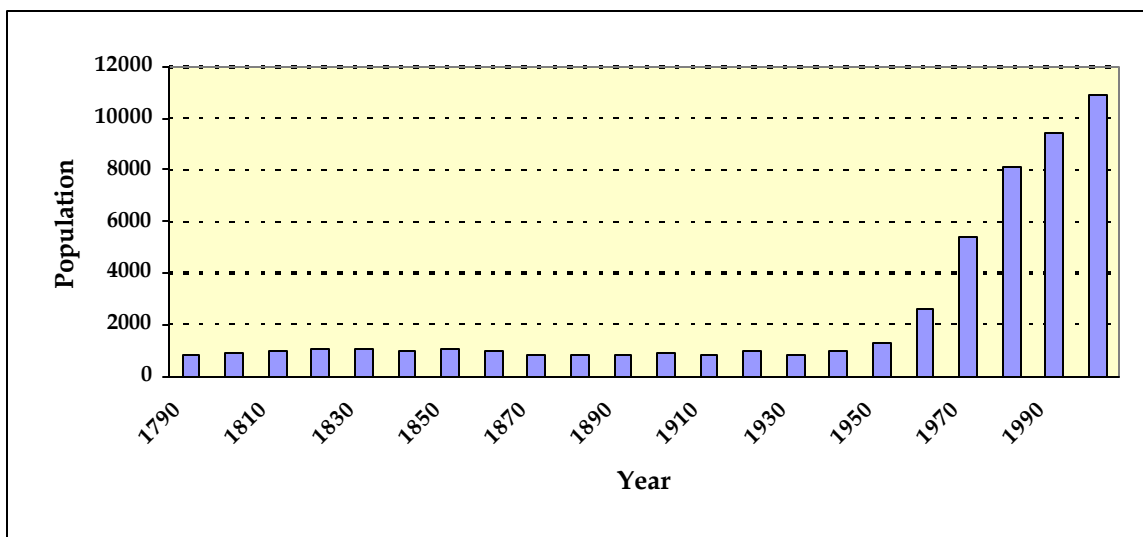
During the mid-19th Century, Pelham, like most rural New Hampshire towns, experienced the beginning of a long, slow period of population decline as populations migrated either west or to newly emerging industrial centers. This trend continued into the 20th Century. By 1890, Pelham's population had returned to its 1790 population level of 791 people. The Town did not surpass its 1859 peak population level of 1,071 people until 1950. Between the 1930's and 1960's, the population grew steadily and moderately. The 1960's, however, saw the beginning of a two-decade long period of rapid population growth spurred on by the growth of high-technology industries in the Nashua area and by ex-urban expansions of the Boston metropolitan area made possible by major improvements to the state and federal highway system. Between 1960 and 1970, Pelham grew by 108%, the fastest period of growth in the Town's history. From 1970 to 1980, the Town grew more moderately from a population of 5,408 to 8,090, an increase of approximately 50%. Since 1980, growth has occurred at a somewhat more moderate rate of 16% per decade. The Town's population was 9,408 in 1990 and 10,914 in 2000. Historical growth trends are depicted in Table II-1 and Figure II-1.

Table II-1: Comparative Population Growth, 1790-1990

Year	Pelham	% Change	NRPC Region	% Change	State of NH	% Change
1790	791	-	10,196	-	141,885	-
1800	918	16%	11,431	12%	183,858	30%
1810	998	9%	12,444	9%	214,460	17%
1820	1,040	4%	13,003	4%	244,161	14%
1830	1,070	3%	14,461	11%	269,328	10%
1840	1,003	-6%	17,589	22%	284,574	6%
1850	1,071	7%	21,656	23%	317,976	12%
1860	944	-12%	22,423	4%	326,073	3%
1870	861	-9%	23,055	3%	318,300	-2%
1880	848	-2%	25,103	9%	347,000	9%
1890	791	-7%	30,998	23%	376,500	9%
1900	875	10%	36,731	18%	411,600	9%
1910	826	-6%	38,467	5%	430,600	5%
1920	974	18%	40,796	6%	443,100	3%
1930	814	-16%	45,347	11%	465,300	5%
1940	979	20%	48,214	6%	491,500	6%
1950	1,317	35%	52,010	8%	533,200	9%
1960	2,605	98%	63,216	22%	606,900	14%
1970	5,408	108%	100,862	60%	737,579	22%
1980	8,090	50%	138,089	37%	920,475	25%
1990	9,408	16%	171,478	24%	1,109,252	21%
2000	10,914	16%	195,788	14%	1,235,786	11%

Source: US Census; compiled by NRPC.

Figure II-1: Population by Decade, Pelham 1790 - 2000



From 1950 to 1980, Pelham was growing at a significantly higher rate than that of the region or state. Since 1980, however, population growth has slowed to a rate similar to that of the region and state.

Indeed, during the decade 1980-1990, Pelham's population growth rate was the second lowest in the region, at 16%. Table II-2 and Figure II-2 compares the growth rates by decade for the Town, region and state. Table II-3 shows the actual population by decade since 1960 for the Town, region and state. Despite recent growth rate decline, the tremendous increases in population in the past five decades have had an obvious impact on the land and people of Pelham.

Table II-2: Proportionate Growth by Decade, 1950-2000

	1950-1960	1960-1970	1970-1980	1980-1990	1990-2000
Pelham	98%	108%	50%	16%	16%
Amherst	40%	125%	79%	10%	19%
Brookline	18%	47%	51%	36%	74%
Hollis	44%	52%	79%	22%	23%
Hudson	40%	81%	32%	39%	17%
Litchfield	69%	97%	192%	33%	33%
Lyndeborough	8%	33%	36%	21%	22%
Merrimack	57%	188%	79%	44%	13%
Milford	27%	59%	31%	36%	15%
Mont Vernon	44%	55%	59%	25%	12%
Nashua	13%	43%	22%	17%	9%
Wilton	4%	12%	17%	17%	20%
Region	22%	60%	37%	24%	14%
State	14%	22%	25%	20%	11%

Source: US Census, derived by NRPC.

Figure II-2: Comparative Population Growth by Decade; Pelham, Region and State

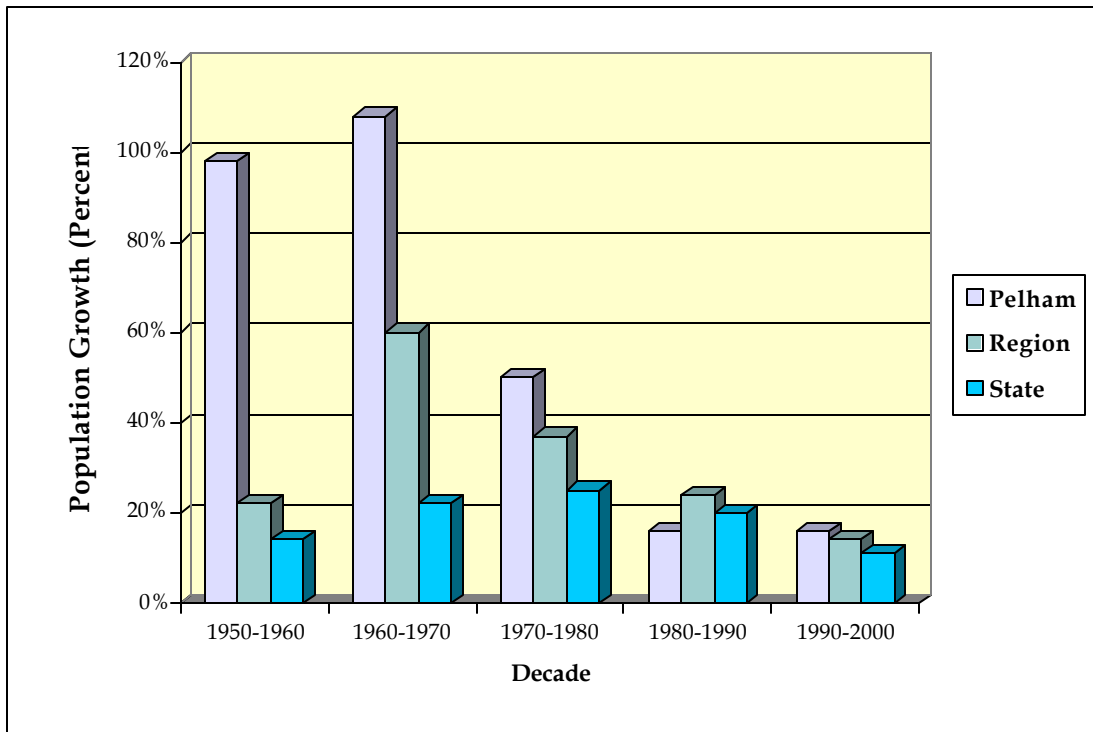


Table II-3: Population Growth, Pelham and NRPC Region, 1960-2020

Community	1960	1970	1980	1990	2000	2010* Projected	2020* Projected
Pelham	2,605	5,408	8,090	9,408	10,914	14,118	17,285
Amherst	2,051	4,605	8,243	9,068	10,769	12,113	14,686
Brookline	795	1,167	1,766	2,410	4,181	5,953	8,279
Hollis	1,720	2,616	4,679	5,705	7,015	9,299	11,940
Hudson	5,876	10,638	14,022	19,530	22,928	26,267	31,656
Litchfield	721	1,420	4,150	5,516	7,360	9,674	11,785
Lyndeborough	594	789	1,070	1,294	1,585	1,920	2,427
Merrimack	2,989	8,595	15,406	22,156	25,119	28,126	32,886
Milford	4,159	6,622	8,685	11,795	13,535	15,106	17,006
Mont Vernon	585	906	1,444	1,812	2,034	2,448	2,978
Nashua	39,096	55,820	67,865	79,662	86,605	87,997	91,145
Wilton	2,025	2,276	2,669	3,122	3,743	3,889	4,363
NRPC Region	63,216	100,862	138,089	171,478	195,788	216,910	246,436
State of NH	606,921	737,681	920,610	1,109,117	1,235,786	1,358,750	1,527,873

Source: US Censuses, 1960 – 2000 and NH Office of State Planning, 1999.

2. Population Projections

The New Hampshire Office of State Planning's (OSP) population projections for the Town, region and state are presented in Table II-4. OSP's forecasting methodology is based on a community's historical share of its respective county's growth, and assumes that a community's share of growth, according to changes in the 1970 through 2000 population, will remain about the same into the future. Pelham's population is projected to continue to increase by 2.3% per year over the next twenty years. If these projections hold true, then an additional 6,371 persons will be added to Pelham's population by 2020. With an estimated population of 17,285 in 2020, Pelham would no longer be a rural community with suburban elements, but a suburban community with increasing urban elements such as increased commercial and industrial development or two-family housing.

Table II-4: Population Projections, 2020

Community	Projected Population 2020	Population 2000	Projected Net Increase 2000-2020	Projected Percentage Increase 2000-2020	Projected Annual Percentage Increase 2000-2020
Pelham	17,285	10,914	6,371	58%	2.3%
NRPC Region	246,436	194,788	51,648	27%	1.2%
State of NH	1,527,873	1,235,786	292,087	24%	1.2%

Source: US Census 2000 and NH Office of State Planning Projection, 1999.

The Town should consider conducting a Buildout Analysis using the Nashua Regional Planning Commission's parcel-based Geographic Information System. A Buildout Analysis considers the remaining undeveloped land in the Town and the constraints to development on that land, including

soils, slopes, ownership and the provisions of the Pelham zoning ordinance. The Buildout Analysis estimates the number of housing units that will result when the Town is fully developed by Traffic Analysis Zone and can aid in determining the type and quantity of public facilities needed in the future.

3. Population Density

Closely related to population growth is population density. Because towns vary in size, population levels alone do not provide sufficient indication of the extent to which the land in a community is developed. A comparison of the densities for the Town, NRPC region and the state is provided in Table II-5. This information, however, must be viewed cautiously. Certain communities, for example, may contain a relatively high overall density, but may still contain substantial rural or undeveloped areas. This is the case for communities such as Milford, which contains a high concentration of population within a relatively small portion of the Town.

Table II-5: Population Density 1990, 2000 and 2020

Community	Area (sq. mile)	Pop. 1990	Density /sq. mile 1990	Pop. 2000	Density /sq. mile 2000	Projected Pop. 2020*	Density /sq. mile 2020
Pelham	26.7	9,408	352	10,914	409	17,285	647
Amherst	34.5	9,068	263	10,769	312	14,686	426
Brookline	20.1	2,410	120	4,181	208	8,279	412
Hollis	32.6	5,709	175	7,015	215	11,940	366
Hudson	29.2	19,530	669	22,928	785	31,656	1,084
Litchfield	15.1	5,516	365	7,360	487	11,785	780
Lyndeborough	30.6	1,294	42	1,585	52	2,427	79
Merrimack	33.0	22,156	671	25,119	761	32,886	997
Milford	25.9	11,795	455	13,535	523	17,006	657
Mont Vernon	16.8	1,812	108	2,034	121	2,978	177
Nashua	30.6	79,662	2,603	86,605	2,830	91,145	2,979
Wilton	26.1	3,122	120	3,743	143	4,363	167
NRPC Region	321.2	171,478	534	195,788	610	246,436	767
State of NH	8,993.0	1,109,252	123	1,235,786	137	1,527,873	170

Source: US Censuses, 1990 – 2000 and *NH Office of State Planning, 1999; compiled by NRPC.

Table II-5 indicates that Pelham has an overall population density that is higher than six of the region's communities, but lower than the regional average. Development since the 1960's, however, has provided Pelham with a population density far higher than rural towns such as Lyndeborough, Mont Vernon, or Brookline. This indicates that Pelham has increasingly become a suburban community. Based on OSP population projections, Pelham's population density will increase substantially by the year 2020. Should such a scenario be fulfilled, Pelham would achieve densities exceeding that of current day Milford, and approaching that of current day Hudson and Merrimack. Such a rate of development would make the Pelham of twenty years hence a place somewhat more developed than the present day.

4. Population Composition

According to the US Census 2000, 96.4% of Pelham's population reported their race as white only, compared to 90.5% for the region. The vast majority of the region's racial diversity is located in the City of Nashua. Table II-6 compares the racial diversity of Pelham to the region and the state.

Table II-6: Population by Race, 2000

Community	White Only	Black or African-American Only	Asian Only	American Indian/Alaska Native Only	Other (Only One)	Two or More Races	Hispanic Origin	Percent Non-White
Pelham	10,624	48	114	24	27	77	105	3.6%
NRPC Region	183,081	2,428	4,592	461	2,956	2,212	6,618	9.5%
State of NH	1,186,851	9,035	15,931	2,964	7,420	13,214	20,489	5.5%

Source: US Census, 2000.

In terms of age, over 36% of Pelham's population were between 35 to 54 years of age in 2000, forming the Town's largest age group. Comprising 24% of the population, school age children (5 to 19 years of age) were the Town's second largest age group. Population by age is indicated in Table II-7.

Table II-7: Population by Age, 2000

Community	Under 5	5 to 19 (School Age)	20 to 34	35 to 54	55 to 64	65 and Over
Pelham	804	2,577	1,824	3,888	967	854
NRPC Region	13,510	44,227	36,516	66,563	16,836	18,136
State of NH	75,685	268,480	228,827	405,165	109,659	147,970

Source: US Census, 2000.

C. INCOME

Average household income in Pelham increased from \$50,817 to \$68,608, or 35 percent, from 1990 to 2000. This is a similar percentage increase to the State and slightly lower than the NRPC Region. The growth in income during the 1990's can be attributed to the growth in high wage, high technology jobs in the northeast United States. Pelham ranks sixth in average household income in the NRPC Region, being substantially higher than that of the City of Nashua and substantially lower than the Towns of Hollis and Amherst. Table II-8 shows the average household income for 1990 and 2000.

Table II-8: Average Household Income, 1990 and 2000

Community	1990	2000	Percent Change 1990 - 2000
Pelham	\$50,817	\$68,608	35%
Amherst	62,568	89,384	43%
Brookline	55,858	77,075	38%
Hollis	64,351	92,847	44%
Hudson	47,859	64,169	34%
Litchfield	49,946	73,302	47%
Lyndeborough	42,208	59,688	41%
Merrimack	52,798	68,817	30%
Milford	38,792	52,343	35%
Mont Vernon	49,650	71,250	44%
Nashua	40,505	51,969	28%
Wilton	36,098	54,276	50%
NRPC Region	49,288	68,644	39%
State of NH	36,329	49,467	36%

D. HOUSING

I. Housing Units



The most important unit of analysis for demonstrating the impact of growth is the housing unit because it represents the household for which most state and local services are oriented. Data on housing can be found in the NRPC Regional Housing Needs Assessment, updated every five years.¹ While the data directly correlates with the changes in population over time, household sizes have been decreasing significantly since the 1950s, due to the increase in single parent households and a reduction in the number of children per household. In 1960 the average household size in Pelham was 3.01 persons per household whereas in 2000 the average household size was 2.92 persons per household. The implication of a dwindling household size is that it requires a greater number of units to house the same population, with obvious impacts on the environment and housing costs per capita.

From 1960 to 2000, Pelham experienced a significant increase in the total number of housing units. As shown in Table II-9, Pelham's housing unit growth (432%) during this timeframe outpaced regional (354%) and state growth (244%).

¹ Nashua Regional Planning Commission, *Regional Housing Needs Assessment*, 1999.

Table II-9: Housing Unit Growth, 1960-2000

Community	1960	1970	1980	1990	2000	% Increase 1960 - 2000
Pelham	865	1,641	2,408	3,118	3,740	432%
NRPC Region	21,002	31,260	47,944	66,375	74,341	354%
State of NH	224,440	280,962	386,381	502,247	547,024	244%

Source: US Census, 1960 - 2000.

2. Housing Type

While the NRPC region's proportion of single family homes (61%) is identical to the state's, the Town of Pelham exhibits an extraordinarily high percentage of single family housing units (85%) with the majority of the remainder in multi-family units. There are few manufactured housing units in the Town. Housing stock by type is indicated in Table II-10.

Table II-10: Housing Stock by Type, 2000

Community	Single Family Units		Multi Family Units (2+) Units		Manufactured Housing Units		Total Housing Units
	#	%	#	%	#	%	
Pelham	3,339	85%	550	14%	34	1%	3,923
NRPC Region	45,680	61%	26,838	36%	2,655	3%	75,173
State of NH	343,630	61%	170,348	30%	47,689	8%	561,667

Source: Office of State Planning.

3. Affordable Housing

As the NRPC region has continued to grow, the availability of housing affordable to individuals of all income levels has one of the region's most critical issues. According to data from the National Low Income Housing Coalition (see Table II-11), the hourly wage needed to afford any type of rental housing in the Lowell PMSA (Primary Metropolitan Statistical Area, which includes Pelham) is approximately \$1.50/hr. greater than the state level. In addition, individuals earning minimum wage need to work far greater hours to afford rental housing in the Lowell PMSA as opposed to the state average.

Table II-11: Housing Wage and Work Hours at Minimum Wage Needed to Afford Fair Market Rent, Lowell PMSA and State, 2000

Location	Hourly Wage Needed to Afford Fair Market Rent (@ 40 hrs./wk.)			Work Hours/Week Necessary at Minimum Wage (\$5.15) to Afford Fair Market Rent		
	One Bedroom	Two Bedroom	Three Bedroom	One Bedroom	Two Bedroom	Three Bedroom
Lowell, MA-NH PMSA	\$12.67	\$15.31	\$19.17	84	102	128
New Hampshire	\$11.11	\$14.15	\$18.37	86	110	143

Source: National Low Income Housing Coalition, "Out of Reach," September 2000.

In addition to basic affordability issues, very little assisted housing is located in Pelham. The NH Housing Finance Authority (NHHFA) defines assisted housing as housing units that are “provided subsidies for the purpose of creating affordable units for low and very low income households.” In 2000, Pelham had a deficiency in the amount of assisted housing provided relative to the region and the state. As indicated in Table II-12, the regional and state averages for percentage of assisted housing units in 2000 were both 3.1%. Pelham, at 1.3%, fell below these averages.

Table II-12: Assisted Housing Units, 2000

Community	Elderly Assisted	Family Assisted	Other Assisted or Combined Types	Total Assisted	Percent Assisted Units	(Shortfall)/ Excess
Pelham	48	0	0	48	1.3%	(64)
NRPC Region	1,074	346	842	2,264	3.1%	-
State of NH	8,485	3,514	4,868	16,877	3.1%	-

Source: NH Housing Finance Authority, Directory of Assisted Housing, 2000;
Other or Combined includes group homes, mentally handicapped, physically handicapped,
and developments containing both elderly and family housing.

However, 64 units of affordable housing were approved by the Planning Board in October 2000 (Atwood Road Elderly Facility) and in October 2001 (Pelham Terrace Elderly Housing on Windham Road). If constructed, these units will eliminate Pelham’s affordable housing shortfall for 2000.

4. Home Sales Costs

Table II-13 shows total residential sales (both new and existing) for 1998 and 2001. Throughout the late 1990s, increasing demand and supply increased annual housing sales in Pelham, greater than for the region as a whole.

Table II-13: Total Residential Sales, NRPC Region, 1998 and 2001

Community	1998	2001
Pelham	132	181
Amherst	282	229
Brookline	108	70
Hollis	164	123
Hudson	413	448
Litchfield	163	96
Lyndeborough	N/A	18
Merrimack	622	794
Milford	291	297
Mont Vernon	36	45
Nashua	1,496	1719
Wilton	85	44
NRPC Region	3,792	4,064

Source: New Hampshire Association of Realtors, compiled by NRPC.

Due to the high housing demand of the late 1990s, average home prices in Pelham are high when compared to the NRPC region and surrounding towns such as Hudson, Litchfield and Merrimack (see Table II-14). The average residential sales price in Pelham was \$255,000 in 2001 (both new and re-sale), while the average residential sales price in the region was \$215,500. Pelham has the highest average residential sales price of any town in the NRPC region, with the exception of Hollis.

The relatively high cost of housing in Pelham is perhaps due to the dominance of single family housing in comparison with the region as a whole. Over 85% of all housing units are single family as opposed to 64% for the region (see Table II-10), thereby reducing housing choice. The majority of new single family homes being constructed in Pelham today can be considered “high-end,” often up to 5,000 square feet in size and built on larger lots than homes constructed in the 1960s and 1970s. This new construction is therefore more expensive, with homes often selling for upwards of \$250,000. In addition, Pelham has few manufactured housing units.

Table II-14: Average (Mean) Residential Sales Price, NRPC Region, 2001

Community	2001
Pelham	\$255,000
Amherst	\$258,000
Brookline	\$243,000
Hollis	\$339,000
Hudson	\$188,000
Litchfield	\$222,000
Lyndeborough	\$162,000
Merrimack	\$183,000
Milford	\$180,000
Mont Vernon	\$208,000
Nashua	\$174,000
Wilton	\$174,000
NRPC Region	\$215,500

Source: New Hampshire Association of Realtors, compiled by NRPC.

E. RECOMMENDATIONS

- Conduct a Town buildout analysis using parcel-based Geographic Information System (GIS) technology. The buildout analysis can provide a more accurate estimate of the amount of developable land remaining in the Town. The results of the buildout analysis can be used to predict the level of public services required when the Town is fully developed.
- Using the results of the buildout analysis and the Natural Resources Inventory, conduct a study of the potential need for public water and/or sewer in certain sections of the Town.
- Develop regulatory measures that will facilitate the provision of affordable housing, such as: 1) review and consider revising the Housing for Older Persons Ordinance to further encourage the provision of such housing; 2) review and consider revising the requirements for Accessory Dwelling Units to allow for one-bedroom market rate rental housing; and 3) review and consider revising the zoning ordinance to further encourage the provision of mixed residential/commercial units in the Business Districts

#255F-2

CHAPTER III EXISTING LAND USE

A. INTRODUCTION

The Town's existing natural features, roadways and built environment are the foundation for future development. This chapter discusses: 1) historic development patterns; 2) the existing land use pattern, including residential, commercial, industrial, agricultural, current use and excavation land uses; 3) Pelham's current zoning districts; and 4) an analysis of undeveloped land. Institutional uses are covered in Chapter VI, Community Facilities.

B. HISTORIC DEVELOPMENT PATTERNS

The rich and varied history of Pelham is reflected in existing land use and continues to influence development patterns. The steep slopes and extensive wetlands that dominate much of the community channeled development during Pelham's early agricultural years into scattered parcels of available farmland. The Town's major thoroughfares, also designed with respect to natural constraints, contributed to the spread of development to all corners of the community. Although a Town center was established in the geographic center of Pelham, the center has never been the primary concentration of the Town's population. Pelham remained a relatively stable and prosperous farming community throughout its first one hundred and fifty years or so of existence. Non-agricultural commerce was oriented toward travelers on the Town's important highways as well as toward local needs. Industry, which was scattered throughout the Town, was generally geared toward the needs of the local community and was of the variety typical for rural New England towns of the era.

During the early years of this century, low land values as a result of rural depression and decades of out-migration, coupled with improved transportation, led to the extensive development of the shorelines of Pelham's larger ponds for seasonal homes. This was particularly true for Little Island Pond. In many cases, the so-called "camp lots" or "coffee lots" were actually given away as part of consumer product promotions. As housing prices began to escalate dramatically during the 1960's and 1970's, most of the seasonal homes on the camp lots, often as small as 1,600 square feet, were converted to year-round residences. Such development, accompanied by the subsequent conversions, led to the aesthetic degradation of the shorelines and resulted in persistent water quality problems due to high densities and inadequate sewage disposal. The camp lot areas, however, will remain a part of Pelham for the foreseeable future and provide housing of a type and price level that contrasts sharply with the remainder of the community.

Beginning in the 1960's, development in Pelham began to change and increase rapidly. Due to the proximity of the Town to the growing employment centers of Lowell and Lawrence, Massachusetts and Nashua, New Hampshire, Pelham emerged as a predominantly bedroom community. At the same time, agriculture declined due to changes in the farm economy and to development pressures. New residential development, generally on lots of about one acre, spread throughout the Town wherever developable land was available. Unfortunately, due to Pelham's terrain, much of the development consumed farmland or encroached precariously on the Town's sensitive wetland and hillside areas.

In addition to residential development, automobile dependent commercial uses also began to grow. Commercial development spread primarily along Route 38, the Town's most significant highway. Prior to the emergence of the newer "strip" commercial developments, the Town's more widely scattered traditional businesses and industries had already declined or disappeared. Much of the new commercial development encroached into sensitive wetland areas adjacent to Beaver Brook. New industries became concentrated in the Town's two industrial districts in the south-central and northwestern portions of Town. Much of the

southern industrial district, like the Route 38 commercial areas, encompasses sensitive wetlands. The northern industrial district, in contrast, includes few wetlands but contains large areas of steep slopes.

In response to the development pressures of the past two decades, Pelham began a comprehensive reevaluation of its local land use regulations and policies in the 1970's and 1980's. The Town adopted highly restrictive Recreation-Conservation-Agricultural districts, began a prime wetlands designation initiative, adopted flood plain, wetlands and aquifer conservation districts, revised its residential zoning regulations and adopted soils-based subdivision regulations. These measures, described below, will continue to allow residential developments to follow the course established since the Town's earliest years while avoiding the degradation of the Town's valuable natural resources. Substantial changes affecting the commercial and industrial districts, however, have not been made in recent years although additional districts were created in the 1970's and 1980's.

C. GENERAL LAND USE PATTERN

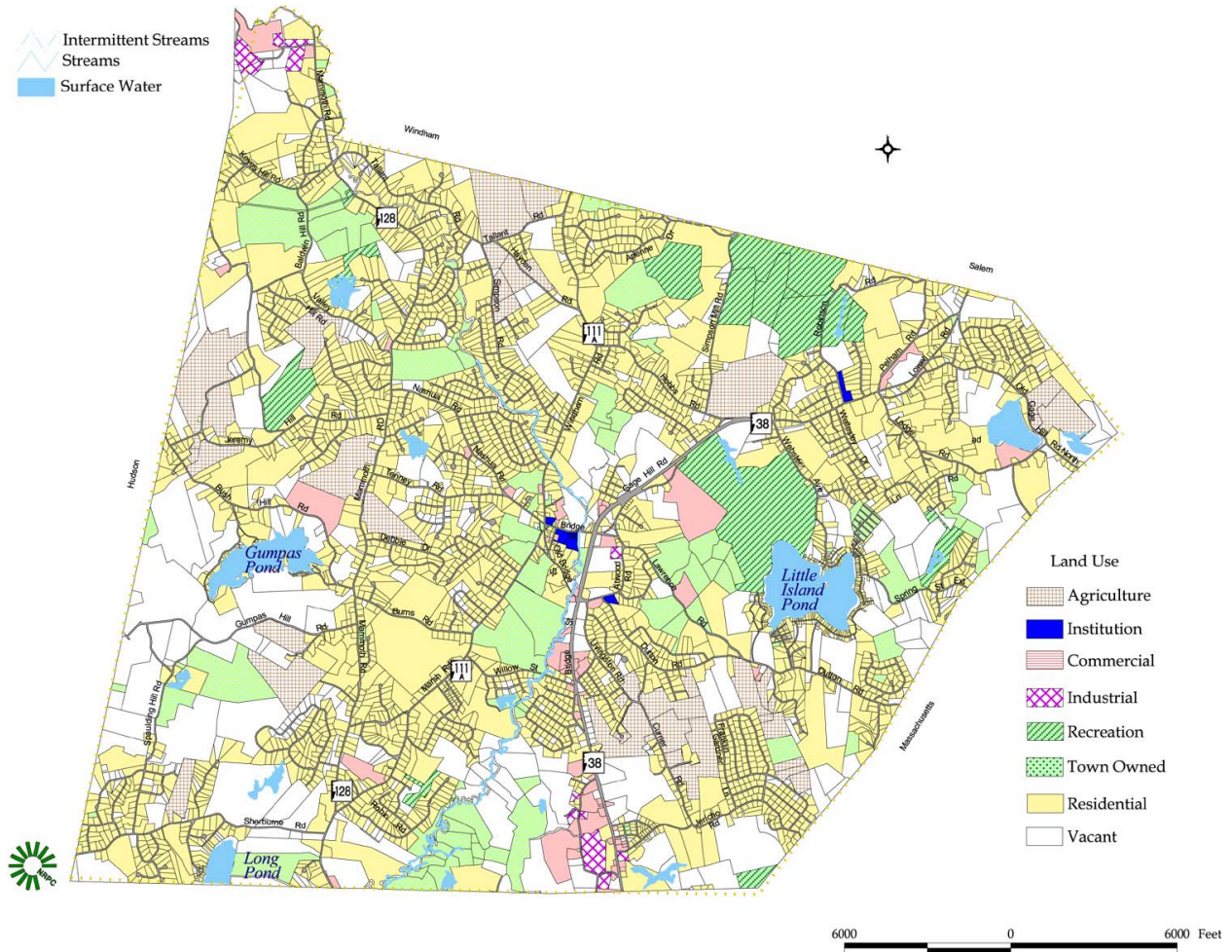
The Town of Pelham includes a total land area of approximately 17,439 acres. The Nashua Regional Planning Commission (NRPC) maintains a Geographic Information System (GIS) database for generalized land use in Pelham. This GIS database is a general representation of how land is being used and is broken down into various land use categories. The database is parcel specific, i.e. each property is assigned one use for the entire area of the property. Table III-1 identifies the generalized land-use classes as currently found in this database. Map III-1 illustrates the location of each land use.

Table III-1: General Land Use Types in Pelham

Land Use	Total Acres	Percent Total Land Area
Residential	7,705	44.9
Commercial	386	2.2
Industrial	84	0.5
Agricultural	1,172	6.8
Church	20	0.1
Town Owned	1,427	8.3
Recreation	885	5.2
Roads	837	4.9
Water Bodies	392	2.3
Vacant	4,249	24.8
Total	17,157	100.0

Source: NRPC GIS parcel database for land use, 2002.

Map III-1: Land Use Classes in Pelham, 2002



I. Residential Land Use

Residential land uses have been developed throughout the Town and are not confined to one specific area. Although steep slopes and wetlands impose significant constraints on development in several areas, the Town does not contain distinctly rural or urbanized areas. An estimated 7,705 acres of land are developed for residential uses in Pelham. Residential development accounts for 45% of the total land area of the Town and is by far the largest land use class.

The majority of Pelham's residential development is single family homes on 1 acre or larger lots. The remaining higher density residential development includes elderly housing, multi-family and the aforementioned "camp lot" developments. There are 48 units of elderly housing in two developments located on Windham Road and Main Street. In addition, a 24 unit elderly housing development on Windham Road and a 40 unit elderly housing development on Atwood Road were approved in 2001. Multi-family housing is located primarily along Route 38. The camp lot developments exist primarily in the vicinity of Little Island Pond and to a lesser extent in the area of Gumpas Pond. A few homes situated on small lots are also located in the vicinity of Town center.

2. Commercial Land Use

An estimated 386 acres of land are developed for commercial uses in Pelham. Commercial development accounts for 2.2% of the total land area of the Town. The vast majority of business uses are located along the southern half of Route 38 within the Town's four business districts. A handful of grandfathered businesses, particularly along the northern portion of Mammoth Road, are situated within the Residential District as well. It should also be noted that the Town's liberal allowances for home businesses encourage small enterprises throughout the community.

Although the land area devoted to commercial uses is comparatively minute, business uses appear to be far more extensive in Pelham than the acreage suggests. The impact of commercial development on the landscape and character of Pelham is accentuated by its development in a liberal fashion along much of the Town's most significant arterial road. Strip commercial development consumes a high ratio of road frontage in relation to acreage. Such development patterns give Pelham's Route 38 corridor an urbanized appearance. Although the Town's overall density and extensive undeveloped lands are indicative of a rural community, the rural character of the Town is increasingly hidden from residents, visitors and passers-by.

Commercial uses in Pelham include a wide range of business types which serve the needs of the local community, commuters and residents from adjacent communities in both states. Businesses include retail, office and service establishments including a supermarket, car lots, restaurants, convenience stores and farm stands. Multi-family as well as single-family housing is also located within commercial areas due to the Town's zoning ordinance provisions.

3. Industrial Land Use

An estimated 84 acres of land are developed for industrial uses in Pelham. Industrial development accounts for 0.5% of the total land area of the Town. Industrial development in Pelham is concentrated within two widely separated areas at the south-central and northwestern extremes of the Town. In the south-central area, approximately 41 acres have been developed for industrial uses on either side of Route 38. The northwestern industrial area, located between Hudson and Windham, is a newer and rapidly growing area and approximately 43 acres have been developed for industrial uses. A large site within the northwestern area is a former major earth excavation site. As a result of poor excavation practices, the site was clear-cut and stripped of topsoil. In 1990, a wood-burning energy plant was proposed for the site but zoning conflicts and opposition from residents in Pelham and adjacent towns led to the withdrawal of the proposal.

4. Agriculture

The number of acres of land remaining in agricultural *production* in Pelham is currently unknown. However, the Assessor's data base indicates that there were 1,172 acres classified as "agriculture" in 2002, which is 6.8% of the total land area in Town. Not all of this acreage will be in active agricultural use, however. Large areas of agricultural uses are located in the Tallant Road/Hayden Road area, the Mammoth Road/Tenney Road area, as well as along Dutton, Currier and Jeremy Hill Roads. In addition, there is one large farm on the northeast side of the Simpson Mill/Hobbs Road intersection.

As much of Pelham's remaining agricultural land is being lost to residential development, it is important to take active measures to preserve what remains as it serves as a valuable source of local produce and open space, and provides an educational and recreational function for local residents. At the time this Master Plan was adopted, agricultural operations determined as row-crop, orchard or pasture for 1974 and 1998 were being coded into the NRPC GIS system using digital aerial photography. Regional data is estimated to be available in July 2002. However, this data is not site specific and an inventory of site specific agricultural lands in Pelham may be useful for conservation efforts.

5. Current Use Land

NH RSA 79-A, enacted in 1973, authorized current use taxation of property. Administered by the NH Department of Revenue Administration, the current use program is designed to "prevent the conversion of open space to more intensive use by the pressure of property tax values incompatible with open space usage" (RSA 79-A:1). Parcels of fieldland, farmland and forestland of ten acres or more; "natural preserves" or wetlands of any size; and farmland generating more than \$2,500 annually are eligible for reduced property assessments under the program. Local officials must lower the assessed valuation of any property in the program to a prescribed level. When a parcel is removed from the program, the owner must pay a penalty (or "land use change tax") equal to ten percent of the land's fair market value. In Pelham, 75% of this land use change tax contributes towards the purchase of land for conservation purposes. Approximately 4,800 acres in Pelham were enrolled in the current use assessment program in 2002.¹ The location of these parcels can be seen on Map IV-12 in the Natural Resources Chapter.

D. PELHAM ZONING DISTRICTS

For the most part, zoning districts in Pelham correspond with existing land use patterns. The Pelham Zoning Ordinance is considered to be an example of "pyramid" zoning whereby, in general, uses permitted in more restrictive, or higher districts, are permitted in the less restrictive or lower districts. For example, residential uses are permitted in the Business Districts. This allows flexibility and the provision of mixed uses such as a retail or office building with apartments on the second floor. The Zoning Districts are: 1) Residential (R) District; 2) Business (B-1 through B-4) Districts; 3) Rural (Ru) District; 4) Industrial (I-1 through I-3) Districts; and 5) Recreation Conservation Agricultural (RCA) District. The district boundaries as of March 2002 are illustrated on Map III-3. In addition, the Zoning Ordinance provides for three overlay districts: 1) Aquifer Conservation (ACD) District; 2) Wetlands Conservation (WCD) District; and 3) Floodplain Conservation (FCD) District.

¹ Source: NRPC GIS. Acres based on area of GIS parcels coded as current use, 2002.

I. Residential District (R)

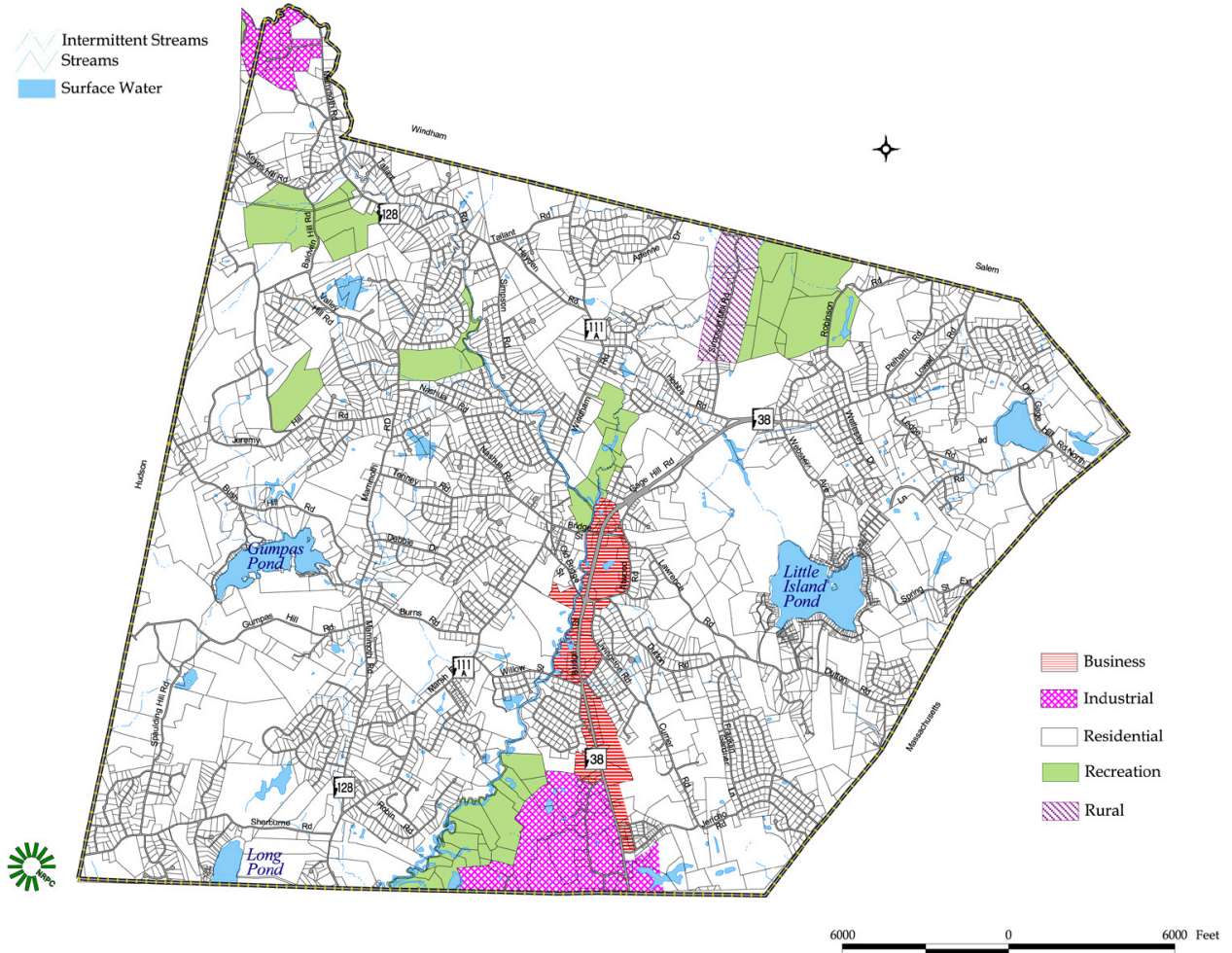
The Town of Pelham provides for a single residential zoning district which encompasses approximately 16,000 acres. The business districts, however, and the Town's rural district also permit residential uses. Most of the requirements governing the Residential District were replaced entirely by a new section of the Zoning Ordinance at the March 1991 Town Meeting, as amended. The extent of the Residential District, along with the Town's four other types of zoning districts, are depicted on Map III-3. The basic requirements of the Residential District are described below.

- i. **Permitted Uses:** Permitted uses within the District are limited to single and two-family residences, elderly housing and agricultural uses. Accessory dwelling units, home occupations, fraternal organizations and membership clubs, churches and other places of worship, schools, colleges, preschools, day care centers, hospitals and clinics, country clubs and golf courses, nursing homes are all permitted by special exception. All uses permitted by special exception (excluding home occupations and accessory dwelling units) must have not less than 200 feet of frontage or direct access to an arterial or collector street.
- ii. **Setbacks:** Single and two-family residential structures must meet a thirty (30) foot setback from rights-of-way and fifteen (15) foot side or rear setback. All other structures must meet a forty (40) foot setback from rights-of-way or not less than a distance equivalent to three times the height of the building. Side or rear setbacks for other structures are thirty (30) feet or not less than a distance equivalent to two times the height of the structure.
- iii. **Frontage:** All uses permitted in the district must have at least two-hundred (200) feet of frontage on a public or private right-of-way except as indicated under special exception requirements.
- iv. **Lot Size:** A minimum lot size of one acre is required for single-family residences, two acres for two-family residences and five acres for elderly housing. Areas of wetland soils, areas within the 100-year floodplain and areas within the Recreation, Agricultural and Conservation Zoning District cannot be counted toward meeting minimum lot size requirements. In addition, areas of utility easements cannot be counted toward meeting minimum lot size requirements for elderly housing.
- v. **Parking:** Off street parking is required for all uses permitted in the District. Uses permitted by special exception (excluding home occupations and accessory dwelling units) may not situate parking areas between a building line and a public right-of-way or within setback areas.

2. Business Districts (B-1 to B-4)

The Town of Pelham contains four business districts: B-1, B-2, B-3, and B-4. The four districts are contiguous and straddle both sides of Route 38 in the south-central portion of Town. Due to their length and shallow depth, the districts can be considered to be an example of "strip zoning". Together, the B-1 and B-4 districts take-up approximately 9,930 linear feet of frontage on the western side of Route 38 or 26.5% of the total length of the road. The B-2 and B-3 Districts take-up 12,827 feet of linear frontage along the road or approximately 34.2% of the total length of the road in Pelham. Together, the four districts encompass 337 acres of land; all of which is within the Route 38 corridor. Because all four districts are governed by the same ordinance, the requirements for development within the districts are described together.

Map III-2: Town of Pelham Zoning Map (March 2002)



- i. **Permitted Uses:** All uses permitted in the Residential District are permitted in the Business Districts and are governed by the regulations applicable to the Residential District. Additional uses permitted in the Business District include: multi-family dwellings, health clubs, general retail and wholesale trade, food and beverage establishments, hotels, motels, rooming houses, tourist cabins, vehicle sales, offices, theaters, function halls, commercial recreation and sexually oriented businesses meeting the strict provisions of the Sexually Oriented Businesses Ordinance. All of the uses permitted within the Business districts are permitted by right, with the exception of accessory dwelling units and home occupations which are allowed by special exception of the Zoning Board of Adjustment under certain circumstances.
- ii. **Setbacks:** Single and two-family residential structures must meet a thirty (30) foot setback from rights-of-way and a fifteen (15) foot side or rear setback. All other structures must meet a forty (40) foot setback from rights-of-way or not less than a distance equivalent to three times the height of the building. Side or rear setbacks for other structures are thirty (30) feet or not less than a distance equivalent to two times the height of the structure.
- iii. **Frontage:** All uses permitted in the Districts must have at least two-hundred (200) feet of frontage on a public or private right-of-way except as indicated under special exception requirements.
- iv. **Lot Size:** A minimum lot size of one acre is required for single-family residences, 60,000 square feet for commercial uses, two acres for two-family residences, three acres for multi-family dwellings (plus and additional 10,000 square feet for each bedroom in excess of ten) and five acres for elderly housing. Areas of wetland soils and areas within the 100-year floodplain cannot be counted toward meeting minimum lot size requirements. In addition, areas of utility easements cannot be counted toward meeting minimum lot size requirements for elderly housing.
- v. **Parking:** Off street parking is required for all uses permitted in the Districts. Uses permitted by special exception (excluding home occupations and accessory dwelling units) may not situate parking areas between a building line and a public right-of-way or within setback areas.

3. Rural District (Ru)

The Rural District is a small zone located along Simpson Mill Road in the extreme north-central end of the Town. The 163 acre district permits all uses allowed in the Residential and Business Districts except for multi-family dwellings and auto sales. In addition to these uses, junk yards and dumps are allowed by special exception of the Zoning Board of Adjustment under certain circumstances.

4. Industrial Districts (I-1 to I-3)

The Town of Pelham includes three Industrial Districts, I-1, I-2 and I-3. Two of the Industrial Districts (I-1 and I-3) are located on Route 38 in the extreme south-central end of Town. These two districts encompass a total of 422 acres. The I-1 District is located on the western side of Route 38 and has approximately 4,191 feet of frontage on Route 38. The I-3 District is located on the eastern side of Route 38 and has approximately 1,433 feet of frontage on Route 38. The I-2 District is located on Mammoth Road in the extreme north-west part of Town and encompasses approximately 121 acres. Because all three districts are governed by the same ordinance, the requirements for development within the districts are described together.

- i. **Permitted Uses:** All uses permitted in the Business Districts are permitted in the Industrial Districts, with the exception of auto sales and all residential uses, and are governed by the regulations applicable to the Business Districts. Residential uses are prohibited. All uses are permitted by right, with the exception of nursing homes which are allowed by special exception of the Zoning Board of Adjustment under certain circumstances. Additional uses permitted in the Industrial Districts include: light industry, manufacturing and warehousing.
- ii. **Setbacks:** All structures must meet a forty (40) foot setback from rights-of-way or not less than a distance equivalent to three times the height of the building. Side or rear setbacks for other structures are thirty (30) feet or not less than a distance equivalent to two times the height of the structure.
- iii. **Frontage:** All uses permitted in the Districts must have a least two-hundred (200) feet of frontage on a public or private right-of-way except under special exception requirements.
- iv. **Lot Size:** The minimum lot size for commercial uses is 60,000 square feet and for industrial uses is two acres. Areas of wetland soils and areas within the 100-year floodplain cannot be counted toward meeting minimum lot size requirements.
- v. **Parking:** Off street parking is required for all uses permitted in the Districts. Uses permitted by special exception may not situate parking areas between a building line and a public right-of-way or within setback areas.
- vi. **Building Height:** No building height limitation is provided in the Zoning Ordinance, however, structures may not exceed two stories.

5. Recreation Conservation Agricultural District (RCA)

The Town of Pelham includes seven Recreation Conservation Agricultural Districts, RCA-1 through RCA-7. Two of the Districts are located on opposite sides of Baldwin Hill Road. The remainder are located along Jeremy Hill Road, Mammoth Road/Valley Hill Road, Golden Brook, Robinson Road and the east side of Beaver Brook. The RCA District encompasses a total of 1,024 acres. Permitted uses in the RCA District are limited to agricultural uses, country clubs and golf courses. Much of the land included in the RCA District is publicly owned, wetland or within the flood plain.

6. Aquifer Conservation Overlay District (ACD)

The Aquifer Conservation District is an overlay zone which encompasses all areas shaded in blue on the USGS Survey map entitled "Saturated Thickness, Transmissivity and Materials of Stratified-Drift Aquifers in the Nashua Region, South Central New Hampshire," 1987, also known as the Toppin Study. The District includes approximately 6,319 acres and permits most uses permitted in the underlying zones, but prohibits automobile service or repair shops, the discharge of hazardous or toxic substances, underground petroleum storage tanks and a number of specific practices which may threaten groundwater quality.

7. Wetlands Conservation District (WCD)

The Wetlands Conservation District is an overlay zone which encompasses all areas of poorly or very poorly drained soils of over 2,000 contiguous square feet in size or areas of poorly and very poorly

drained soils adjacent to surface waters of any size and all areas within fifty feet of any wetland or surface water body. Wetlands encompass approximately 3,222 acres of the Town's land area.²

Within the Business Districts, roughly 21 % of the remaining undeveloped land is governed by the restrictions of the Wetlands District. Similarly, within the Industrial Districts, roughly 21% of the remaining undeveloped land is governed by the restrictions of the Wetlands District. For the Residential and Rural Districts, roughly 13% of the remaining undeveloped land is governed by the restrictions of the Wetlands District. Virtually all uses other than agriculture or conservation are prohibited within the Wetlands Conservation District. No structures may be erected or activities permitted which would result in major alteration of the terrain or in dredging or the addition of fill. Special exceptions are provided, however, for the installation of water impoundments for fire protection and drainage, for streets, roads or driveways and for utilities. No building or structure may be located within twenty-five (25) feet of a Wetlands Conservation District (75 feet from the edge of the wet area). No leachfield may be located within seventy-five (75) feet from a Wetlands Conservation District (125 feet from the edge of the wet area). However, there are no additional provisions for wetlands of special concern in the WCD.

8. Floodplain Conservation Overlay District (FCD)

The Floodplain Conservation District is designed to regulate development in all areas designated as special flood hazard areas by the Federal Emergency Management Agency (FEMA) in its 1980 Flood Insurance Rate Maps. Floodplains encompass approximately 2,780 acres of the Town's land area. The Ordinance is designed to establish standards and regulations for development within floodplain areas. While the FCD District does not exclude any type of land use in the underlying Zoning District, it does provide for measures to prevent loss of structures constructed within the floodplain.

E. OTHER LAND USE REGULATIONS

While zoning is perhaps the most obvious form of implementing the recommendations of a community's Master Plan, all planning boards are also empowered to adopt site plan and subdivision regulations. These regulations, although more limited in scope than a Zoning Ordinance, also have a significant impact on the way in which land is used. This is particularly true at the time land is developed or redeveloped. The most significant portions of the Town's site plan and subdivision regulations which relate to land use are summarized below.

I. Subdivision Regulations

Pelham's Subdivision Regulations govern any division of land for the purposes of sale or development. The subdivision regulations were substantially amended on November 8, 2001. The subdivision regulations include: 1) provisions for application and review procedures, 2) plan requirements; 3) design requirements including access, sidewalks and bikeways, landscaping, protection of natural and historic features, bridges, fire protection, water and sewage and utility easements; 4) additional information and studies; and 5) action on applications. The subdivision regulations also include a checklist to assist the applicant in ensuring that all the application requirements are met.

The subdivision regulations adopted in 2001 are designed to: ensure that new subdivisions are developed consistent with the Master Plan and the Zoning Ordinance; ensure that development does not occur on unsuitable land including poorly drained soils, flood plains and steep slopes; and prevent scattered and premature development. The subdivision regulations include requirements for lot shape,

² **Note:** Area of wetlands are an estimate and based on area of soils identified as wetland soils in NRPC GIS database.

roads, sidewalks, bikeways, bridges, landscaping, sewage disposal, water wells, fire protection, utilities, open space and signage.

2. Site Plan Regulations

Pelham's Site Plan Regulations govern the development of all uses other than single and two-family residential development. The site plan regulations include: 1) provisions for application and review procedures; 2) plan requirements; 3) design requirements including: parking, access, drainage, landscaping, lighting, signs, fire protection, water and sewage and noise. At the time of adoption of this plan, the site plan regulations were under review for consistency with the Master Plan.

F. ANALYSIS OF VACANT LAND

The amount of developable land remaining in the Residential, Business, Industrial and Rural Districts is shown in Table III-2.

Table III-2: Undeveloped and Developable Land by Zoning District, 2002

Zoning District	Undeveloped Land* (acres)	Restricted Land** (acres)	Wetlands (acres)	100 year Floodplain (acres)	Developable Land (acres)
Residential	6,276	1,384	839	247	3,806
Business	147	6	31	13	97
Industrial	248	61	53	19	115
Rural	69	55	2	0	12
Total:	6,740	1,506	925	279	4,030

Source: NRPC GIS database, 2002.

*Note: Undeveloped land includes vacant, protected and agriculture uses as defined in NRPC GIS database, 2002.

**Note: Permanent open space includes publicly owned and recreation land as defined in NRPC GIS database, 2002.

As of February 2002, approximately 7,733 acres of the total land area in Pelham remained undeveloped for residential, commercial or industrial use. Of that total, 6,740 acres of undeveloped land is within the Residential, Business, Industrial or Rural Zoning Districts and may be considered developable to some extent. A simple Buildout Analysis was conducted in 1999 as part of an Impact Fee Study.³ A Buildout Analysis estimates the amount of developable land remaining in the Town and estimates the number of housing units and non-residential acres that could be developed. The Buildout Analysis considered issues of ownership, wetlands and 100 year flood plains as development constraints.

Table III-3 shows an update of this simple Buildout Analysis. The results of the update indicate that, of the total 6,740 acres of undeveloped land, there are 1,506 acres of restricted land (publicly owned or recreation), 925 acres of wetlands and 279 acres of 100 year flood plain. These areas are considered undevelopable. Therefore, approximately 4,030 acres throughout Pelham are available for development. Of that total, 3,818 acres are within the Residential or Rural Zoning Districts. Given Pelham's existing 1 acre residential zoning in 2002, this means that there is a potential for an additional 3,818 new residential housing units in Pelham before all remaining land is developed. Similarly, of the total, 97 acres are available for development within the Business Zoning District and 115 acres are available for development within the Industrial Zoning District. It should be noted, however, that the remaining residential land area is unlikely to develop at one unit to the acre, given land constraints such as steep

³ Nashua Regional Planning Commission, *Town of Pelham Impact Fee Study*, January 1999.

slopes and area needed for roads, utilities and/or open space. A more detailed Buildout Analysis may be useful as a planning tool to determine the full potential of the Town's land to accommodate future housing units and non-residential development.

#255-3

CHAPTER IV NATURAL RESOURCES

A. INTRODUCTION

The Town of Pelham lies in the eastern reaches of the Lower Merrimack River Basin in south central New Hampshire. The Town shares a border with the State of Massachusetts and as a result has experienced significant growth as people realize that they can commute to the Boston area and still live in a relatively rural Town. This growth makes it even more important to understand and inventory the Town's remaining natural resources.

In analyzing the Town's natural resources, it is important to understand that a unique set of constraints to development may exist on each parcel of land due to the specific soils and slope conditions that may be present. In addition, the abundance and diversity of natural resources in Pelham (wetlands, ponds, streams, fields and forests) provide opportunities for a variety of land uses, while contributing to the overall quality of life in the community. Improper shoreline buffers will have negative impacts on water quality and the general health and function of the Town's wetlands, streams, groundwater and ponds.

A thorough understanding of the natural resource base is extremely important in determining the limits of growth and guiding future development in the community. The information that follows is a guide to the consideration of these constraints in planning for the future growth of the community. This chapter considers: 1) general natural characteristics such as topography and soils; 2) water resources; 3) forests; 4) wildlife; 5) existing and potential conservation lands; and 6) recommendations.

B. GENERAL NATURAL CHARACTERISTICS

I. Topography

Topography generally relates to the surface configuration of the land. The topography of an area can be described by two measurable characteristics — Elevation and Slope. A brief description of each of these factors is given below, along with an explanation of their importance in planning for land use and development within the Town.

a. Elevation

Elevation defines the relative height of a piece of land at a given point. So that measures of elevation are comparable, they are expressed in terms of feet above Mean Sea Level (ft. AMSL). Elevations in Pelham vary from approximately 120 feet above mean sea level (aMSL) near Beaver Brook in the south-central portion of Town, to 575 feet aMSL on top of Jeremy Hill, the Town's highest point. The western third of the Town is dominated by higher elevations and steep slopes, which sometimes abruptly, give way to the relatively flat land of the Beaver Brook valley bisecting the center of Pelham. The eastern third of the Town is also hilly, but with slopes and elevations that are more moderate than found to the west.

b. Slope

Slope refers to the relative steepness or pitch of a piece of land. Measurements of slope are expressed in percentages and are calculated by dividing the difference in elevation of two points by the distance between the points (i.e., change in elevation/distance = % slope). Thus, land with 0% slope has constant elevation and is perfectly level. Likewise, land with 100% slope has a pitch equivalent to a 45-degree angle. The mapping of slopes is a valuable tool in determining areas

where slope conditions may require special design considerations or other precautionary measures. The following slope categories are recommended for consideration in planning for the future land uses in Pelham and are illustrated on Map IV-1.

25+% Slope - Land areas in this category are among the most difficult to develop. A 25% slope represents a 25-foot vertical rise in elevation in a 100-foot horizontal distance, and is twice as steep as the steepest section of Pelham's roads! These areas will require extreme care and usually need special engineering and landscaping to be developed properly. The major problem of development on slopes of 25% or more is that generally steep slopes have only a very shallow layer of soil covering bedrock. Because of this, safe septic system installation is very difficult, storm water run-off is accelerated rather than absorbed, and soil erosion potential increases. Road and driveway construction to steep slope sites is more difficult and costly, and also increases the amount and velocity of surface run-off. Proper safeguards must be applied to such sites to minimize hazards to downslope properties, and these safeguards usually mean costly and often problematic engineering and landscaping solutions.

For these reasons, active use of steep slope sites should be avoided wherever possible, or approached with extreme caution and subjected to a thorough review by the Conservation Commission, Town Engineer and/or designated representative of the safeguards to be employed. If possible, the Planning Board and Town should consider preserving such areas as open space and limiting their use for intensive development. Where slopes in this category are to be developed, those involved should consult the principles, methods, and practices found in the Erosion and Sediment Control Design Handbook for Developing Areas of New Hampshire (1981 and amended in 1987), that has been prepared by the Hillsborough County Conservation District.¹

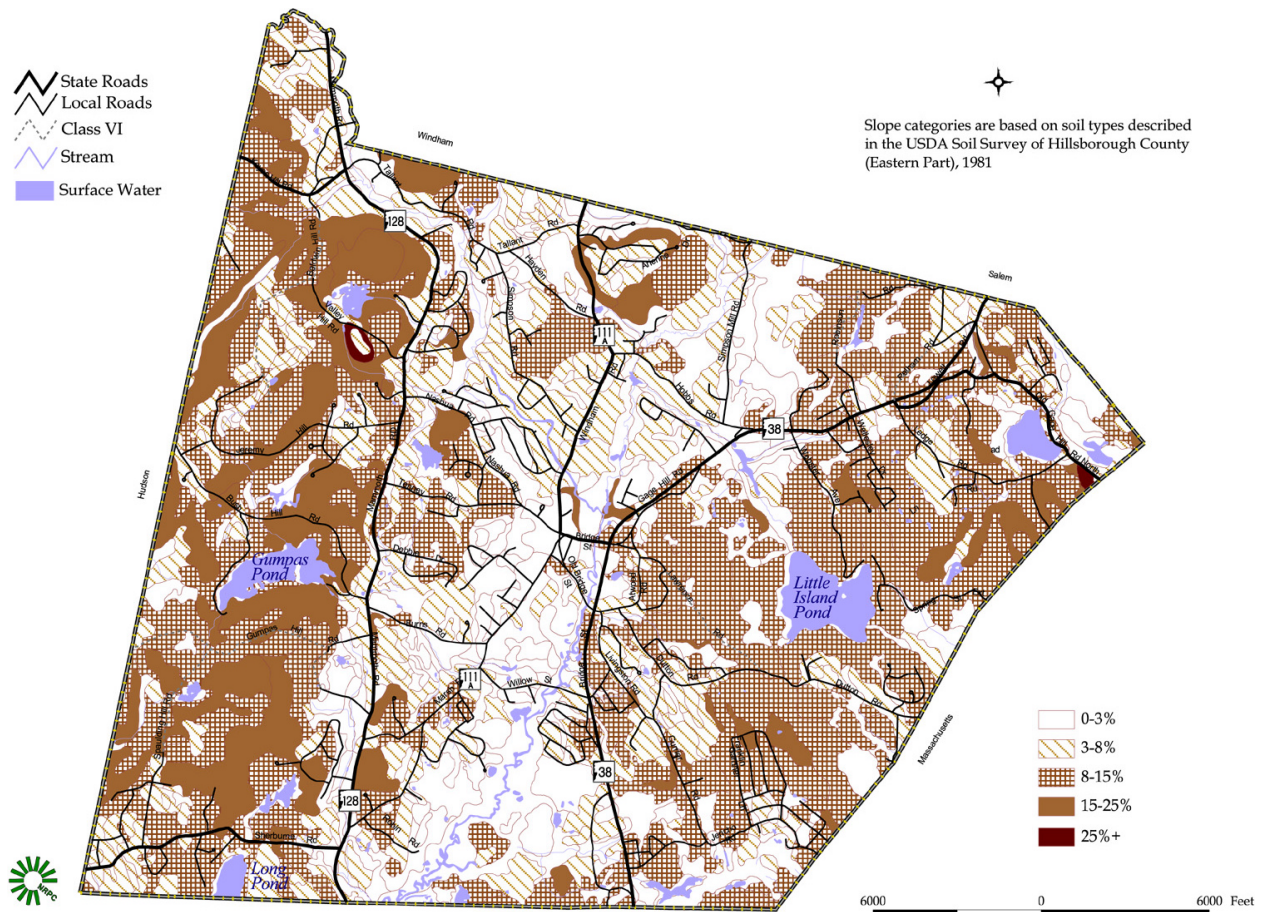
15-25% Slope - Areas in this slope category present substantial problems to their development. Development of these areas should only be undertaken with extreme care, recognizing the sensitivity of the environmental factors involved. In general, the steeper the slope, the shallower the soil layer covering bedrock. In addition, the velocity of surface water run-off can increase with the steepness of the slope, thereby increasing the potential for erosion and decreasing the potential for absorption of surface run-off.

The above conditions suggest that on-site waste disposal, and stabilization and landscaping of the site, will be quite costly to be developed effectively. Road construction is also more difficult and costly under these slope conditions and will result in increased amount and velocity of run-off to adjacent roadway areas. If proper safeguards are not applied, substantial hazards and potential damage to downslope property could result. For these reasons, active land uses should be avoided or approached with extreme caution.

Areas with slopes greater than fifteen to twenty-five percent are generally found in the western part of Town and are more suitable for open space. By preserving these areas as open space their absorption capacity is maximized and just allowing the natural vegetative cover to remain in place minimizes the erosion potential. In addition, these slopes pose severe limitations to development on soils of lesser slope because of the limitations on any needed future public facilities which would have to cross adjacent steep or other limiting soils conditions.

¹ Hillsborough County Conservation District, Erosion and Sediment Control Design Handbook for Developing Areas of New Hampshire , 1981 and amended in 1987.

Map IV-1: Slope



8-15% Slope - Land areas with slopes in this category present many of the same problems that are associated with the 15%+ category. Here too, the high erosion susceptibility and the low absorption potential make site development and subsurface sewage disposal difficult. The severity of these conditions, however, may be less hazardous than on steeper slopes. Overcoming site conditions may also be less costly and difficult on these slopes if approached with caution and sufficient foresight. A closer examination of specific parcels in this category will determine which problematic conditions may be overcome, and at what cost.

0-8% Slope - Land areas in this slope category are generally considered to be well suited for development. These moderately sloping areas are preferred for active use. Their relative flatness does not pose severe erosion potential, and the velocity of the surface water run-off is sufficiently slow to allow absorption of the water into the soil. In addition, soil layers on slopes of zero to eight percent are usually of sufficient depth to allow the absorption and purification of run-off and septic system effluent. This will depend on the specific soil conditions found on particular sites with slopes in this category.) Overall, slopes of this nature are capable of supporting a wide variety of land uses.

One exception to the above comments, however, must be noted. Areas of 0-3% slope at low elevations, or with poorly or very poorly drained soils, have been found to have a high water table (at or near the surface) throughout a majority of the year. (Pooling may occur in some instances.) These areas pose substantial problems to site preparation, construction, and effective subsurface sewage disposal. But generally, flat, well-drained areas are usually quite suitable for active use and development.

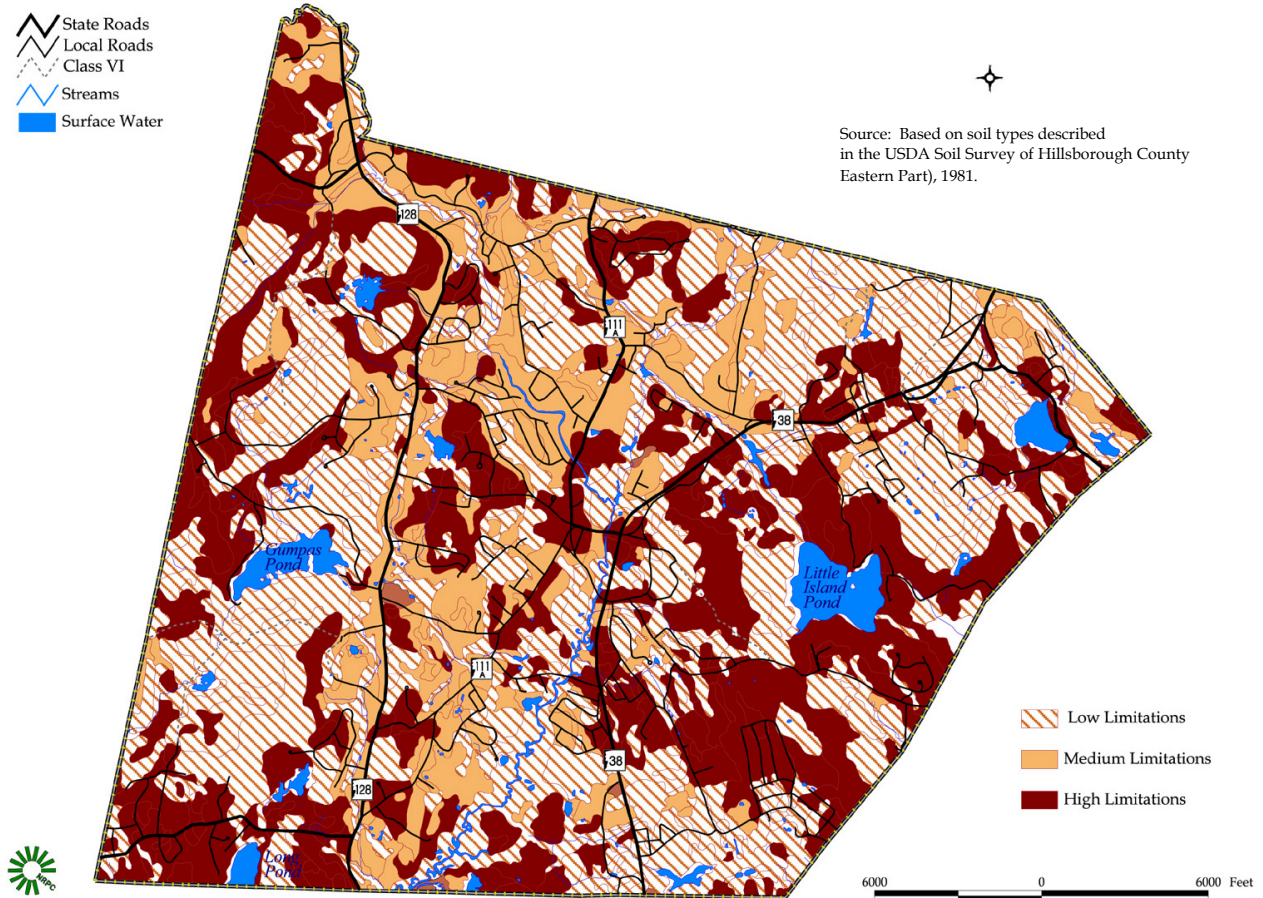
The slope categories, as described above and shown on Map IV-I on the previous page, are intended to serve as a general guide to community master planning. They are by no means the final word as to where development should or should not take place. Local variations will require site inspection by the Town Engineer and/or designated representative to determine the existence and severity of problems to be overcome if developed. The slope data should be considered in conjunction with soils data and water resource data in determining the overall natural ability of the land to support development.

2. Soils

Soils are the foundation upon which all land use occurs. Soil conditions are the most important factor in determining the capability of land to support development. They are especially important in Pelham, where the soil material is the sole medium for the purification of wastewater generated by residents.

The Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service (SCS) has devoted extensive time and resources to compiling soil surveys, which analyze the physical and chemical properties of different types of soils. From this information they have determined the suitability of soils for use, and the limitations and potentials affecting the use of soils for particular purposes. Of special importance to Pelham is the NRCS research on the suitability of soils for use as septic tank absorption fields. Since the Town relies solely on subsurface disposal of wastes, this information is a valuable planning tool in targeting future growth to areas where hazards to the public health will be avoided. The results of the research were summarized into an overall rating of the soils for the particular use. The rating indicates which soils have low, moderate, or high limitations for use with septic systems. These soil types are listed in Appendix IV-1 and illustrated on Map IV-2.

Map IV-2: Soil Classifications for Septic Systems



a. Low Limitation

Soils in the low limitation class have the best potential for active uses. Soils in this class have properties generally favorable for use involving septic tank absorption fields. The limitations for using soils in this manner are considered to be minor and can easily be overcome. These areas could support active use, pending the consideration of other factors affecting their suitability for development. Since the Town contains only a small amount of land in this class, efficient use of these areas should be actively encouraged if not required. Innovative zoning techniques can make efficient use of these soils while setting aside less suitable soils for less intensive uses.

b. Moderate Limitation

Soils in the moderate limitation class have intermediate potential for supporting septic tank absorption fields. They have properties moderately favorable for septic systems; however, limitations may be overcome through careful consideration and planning in the design and maintenance of septic systems. These areas are identified to alert interested parties that soil conditions do not preclude their development, however, additional consideration and cost may be necessary for development of specific site. Here again, the short supply of land in this class mandates efficiency in its development. Innovative zoning techniques may offer one method of solution; however, such proposals must be sensitive to the limitations, which place these soils in the 'moderate' class.

c. High Limitation

Soils in the high limitation class have the poorest potential for supporting septic tank absorption fields. Soils given this rating have one or more properties that are unfavorable for septic use. This designation, by itself, does not preclude all development but alerts developers and local officials that substantial effort and cost may be necessary to make the site suitable for development. The extent to which corrective measures are required will depend on the individual site and should be ascertained through site inspection by the Town Engineer and/or designated representative.

Because Pelham relies totally on septic systems, the soil potential for septic tank absorption fields has the greatest impact on development capability. There are 5,318 acres (approximately 64% of total land area) of agricultural and vacant land left in Pelham has a medium, low or very low limitation for septic. It is recommended that the soils with a high or very high limitations for septic, which comprise acres (26% of total land area) be set aside as open space. This does not mean that areas with high limitations are undevelopable; however, any proposals for development in these soils should receive close scrutiny. Specific soil types are addressed in more detail by the Planning Board in the current Subdivision Regulations. Appendix VI-I contains a list of the soil types in Pelham and their potential for development of septic systems.

Permeability is another critical soil characteristic that is important to consider when siting septic systems. Permeability is the rate of downward movement of water through a saturated soil measured in number of inches per hour. The two permeability categories of concern are rapid and very rapid, 6-20 inches and more than 20 inches per hour respectively. Soil with this rapid permeability will transmit water quite rapidly, meaning that contaminants can easily and quickly reach surface waters and groundwater. Because of this, soils with rapid and very rapid permeability are poor filters for septic system effluent as indicated in the *Soil Survey of Hillsborough County*.²

² United States Department of Agriculture, Soil Conservation Service, *Soil Survey of Hillsborough County New Hampshire, Eastern Part*, October 1981.

For many years, the Town has relied on a soils analysis method prepared by the SCS which examines the various limitations of each soil type relative to the soils effectiveness for subsurface septic system installation and operation. Although a new soil classification system was developed by the SCS recently, it is useful to briefly review the former method, which was used for so many years. For the earlier method, the Soil Conservation Service evaluated the following soil properties in determining the suitability of soils for use with septic tank absorption fields:

1. Permeability of soil;
2. Depth to water table;
3. Depth to bedrock;
4. Steepness of slope;
5. Stoniness/Rockiness of soil; and
6. Susceptibility to flooding.

It has been common practice for communities to require that soil maps and information be submitted as part of a completed application for subdivision or site plan review. A certified soil scientist in accordance with either the High Intensity Soil Map Standards (HISS) or the Order 1 Soil Map Standards prepares these maps. Both Standards are currently being phased out of use by the year 2002. The Society of Soil Scientists of Northern New England has recently combined the better features of both soils mapping techniques into Site Specific Soil Mapping Standards (SSSMS).³ The SSSMS meet the criteria of the National Cooperative Soil Survey of the USDA/NRCS. This means that maps prepared in accordance to the SSSMS classify soils to the series level, which is consistent with the maps found in the county soil surveys. The SSSMS are the most current standards available that can be used for a variety of land use activities. The recently adopted Pelham Subdivision Regulations require the use of the Site Specific Soil Mapping Standards. However, the Pelham Site Plan Regulations do not specifically require the use of SSSMS.

d. Agricultural Soils

The importance of agricultural lands as a valuable, rapidly diminishing resource has increased at national, state and local levels. Nationally, the US Department of Agriculture estimates that one million acres of farmland are lost each year to the advancing urban sprawl that is sweeping the country. In New Hampshire, more than two-thirds of the State's farmlands have gone out of production over the last fifty years. There are a few small farms remaining. The last orchard in Town was recently sold for residential development.

Currently, New Hampshire farmers produce only about fifteen percent of the food needed to feed its growing population. The State is heavily dependent upon outside food suppliers, which are subject to their own local growth situations and national/regional economic pressure. Thus, inflationary pressures on the various sectors of the economy will continue to escalate the price that New Hampshire residents will pay for food in the future.

As growth continues within the State, so too will the pressures to take agricultural lands out of production in favor of development. A number of factors contribute to the incentive for this conversion of agricultural lands. First, rising land values and a strong demand for housing act as an incentive to the development of agricultural lands, many of which are quite suitable for active use and less costly to develop. Additionally, inequitable assessment and taxing procedures act as a disincentive to farming uses (and as incentives for sale of farmland) by placing a heavy tax burden on the farmer. And finally, the farmer's difficulties in obtaining the capital and credit needed to maintain an efficient farming operation hurts his ability to compete with the more

³ Society of Soil Scientists of Northern New England, *Site Specific Soil Mapping Standards*, 1999.

affluent developers for the use of the land. It must be recognized that the re-establishment of agricultural uses on land once developed may require an investment of manpower, capital, and technical resources, which is highly unfeasible.

For these reasons it is important that steps be taken now to protect the Town's remaining productive and idle farmlands. The local economy provides a market for locally produced goods. In return, local farming operations can provide employment opportunities, and can reduce the cost of food by eliminating a significant transportation cost add-on. The Town's important agricultural lands (identified by soil types) are illustrated on Map IV-3. A complete list of soils is in Appendix IV-2. The agricultural lands indicated have been divided into three groups of important farmlands based on the character of the soils and their suitability for crop production.

Prime Farmland - These lands are best suited for producing food, feed, forage, fiber or soil seed crops. Their soil quality, growing season, and moisture supply make them suitable for producing sustained high yields of crops economically when treated and managed according to modern farming methods. They can be farmed continuously without degrading the environment, and usually require little investment and energy for maintaining their productivity. These soils are rated among the best in the country for farming uses. The SCS has identified 5 soil types in Pelham considered Prime Farmland Soils.

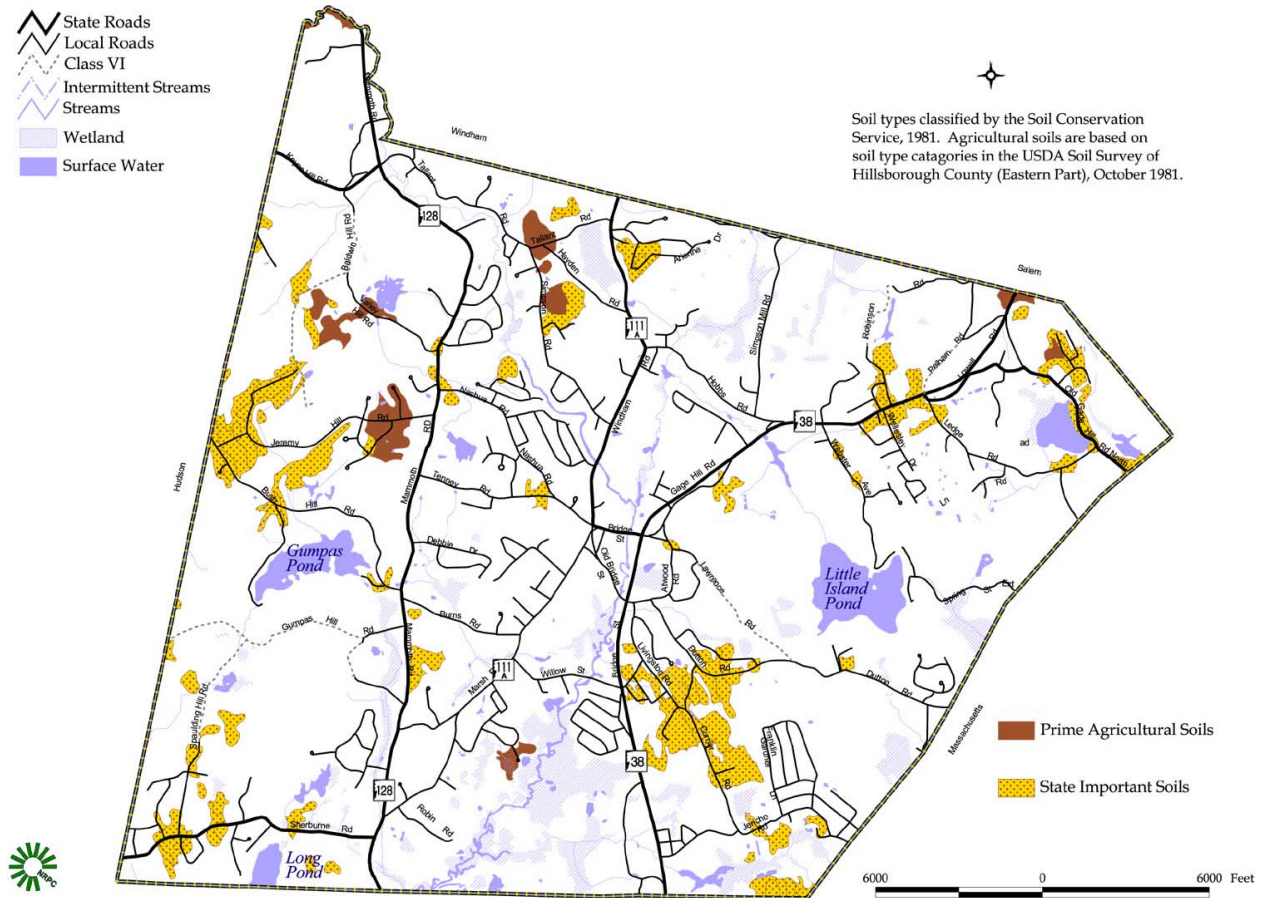
Farmlands of Statewide Importance - These lands are rated as being of statewide importance for the production of food, feed, fiber, forage, and oilseed crops. They are important to agriculture in New Hampshire but exhibit some properties, which exclude them from Prime Farmland status (such as erodibility or droughtiness). They can be farmed satisfactorily by greater input of fertilizer and erosion control practices, and will produce fair to good crop yields when managed properly. The SCS has identified 6 soil types as constituting farmlands of statewide importance.

Farmlands of Local Importance - These lands are rated as having local importance because they are already being actively farmed. Since they are now under active farm management, they are important to the role agriculture plays in the Town's economic, cultural, and conservation picture.

Land in the first two classes is considered to be of importance to the food-producing ability of the State. Consideration should be given to steps by which these and the locally important farmlands may be protected and encouraged to remain in agricultural production. The Trust for New Hampshire Lands Program and the Land and Community Heritage Investment Program could be one such means of protecting important agricultural lands through development rights acquisition of these properties.

A listing of the soils situated within the Town are grouped according to their potential for, or limitation to, active use and development is included in Appendix IV-1 and 2. The list is intended for use as a reference in reading and understanding the implications of the soils. These are designed to provide an assessment of the soils' suitability for development and to alert officials and developers to the potential problems, which may require attention in the development process. As such, this information should be given primary consideration in the Town's master planning efforts.

Map IV-3. Important Agricultural Soils



C. WATER RESOURCES

Water is essential to every element of community life. Like air, water is constantly in motion - running above and below the ground's surface across Town, state and national boundaries. The natural system of water in Pelham is extremely important in planning for growth, as the ground is the sole medium through which septic waste water is purified and from which drinking water is drawn. The safe conduct of both of these practices must be enforced if hazards to the health and well being of community residents are to be avoided.

I. Surface Water Resources

Surface water resources provide storm drainage, storage, groundwater recharge, wildlife habitat, water supplies and active or passive recreation. The Town's major streams are Beaver Brook, Golden Brook, Island Pond Brook and Gumpas Pond Brook. Over 35 miles of perennial streams flow through Pelham. Although they may represent a small portion of the Town's land area, because of the extensive network they form, they are an important resource to consider relative to the Town's existing and future growth. Because of the interconnection between surface waters and groundwater, all of the Town's surface waters are important when you consider the need to protect local water supplies.

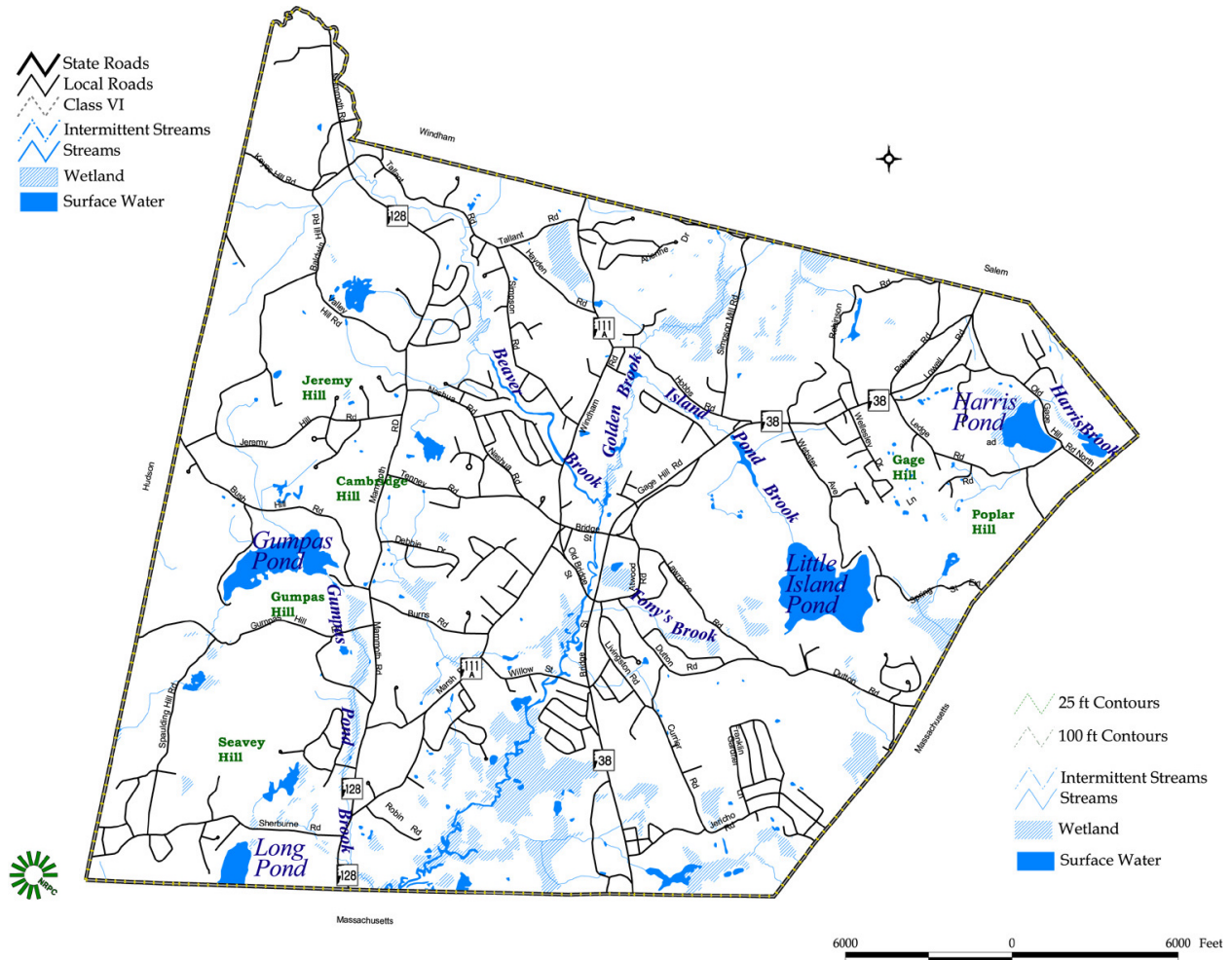
Water quality classifications are established by the legislature. The classification represents the desired level of water quality for the stream and does not necessarily reflect actual conditions. In many instances water quality in a river or stream does not meet the standards of the legislative classification. All of the streams in Pelham have a legislative water quality classification of B. This means they either meet or have a goal to achieve the fishable and swimmable criteria established under the Clean Water Act. Characteristics of Pelham's perennial streams are summarized in Table IV-1 and Water Resources are illustrated on Map IV-4.

Table IV-1: Perennial Streams in Pelham

Name Number	Total Length In Miles	Miles in Pelham	Start Elevation	End Elevation	Stream Order	Feeder Streams
Beaver Brook	26.8	9.8	300	60	4th	62.6
Two-a	1.2	1.2	310	170	2nd	0.75
Three-a	1.2	1.2	260	140	1st	0
Four-a	1.2	1.2	270	140	2nd	1.3
Five-a	0.6	0.6	170	140	1st	0
Golden Brook	5.8	1.3	180	130	3rd	11.2
Seven-a	2.4	2.1	185	140	1st	0.1
Harris Pond Brook		0.8	160	150	2nd	0.8
Eight-b	0.8	0.8	190	150	1st	0
Island Pond Brook	1.7	1.7	140	130	2nd	0.8
Bartlett Brook		0.4	170	160	1st	0
Thirteen-a	5.5	4.2	190	120	2nd	3.2
Thirteen-b	1.3	1.1	140	130	1st	0
Thirteen-c	1.4	1.3	190	130	1st	0
Thirteen-d	0.5	0.5	140	130	1st	0
Tony's Brook	0.9	0.9	150	130	1st	0
Fifteen-a	2.3	2.3	170	140	2nd	1.4
Gumpas Pond Brook	2.5	2.5	220	135	3rd	2.6
Eighteen-a	1.6	0.7	310	200	2nd	0
Nineteen-a	0.8	0.8	290	140	1st	0

Source: NRPC, Pelham Water Resources Management Plan, 1988.

Map IV-4: Water Resources



Pelham's lakes and ponds are also a very important surface water resource, providing wildlife habitat, water supply, flood control, and outdoor recreational opportunities. An inventory of Pelham's lakes and ponds are shown in Table IV-2 below:

Table IV-2: Lakes and Ponds in Pelham

Name of Water	Size	Description
Gumpas Pond	Area: 89.9 acres	Class: Meso
	Shoreline: 2.7 miles	Max. Depth Sounded: 24 feet
	Average Depth: Unknown	Elevation: 201
Harris Pond	Area: 45.7	Class: Meso
	Shoreline: 1.1 miles	Max. Depth Sounded: 22 feet
	Average Depth: Unknown	Elevation: 152
Little Island Pond	Area: 155.0	Class: Meso
	Shoreline: 4.8 miles	Max. Depth Sounded: 55 feet
	Average Depth: Unknown	Elevation: 145
Long Pond	Area: 120.5	Class: Oligo
	Shoreline: 3 miles	Max. Depth Sounded: 25 feet
	Average Depth: 13 feet	Elevation: 151

Source: NH Department of Environmental Services, *Survey Lake Data Summary*, November 2000.

The importance of surface, water resources in the protection of water quality requires that they be treated with care in the land use planning process. It is recommended that land adjacent to surface water resources be protected by restricting their development from active use. These areas can be safely developed within a protective buffer to meet the community's needs for recreation and open space.



Buffers consisting of a herbaceous layer (groundcover/ vines), understory plants consisting of shrubs, grasses, sedges, and trees ranging from 1 to 15 feet, and mature trees are recommended for maximum nutrient uptake and wildlife habitat. The State of New Hampshire has not adopted a standard buffer width. It is generally recommended in scientific literature, however, that a minimum 100-foot buffer be used. There are many considerations when considering the width of buffers including but not limited to hydrology, topography, and the presence of threatened or rare and endangered species.

The buffers will also provide protective greenways that minimize any land use impacts that may be created by permitted development. This not only protects the water quality, but also enhances the value of the surface water resources by allowing them to continue to support a community of wildlife within and around them. In addition, the connected surface water resource then serves as the basis for a natural system of open space around which development can occur.

2. Shoreline Protection Act

The Shoreline Protection Act establishes minimum standards for the future subdivision, use, and development of shorelands of the state's public waters. When repairs, replacements, improvements, or expansions are proposed for existing development, the law requires these alterations to be consistent with the intent of the Act. Development within the protected shoreland must always comply with all applicable local and state regulations. Protected shoreland includes all natural, fresh water bodies without artificial impoundments, artificially impound fresh water bodies, rivers, coastal water, and all land located within 250 feet of the reference line of public waters. Long Pond, Harris Pond, Little Island Pond, Gumpas Pond, and Beaver Brook below the junction of Golden Brook must adhere to the Act. Natural woodland buffer s must adhere to the following:

1. Where existing, a natural woodland buffer must be maintained.
2. Tree cutting limited to 50% of the basal area of trees, and 50% of the total number of saplings in a 20 year period.
3. A healthy, well-distributed stand of trees must be maintained.
4. Stumps and their root systems musty remain intact in the ground within 50 feet of the reference line.

3. Groundwater Resources

A substantial portion of water in Pelham is below the ground's surface. Groundwater is water that is stored in the pore or fracture spaces between the individual particles of soil, sand, gravel, bedrock, etc. In essence then, the ground acts as a sponge (or more correctly, aquifer) which filters and stores large amounts of potable water. These supplies are tapped by drilling or digging wells to obtain water for domestic consumption. The amount of water, which can be obtained in this manner, is determined by the nature of the material holding the water. For example, per unit volume of material, sand and gravel deposits generally have a higher potential for yielding large amounts of water than do deposits of till and bedrock. The three different types of groundwater aquifers include: saturated stratified drift, saturated unconsolidated till and bedrock. Each source varies as to the quantity of groundwater present and how it moves. Each is described in greater detail below and illustrated on Map VI-5.

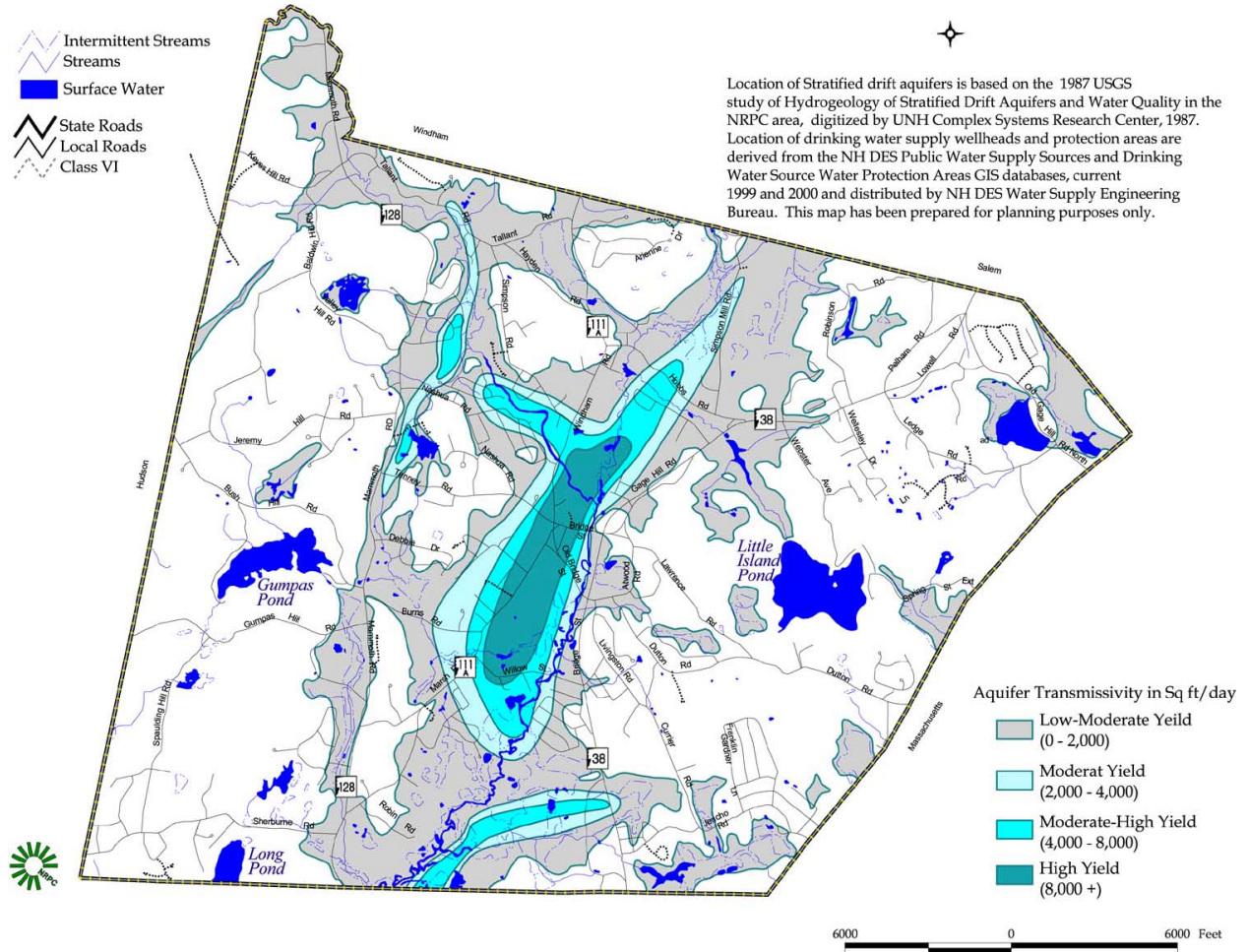
Groundwater from stratified drift deposits, unconsolidated till deposits and bedrock provides water for residential, commercial and industrial users in Pelham. Stratified drift aquifers are composed on well sorted sands and gravels, which generally have the potential to yield large quantities of water. Stratified drift deposits as depicted on the Aquifer Map underlie approximately 11.5 square miles or thirty-six percent of the total Town area. The United States Geological Survey study, *Hydrogeology of Stratified Drift Aquifers and Water Quality in the Nashua Regional Planning Commission Area*,⁴ described Pelham's stratified drift aquifers. The aquifers are also described in detail in the *Water Resources Management and Protection Plan*.⁵

Till deposits contain a mixture of clays, sands and gravels of varying grain sizes. These deposits do not have the capacity to store or transmit large volumes of water; however, they can provide sufficient volumes to supply individual residences or small community wells. Bedrock wells are drilled into rock containing fractures and can provide substantial volumes of water. Well completion reports on file with NH DES Subsurface Systems Bureau, indicate a range in depth of 75 feet to 1,000 feet for bedrock wells.

⁴ United States Geological Survey, Water Resources Investigations Report 86-4358, *Hydrogeology of Stratified Drift Aquifers and Water Quality in the Nashua Regional Planning Commission Area, South-Central New Hampshire*, 1987.

⁵ Nashua Regional Planning Commission, *Water Resources Management and Protection Plan*, 1988.

Map IV-5: Aquifers



a. Stratified Drift Aquifers

Stratified drift aquifers are made up of sand and gravel materials. The materials were deposited by the melting of glacial ice similar to rivers that deposit sand or gravel bars today. The deposits may be quite extensive, and are layered or "stratified." Their coarse texture allows for large volumes of water to be stored and their high porosity allows groundwater to flow through quite readily. For these reasons, stratified drift aquifers are a prime source of water for municipal and other large-volume users as they have a potential to yield large volumes of water to a well. Water usage will vary depending on the type of development. In the absence of a municipal water supply system, the mapping of groundwater potential can be helpful in deciding where various land uses might be best located and limit the maximum amount of growth.

Aquifers are porous and transmit water along with any pollutants or contaminants it may contain. The potential for contamination will depend on the nature and intensity of the uses located over the aquifer and recharge sources in the watershed. These are uses, which in many cases depend on the aquifer for potable water supplies. The potential for contamination is also further compounded by the dynamic nature of water. Pollutants discovered at one point may originate from a distant water gradient source. Thus, the delineation of aquifers and the drainage basins which feed them can help officials in determining the impact of uses which occupy land areas important to the recharge of groundwater supplies.

High Potential - Wells located within these areas by systematic groundwater exploration should yield sufficient quantities of water to meet or augment municipal and industrial requirements.

Medium Potential - Shallow wells and infiltration galleries located in these areas by systematic groundwater exploration should yield sufficient water for small municipal and rural water districts, commercial and light industrial use.

Low Potential - These areas, in which hardpan and ledge are at or near the surface, have low potential to yield water. Wells in till and bedrock commonly yield sufficient water for single family domestic use. In places where wells penetrate saturated zones or fractures in bedrock, wells may yield more than 40 gals./min. Wells in these areas will not support large sustained yields.

In the *Aquifer Delineation Study* for the Nashua area the USGS first considered the availability of existing hydrogeologic information in and around these potential areas. Additional field mapping, well borings (50), and material sample testing were conducted to fill data gaps. Field work included twenty-two seismic refraction lines (a combined total length of almost eight miles). This was done to provide depth-to-water-table and bedrock subsurface information.

Due to the unpredictable nature of till and bedrock aquifers and the cost of exploring them geophysically, they were not included in this study. This study covers only stratified drift deposit aquifers located within the region. The principle new data developed in this study include: the location and extent of watershed areas; the location and extent of the stratified drift material (both surface area and depth); water table elevation; saturated thickness of stratified drift deposits; individual aquifer characteristics including type of material, transmissivity and direction of groundwater flow; and, groundwater quality sampling results.

Location and Extent of Watershed Areas - As mentioned previously, surface water and groundwater are interrelated. Precipitation falls in areas referred to as watersheds formed by a series of connecting ridges. Surface water, flowing through a system of interconnected wetlands,

brooks, streams, rivers, is encompassed by a drainage basin or watershed. A watershed can be subdivided into smaller subwatersheds. Watersheds are particularly important to consider when production wells are located adjacent to surface water bodies. Watershed management and protection may provide a framework for a comprehensive water resource strategy, of which aquifer protection is but a part. However, caution should be exercised in the use of watershed protection exclusively as a groundwater strategy.

Groundwater is recharged in stratified drift aquifers in two ways. The area of direct recharge is the land surface directly overlying the stratified drift deposit. Water infiltrating the earth materials within this area has a "direct" route to the groundwater resource. The indirect recharge is the land surface outside the direct recharge area, but within the surrounding watershed, which contributes water to the groundwater system.

Location and Extent of Stratified Drift Deposits - Location and extent of stratified drift deposits is determined from existing surficial geology mapping, SCS Soil Survey information, and additional fieldwork. The extent of these deposits are delineated on a USGS 7.5 minute (7.5'), 1:24,000 scale (one inch = 2000 feet) topographic base map. The map line showing the deposit boundary actually represents the location where the composition of the glacial deposit changes from stratified drift to till or bedrock. The actual width of this change (represented by a line on the map) may vary. In some cases, the geologist conducting the surficial geology mapping noticed a "clean break," while in other instances a "transition zone" was identified.

The depth of existing stratified drift deposits is important information used in evaluating an aquifer. To determine this, the hydrogeologist does "seismic profiling" while in the field. From the results of this field work a subsurface profile or cross-section is developed. Using numerous seismic lines and consulting other data, a better picture is put together of what actually exists below the ground.

Water Table Elevation - Water table elevation is the position of the water table in relation to the Mean Sea Level reference point. Similar to mapping the ground surface with topographic contours, the water table is mapped in feet above Mean Sea Level (ft. AMSL). The water table contour interval (vertical space between lines) is ten feet. The contour information was developed from seismic profiling, well completion and test boring reports. These reports have limitations that the hydrogeologist must incorporate into the analysis. These include seasonal variations of well measurements, the effects of nearby pumping wells, and the reliability factor of well completion reports submitted to the NH Water Well Board (WWB).

Saturated Thickness of Stratified Drift Materials - From the information provided on the maps, it is possible to determine how far one would have to dig through the unsaturated materials to hit the water table. A location is identified from the topographic contours, and then the ground surface elevation established (e.g., 350 ft. AMSL). Then the water table elevation is subtracted from the ground surface elevation. This results in the number of feet of unsaturated material (e.g., 350 ft. - 300 ft. = 50 ft.). Saturated thickness is determined by combining depth to bedrock and water table level information. Within the total thickness of a stratified drift deposit, this is the zone of saturation. Saturated thickness is shown on the aquifer maps using contour lines of 10, 20, 40, 60, 80, and 100 feet.

Material Type, Transmissivity, and Rate and Direction of Flow - The type of material (fine, coarse, sand, gravel, etc.) is an important factor in determining the quantitative characteristics of an individual aquifer. In classifying aquifers for this study, the hydrogeologist mapped four categories of material type: predominantly coarse; predominantly fine; coarse over fine with

coarse materials over 25% of total thickness; and, fine over coarse with buried coarse materials at least ten feet thick.

The capacity of an aquifer to transmit water is referred to as its rate of transmission, or transmissivity. A transmissivity value for an aquifer is determined from the material samples test data. Aquifer transmissivity values are mapped using contour lines representing 0-2, 2-4, 4-8, and over 8 thousand square feet per day. The greater the "T" value, the more groundwater the aquifer will transmit.

Velocity or rate of groundwater flow is also a function of material type, porosity, and slope (hydraulic gradient) of the water table. Very coarse (porous) materials with steeper hydraulic gradients are expected to have higher anticipated rates of flow. In reverse, finer (less porous) materials with flatter hydraulic gradients are expected to have lower rates of flow.

Direction of flow is determined from reading the groundwater table contours. Groundwater flow does not always follow surface topography so having water table contour information will help alleviate the guesswork. Arrows are used to show direction of groundwater flow on the maps.

Groundwater Quality Sampling Results - Groundwater quality monitoring was done in conjunction with USGS fieldwork. Testing of samples collected was made possible through EPA grant funds. A total of 46 water samples were tested. The results show that overall water quality in the Nashua region is very good. Localized groundwater contamination incidents have been recorded at certain sites within the region. These incidents have been associated with specific land use problems on or near the site. The water quality study done for the region analyzed past information, located new sampling sites, performed ureter quality testing, and prepared final analysis, findings and recommendations.

b. Till Aquifers

Till aquifers are also made up of glacial deposited earth materials. The main differences between till and stratified drift aquifers are material porosity and thickness. Till is a mixture of clay, silt, and gravel materials. These materials were ground-up from solid rock by the glacier. Little groundwater can flow through such small individual pore spaces. In addition, till was deposited by glaciers on the tops and sides of valleys, making till deposits relatively thin compared to those of stratified drift. Wells drilled in till usually yield only small volumes of groundwater which may be adequate for private residential use.

Aquifers composed of glacial till materials may not be considered as good a water supply source as stratified drift aquifers, but for individual home owner needs they may supply shallow drilled or dry wells with marginal to adequate water yields. For the most part, those areas within Pelham not mapped in the USGS aquifer study would be considered as till deposits. There may also be small, scattered areas where bedrock is not covered by glacial till and is exposed at the surface. Glacial till deposits also have been mapped and can be delineated using USGS and Department of Resource and Economic Development (DRED) surficial geology maps. The SCS Soil Survey also lists those soil series', which likely have developed from glacial till deposits.

In those areas not mapped as stratified drift, any water supply wells relying on till deposits will be shallow in depth, and possibly seasonal in duration. The water table levels and yields will likely fluctuate greatly, corresponding to the seasonal variations in precipitation and drought. Because these wells are also close to the surface of the ground, they are very susceptible to land use related contamination (septic systems, fuel storage, fertilizers, road salt, etc.). The

Town should consider increasing the setback of future land-uses to these water supply wells in order to prevent the unnecessary contamination of someone's water supply.

c. Bedrock Aquifers

Bedrock aquifers are composed of fractured rock or ledge, where groundwater is stored in the fractures. These aquifers are very complex because bedrock fractures decrease with depth, "pinch out" over short distances, and do not carry much water. Wells drilled in bedrock that do not "hit" a fractured area will come up dry. If the well encounters an extensive fracture system, then groundwater yields may be high. On the average, bedrock aquifers yield smaller volumes of groundwater than wells drilled in stratified drift.

As mentioned above, it is the fractures in the solid bedrock that carries groundwater. Unfortunately, locating bedrock fractures requires high-technology fieldwork and is very costly. Bedrock fractures are also hard to locate because of all the glacial material that may be covering them. The presence of fractures also depends on the type of bedrock involved and depth.

Bedrock aquifers are recharged from the same source as stratified drift and till aquifers. Surface water can directly enter the fractures exposed at the surface, or soak into the overlying material and then enter any fractures that may exist along the material-bedrock contact. The latter is the main way bedrock aquifers are recharged. Knowing just where this takes place for a particular fracture or fracture zone is extremely difficult, primarily due to the complex interconnecting nature of fractures, and the large area they may cover (e.g., an entire watershed).

Locating water supply wells in bedrock is often a hit or miss proposition. If one is drilling in a high fracture area, then there is a good chance the well will intercept a fracture and yield sufficient quantities of water. However, if the bedrock is not highly fractured, the chance of hitting a fracture decreases substantially. The Town is fortunate to have both stratified drift and till aquifers to provide a steady water source.

4. Water Supply

All water supplied to Town residents comes from groundwater sources. These sources are tapped by drilling or digging wells to obtain water for domestic consumption. In general, the sand and gravel soil deposits, which comprise most of the community, are capable of yielding sufficient potable water for individual household consumption.

The presence and location of major groundwater supplies demand careful consideration in the Town's planning efforts. Map IV-5, Aquifers, indicates areas of groundwater favorability. It should be noted that all groundwater supplies are connected and thus contamination of one supply will over time lead to the contamination of other supplies in varying degrees. The Town should be conscious of this in its planning efforts and take steps necessary to protect these major sources of groundwater.

The most important steps that can be taken by local officials to protect groundwater supplies should be aimed at minimizing, if not eliminating altogether, polluting uses and activities on the land located directly over major groundwater supplies. Non-point sources are those polluting activities, which cannot be identified by a specific point or location. (For example, a pipe discharging raw sewage or chemicals into a stream would be a "point source," while a local landfill would be a "non-point source." Non-point sources of pollution can be just as damaging to water quality as point sources.

Since the Town must rely on groundwater sources for present and future supply, it must also take a serious look at ways to protect the supplies from potential pollution sources in all areas that are tied into the groundwater system, including wetlands, floodplains, surface water bodies and water

courses and adjacent lands and lands located over major groundwater sources. Potential pollution uses which have been commonly acknowledged to date include: road salt storage and application; municipal and private landfill operations; salvage yards; subsurface sewage disposal systems (especially faulty or overused systems, and a concentrated number of systems in one location); underground storage of bulk oil, gas, or other polluting substance; and agricultural uses which entail cumulative pesticide and fertilizer use and concentrations of organic pollutants and residential application of yard products.

In the interest of protecting the public supplies of water, local officials may deem it beneficial to restrict or prohibit some or all of the above practices in certain areas of Town. While this is recognized as restriction of the individual property-owner's rights of ownership, it also must be recognized that such actions are invoked to protect the public health and well-being of present and future generations, and such restrictions are imposed with the specific purpose and intent of protecting the public welfare.

5. Sewage Disposal

In Pelham, it is impossible to study the future of the Town's water supply without considering the impacts of current sewage disposal methods. As in many communities, the sole means of disposal in Pelham is through subsurface sewage disposal systems on each individual home site. Map IV-2 illustrates the Soil Conservation Service's determination of the suitability of soil types for use as septic tank absorption fields. This map shows that 64% of the Town's area is comprised of soils, which have a low or moderate limitation for such use. Consideration of this information will be important in making decisions on the locations of future land uses. This is especially true in Pelham where water supply and sewage disposal rely on the natural capabilities of the soil.

The NH Department of Environmental Services Subsurface Systems Bureau (Bureau), formerly the Water Supply and Pollution Control Commission, has developed minimum standards for the design and construction of subsurface sewage disposal systems. The Bureau is the statewide permitting authority and is responsible for reviewing and approving all proposed facilities for the treatment of wastes. As such, it is constantly under fire from local authorities and developers alike for alleged inconsistencies and problems in its approval and enforcement activities. The Bureau has made it clear that the regulations it administers are "minimum" guidelines that are enforceable statewide and individual municipalities are encouraged to enact more stringent guidelines, which are more sensitive to local conditions.

NH RSA 147⁶ empower communities to develop Health Codes that they feel are applicable to its own particular circumstances. Thus, if deemed beneficial, Pelham could enact health ordinances governing the design, inspection, construction, repair and replacement of subsurface disposal systems as a means of protecting local water quality. If such an ordinance were adopted, the Town would then take on the responsibility of administration and enforcement, as well as defense of legal challenges. This latter condition presents problems in that the financial and manpower resources for administration and enforcement are not readily available.

It is recommended that the Town begin to explore the means by which sewage disposal practices may be regulated at the local level. Several examples of local regulation exist in the southern New Hampshire area, and can serve as models for the Town to study. In studying the various approaches used elsewhere, local officials should consider how these approaches can be applied in Pelham and what level of resources are needed to be committed to ensure that local regulation is effective in protecting water quality.

⁶ State of New Hampshire, RSA 147:14, *Drainage* and RSA 147:17-a, *Private Sewage Systems*.

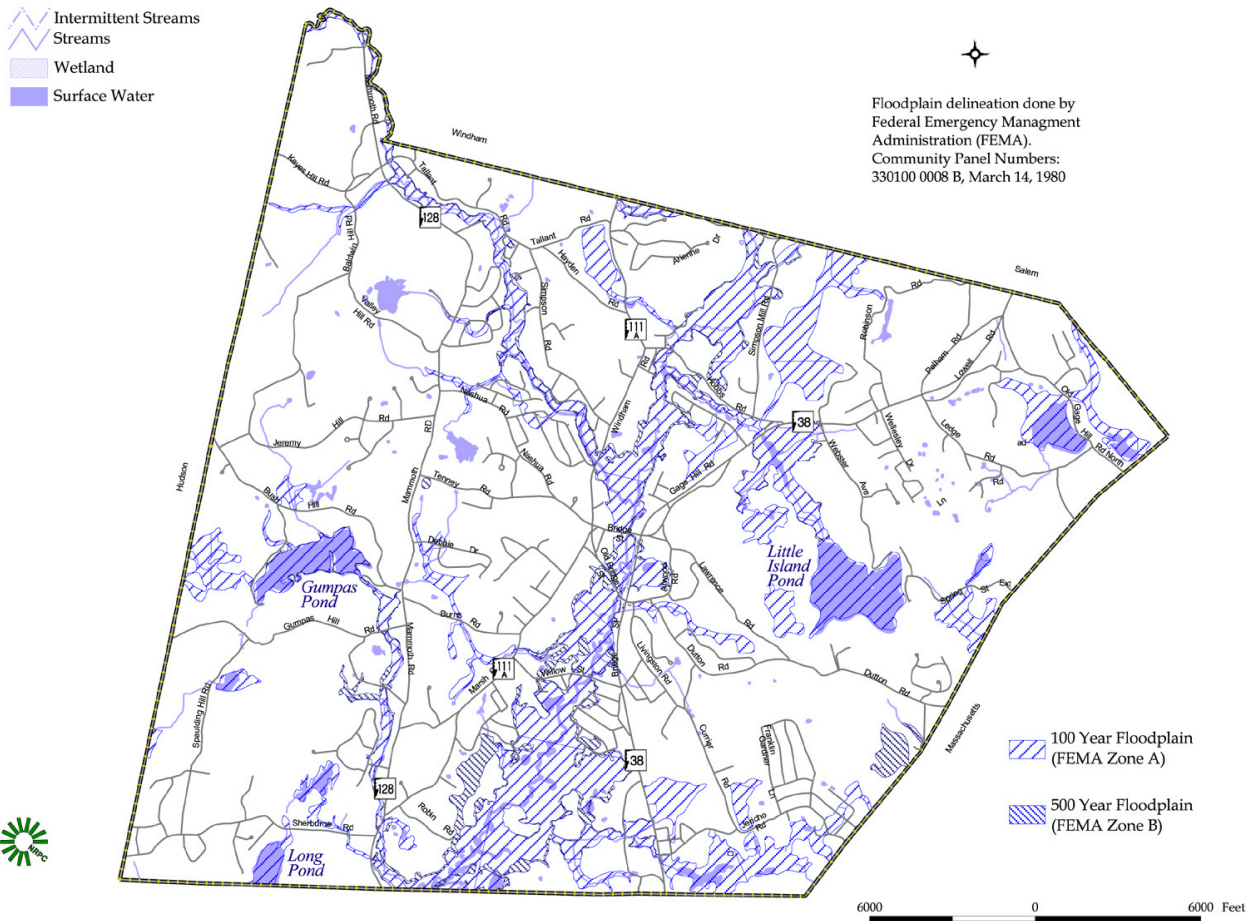
6. Floodplains

Floodplains are areas adjacent to watercourses and water bodies, which are susceptible to the natural phenomenon of flooding during periods of high run-off. Flooding is the process through which the exchange of water from surface to groundwater stores is accomplished. The unpredictable nature of flooding requires the application of precautionary measures to avoid substantial damage to life and property in areas susceptible to floods.

Two methods are available to avoid the problems presented by periodic flooding. Protective measures can be applied to structures already located, or proposed for location, on floodplain areas. Preventive measures can also be used to regulate the types of development permitted in these areas so as to minimize the potential hazards to life and property of community residents and landowners. To employ either approach requires the identification of affected properties.

Pelham has participated in the National Flood Insurance Program since 1980. Floodplain areas cover over 2,600 acres or approximately 15% of the area in Town. Most of the floodplain area is located in the Beaver Brook valley as indicated on Map IV-6. The only way to change the floodplain boundary is for the owner or the Town to submit a Letter of Map Revision and proof to Federal Emergency Management Agency (FEMA) stating that the designated area is no longer subject to flooding, although it may have been at one time. The Recreation-Conservation-Agricultural (RCA) Zoning District protects some of these areas but it is strongly recommended that the remaining floodplains be removed from consideration for development for active use. At the present time, the RCA Zoning pose no hardship to affected property owners; however, it reduces the potential for flooding by limiting permitted uses to open space or limited agricultural uses.

Map IV-6: Floodplains



7. Wetlands

Existing wetlands include those areas where the soils are particularly sensitive to development. Wetlands perform many unique functions within the hydrologic system of each watershed. Wetlands provide: a vital link between incoming precipitation and aquifer recharge; flood storage and prevention; erosion control; water purification of sediment, contaminants, and problem nutrients. They also provide important habitat to a variety of vegetation and animal life, including aquatic plants, insects, amphibians, fish and waterfowl.



The role education plays in understanding the importance and sensitivity of wetlands cannot be overestimated. Promoting the development of school and public environmental education programs that utilize the outdoors as natural classrooms is one way of increasing community awareness. The designation of wetland areas is the first step in developing any kind of protection plan or strategy. Wetland designation involves determining the location or extent of any areas that support typical wetland soils and vegetation. The existence of either wetland soils or vegetation is the result of water table characteristics, which cause frequent flooding, or saturation of the soil.

Nothing can replace the field survey when it comes to identifying wetlands. Trained botanists, wetland scientists, ecologists, soil scientists, and hydrologists, when working in the field, can provide the highest level of information needed. This information should be incorporated into any land use decision-making process. In 1987 the Conservation Commission prepared the *Pelham Prime Wetlands Study*⁷ based on nine criteria. The criteria included the following: Flora, Fauna, Food chain production, Hydrology, Historical, Archaeological and/or Scientific Significance, Geomorphologic Features, Aesthetics, Size, and other considerations. The Study identified 46 areas initially and narrowed the list down to 11 for further consideration. Seven wetlands were chosen for inclusion in a zoning overlay district at Town Meeting in 1988.

The New Hampshire Method of Evaluating Wetlands was developed 1991.⁸ A prime wetland is a wetland that is worthy of extra protection because of its unspoiled character, uniqueness, or fragility. All prime wetlands must have over 50% hydric A soil, which are very poorly drained soils. The New Hampshire Method uses a ranking system based on 12 criteria. These criteria are as follows: Ecological Integrity, Wildlife Habitat, Fin Fish Habitat, Educational Potential, Aesthetic Quality, Water Based Recreation, Flood Control Potential, Groundwater Use Potential, Sediment Trapping, Nutrient Filtering, Urban Quality of Life Potential, and Historical Site Potential.

In 1999, the Town contracted with the University of New Hampshire to continue the evaluations started in 1987.⁹ Using the New Hampshire Method, the assessment concluded that three additional wetland systems were worthy of prime wetland status. The three wetlands were Little Island Pond, St. Patrick's Convent School and the Sherburne Road Bog and Wetland. The Pelham Memorial School Wetland did not meet the hydric A soil requirement for the New Hampshire Method and cannot be designated as a prime wetland according to the New Hampshire Code of Administrative Rules.¹⁰ However, this wetland system did rank high in the 12 categories and should be protected.

⁷ Pelham Conservation Commission, *Pelham Prime Wetland Study*, 1987.

⁸ Amman, A., and A. L. Stone, *A Method for the Comparative Evaluation of Non-Tidal Wetlands in New Hampshire*, 1991.

⁹ University of New Hampshire, *Pelham Prime Wetland Assessment*, 1999.

¹⁰ State of New Hampshire, *RSA 482-A:15, Prime Wetlands*.

There are two other sources of information and technical assistance presently available to local Planning Boards. One is the Hillsborough County Soil Conservation District and SCS Soil Survey. The other is the US Fish and Wildlife Service, National Wetlands Inventory classification system and map products.

Significant technical and scientific expertise has gone into the development of the Hillsborough County Soil Survey. The District also offers technical assistance at the local and regional levels to make the best use of this information. In mapping the region's soils, the SCS has delineated those soils having poor to very poor drainage based on individual soil properties. Soils in these categories are in Table IV-3.

Table IV-3: Very Poorly and Poorly Drained Soils in Pelham

Very Poorly Drained Soils	Poorly Drained Soils
Borochemists (BoA, BpA)	Leicester-Walpole Complex (LtA, LtB, LvA, LvB)
Chocorua Mucky Peat (Cu)	Pipestone (PiA, PiB)
Greenwood Mucky Peat (Gw)	Ridgebury (ReA)
Scarboro (So, Sr)	Rippowan (Rp)

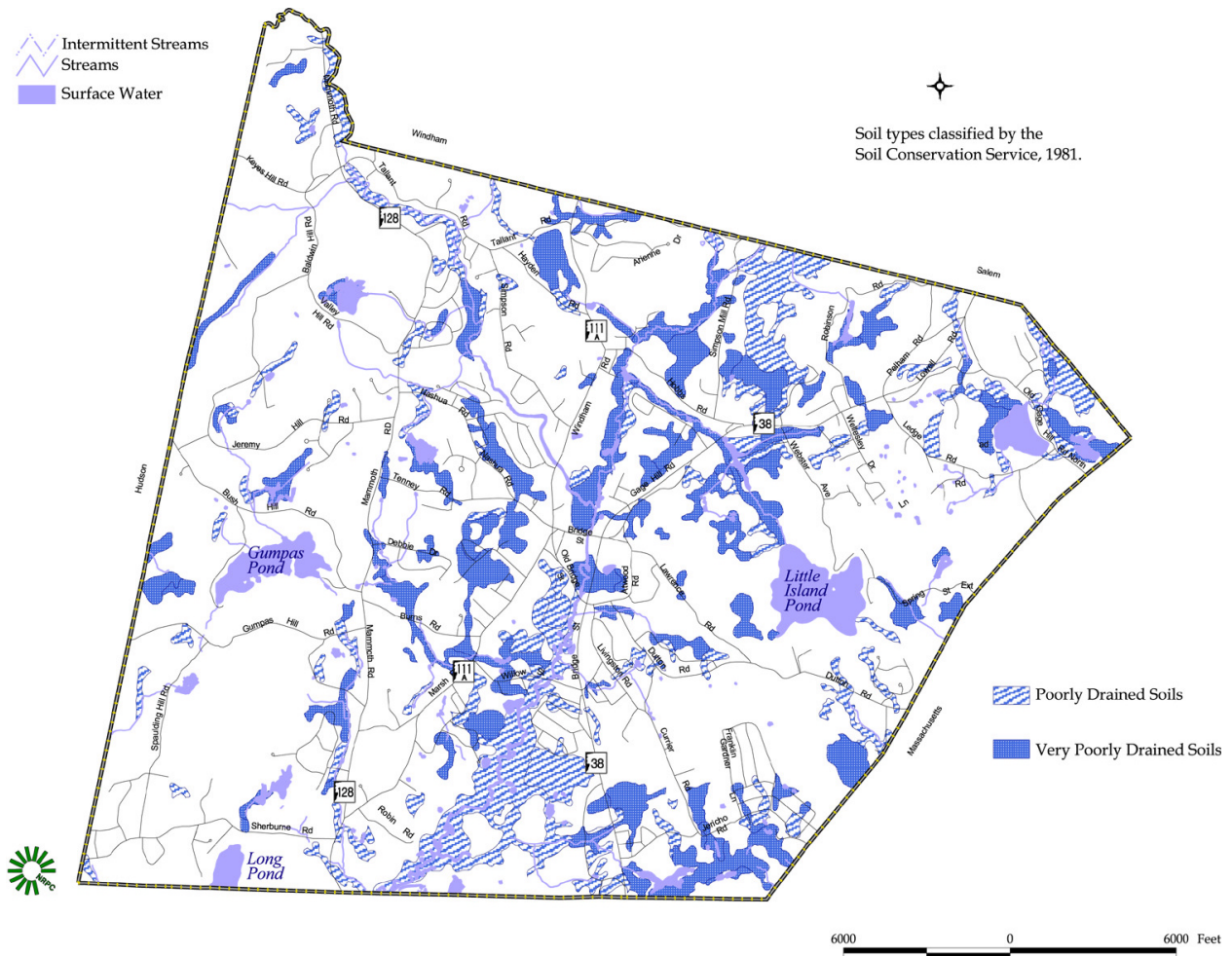
Source: *Soil Survey of Hillsborough County New Hampshire, Eastern Part*, US
Department of Agriculture,
Soil Conservation Service, October 1981.

The proximity of these soils to low-lying areas or to surface waters is evidence supporting the sensitivity of these areas and their importance as wetlands. The amount and location of incoming run-off, slope, accessibility of natural drainage features, and seasonal wet conditions are all important points to consider in documenting the importance of sensitivity of a particular wetlands.

Map IV-7 illustrates those SCS wetland soils that exist within the Town. From this map, major concentrations of these soils are found to exist. Wetland areas are for the most part located adjacent to or very near open water as found in the Town's rivers, streams and ponds. This relationship is the result of a localized higher water table and the source of greater quantities of soil water during periods of high stream flow. There are also some scattered pockets of wetland soils throughout the Town, usually at the bottom of low-lying areas or depressions.

The next step in protecting wetlands would be to set the priority of wetland areas based on their location and the need of the benefits they provide. For example, wetlands adjacent to a stream may warrant a higher priority for protection than an isolated wetland "pocket." The outcome of these efforts would be a protection plan or strategy involving where and how protection is needed. Other available ways to gain better control of wetland areas considered important would be through Town regulations, conservation easements, deed restrictions, and the fee-simple purchase of development rights or land. Since overcoming the problems in the development of sites with these conditions is quite costly, and since hazardous conditions may result if improperly developed, these areas are recommended for use as open space. This restriction will allow these areas to continue their functions as unique wildlife habitats and as natural purification sites for the recharge-discharge of groundwater supplies.

Map IV-7: Wetlands



8. Threats to Surface and Groundwater Resources

Rivers, streams, lakes, ponds and groundwater resources face a myriad of threats. The two main categories of pollution are point source and non-point source pollution. Point sources of pollution are those that can be traced back to an identifiable source, such as a pipe or sewer outfall. Non-point sources of pollution are more diffuse in origin, such as agricultural and urban stormwater runoff, septic system effluent, snow dumps, road salt, soil erosion, etc. The NH Department of Environmental Services, *New Hampshire Non-Point Source Management Plan*,¹¹ lists the various forms of non-point source pollution in order of priority for abatement efforts. The list is based on the following factors:

1. Danger to public health;
2. Magnitude and pervasiveness of the potential threat;
3. Potential impacts to receiving waters;
4. Professional judgement;
5. Ability of existing regulatory programs to control pollution;
6. Adequacy of existing education programs to promote pollution control;
7. Public perception; and
8. Comments of Non-Point Source Management Plan Subcommittee.

The list, in order of priority, is: 1) Urban (stormwater) runoff; 2) Hydrologic and habitat modifications; 3) Subsurface systems; 4) Junk, salvage, and reclamation yards; 5) Construction activities; 6) Marinas; 7) Road maintenance; 8) Unlined landfills; 9) Land disposal of biosolids; 10) Land disposal of septage; 11) Agricultural activities; 12) Timber harvesting; 13) Resource Extraction; 14) Storage tanks (above ground and underground); and 15) Golf courses and landscaping.

The 2001 draft *Groundwater Protection Recommendations and Implementation Plan*¹² identified junkyards, hazardous materials and septic systems were the top groundwater threats in Pelham. The Town's Junkyard and Automotive Recycling Regulation requires that all existing and proposed junkyards be licensed. Pelham has prohibited new junkyards within its Aquifer Overlay District but should enforce licensing requirements for junkyards operating prior to the Overlay District. State regulations apply to sites with two or more unusable vehicles. The Department of Environmental Services estimates that there may be as many as 40 sites that contain two or more vehicles.¹³ The regulation of hazardous materials is generally done at the state and federal level. The NH Department of Environmental Services has identified 51 hazardous waste generators in Town.

This section briefly examines some of the issues and trends in point and non-point source pollution and actions that can be taken to address this pollution. The focus is on non-point source pollution and urban runoff in particular, now acknowledged as being the most serious threat facing surface and groundwater resources today. The recommendations that follow this discussion will mention several "best management practices" (BMPs) that address non-point source pollution and stormwater runoff in particular. BMPs are variously defined as technical guidelines for preventing pollution caused by particular activities, and recommended treatment or operational techniques to prevent or reduce pollution. Some of the major sources of surface and groundwater contamination are discussed below. Potential threats to groundwater quality in Pelham are illustrated on Map IV-8.

¹¹ NH Department of Environmental Services, *New Hampshire Non-Point Source Management Plan*, 1999.

¹² Comprehensive Environmental, Inc., *Town of Pelham: Groundwater Protection Recommendations and Implementation Plan*, 2001.

¹³ Phone conversation with Comprehensive Environmental Inc., 2002.

a. Stormwater Runoff and Phase I and II Stormwater Rules

The development of land for residential, commercial or industrial purposes necessarily increases the amount of impervious surface area within any given site due to the construction of buildings, roads, driveways, parking lots and other improvements. Impervious surfaces reduce the natural infiltration of stormwater into the ground, thereby, reducing recharge of groundwater resources. This is particularly true where stormwater is discharged into a storm drainage system that exports stormwater off of a site and out of a watershed. Development can also reduce groundwater recharge through increased evaporation that can result from land clearing. Where increased imperviousness results in direct stormwater discharges into streams and rivers, the result is often alteration of the natural flow of the stream, causing erosion and sedimentation, loss of aquatic wildlife habitat and increased flood hazards. Stormwater runoff is also a principal nonpoint contamination source of surface and groundwaters.

Potential contaminants found in stormwater runoff include: nutrients, such as phosphorous, nitrates, heavy metals, floatables and solids, pathogens such as virus and bacteria, organic compounds including oils, grease, MBTE, and pesticides and herbicides. All of these materials singly and in combination can lead to the degradation of surface and groundwaters. The United States Environmental Protection Agency (EPA), through a program called the *National Pollutant Discharge Elimination System* (NPDES),¹⁴ aims to prevent and control non-point pollutant sources. The first phase of this program, appropriately referred to as the "Phase 1 Stormwater Rules," regulated the municipal stormwater systems and discharges of medium and large municipalities (those with populations greater than 100,000).

The Phase II rules, which go into effect in March of 2003, will focus on stormwater systems within the urbanized areas of municipalities with populations less than 100,000.¹⁵ In addition, the Phase II rules will also impact construction activities between 1 and 5 acres, whereas Phase 1 regulated construction activities of greater than 5 acres. In order to comply with Phase II requirements, regulated municipalities must submit a Notice of Intent (NOI) by March 2003. This NOI must include a stormwater management plan that addresses the six minimum control measures required by the EPA.

The six minimum control measures are: 1) public education and outreach, 2) public participation and involvement, 3) illicit discharge detection and elimination; 4) construction site runoff control; 5) post-construction runoff control, and 6) pollution prevention and housekeeping. The Phase II rules mention the "operator," who is the entity responsible for maintaining stormwater conveyances and drainage systems. Stormwater conveyances include anything that can carry water, including ditches and swales. In most communities, these activities fall under the purview of the Department of Public Works or Highway Department. The stormwater management plan must be designed to reduce the discharge of pollutants to the maximum extent practicable, to protect water quality and to satisfy the water quality requirements of the Clean Water Act. Although stormwater management plans must be submitted by March, 2003, full implementation is required by 2008, giving communities 5 years in which to implement their plans.

The preparation of a stormwater management plan that addresses the 6 minimum controls will take time and the coordination of many in municipal government and the private sector. It may be advisable to establish a "Phase II Committee" to begin to address these matters well before the March 2003 plan deadline approaches.

¹⁴ www.epa.gov/npdes.

¹⁵ Comprehensive Environmental Inc., *Phase II Stormwater Rule Summary and How Municipalities Can Prepare for Compliance*; 2000.

b. Road Salt

No-salt routes generally encompass areas adjacent to public water supplies and areas where on-site wells are located near roadways. Other areas are treated with a mixture of salt and sand. A more expensive method is the use of Calcium Magnesium Acetate (CMA) which is biodegradable and non-toxic to the environment. The Town salt storage facility off the Windham Road was built in 1995. It is a three-sided, 3840 square foot covered structure with a paved floor. The State Department of Transportation, which maintains Route 38, Sherburne Road, Route 128 and portions of Route 111A operates under a clear pavement policy.

Excessive salting of roads and improper salt storage create the potential for sodium, calcium and chloride contamination of the ground water, which can pose health threats to humans, endanger animals and plants and corrode metal and concrete. In June 2001, the Pelham Conservation Commission and NRPC completed a *Proposal for Alternative Winter Road Maintenance* study.¹⁶ This study recommends that the Town consider using an alternative de-icer such as Calcium Magnesium Acetate (CMA); however, the study recognizes that this chemical is substantially more expensive than road salt and recommends that its use could be limited to identified problem areas. Another recommendation is that critical portions of roads can be designated for a conversion to “low salt” or “no salt” status on a prioritized basis over a specified time period. The Town can also request that the state use alternative de-icers on certain state maintained roads in priority areas.

c. Subsurface Sanitary Waste Disposal

Septic system failures from improper design, installation, or maintenance allow nutrients, particularly nitrogen and sometimes bacteria and viruses to leach into water resources. The first receptor of these contaminants is often a nearby private well, but surface waters may also be affected. Septic system leachate, along with stormwater runoff, may contribute to excessive algae growth in surface waters which, in turn, decreases the amount of oxygen available to fish, decreases sunlight penetration and clogs waterways. In most cases, older septic systems and cesspools pose the greatest threat to groundwater and surface water quality. The EPA considers new systems meeting today’s heightened standards to be passive and durable systems that can provide acceptable treatment despite a lack of attention by the owner.

d. Underground Storage Tanks

Leaks in improperly equipped underground storage tanks, USTs, are difficult to detect and may go unnoticed for a long time. Even a small leak of only a few gallons can contaminate millions of gallons of ground water. The State regulates USTs where the cumulative volume of all tanks at the facility is 1,100 gallons or more. Some tanks, including those containing non-petroleum based chemicals and those containing heating oil for on-site residential consumption are exempted. As of 2002, 38 USTs in Pelham were registered with the NH Department of Environmental Services Subsurface Water Bureau.

9. Forests

Forests were the dominant landscape characteristic after the retreat of the glaciers. Before 1623 and the colonization of New Hampshire, southern New Hampshire was 93% forested with the remaining 7% open space being marsh or ponds. Many major changes have affected the ecosystem in southern New Hampshire since that time. By 1850, at the height of agricultural development in New Hampshire, only 20% was forest, while the remaining 80% of Hillsborough County was cleared for livestock grazing, growing livestock feed and other crops for home consumption. Most of the changes historically are associated with population and economic opportunities. Agriculture began to decline during the 1860’s with the western migration and industrialization of the northeast. The Amoskeag Mills in Manchester (incorporated in 1831 and by 1910 was the largest textile mill in the world, employing 17,000 workers)

¹⁶ Pelham Conservation Commission and NRPC, *Proposal for Alternative Winter Road Maintenance Study*, 2001.

and the mills in Lowell and Lawrence drew workers (particularly females) from rural communities to the cities. These fields slowly gave way to scrub trees. Conifers generally took over the abandoned farmlands and meadows. During the 20th century, foreign disease and pests have changed forest composition and were responsible for the decline or destruction of the American Beech, American Elm and the American Chestnut. The introduction of the chestnut blight from Asia around 1904 killed most of the mature chestnuts within 20 years.

According to the Society for the Protection of New Hampshire Forests' document *New Hampshire's Changing Lands*,¹⁷ reforestation began to stabilize during the 1960's. The peak and downturn of forest cover began in the 1970's and 1980's when population gains and development increased throughout the state. Around 1983, New Hampshire reached an estimated high of 87% forest cover, which has not been seen since 1700. Satellite analysis in 1993 indicated that the forest cover was approximately 83%. This makes New Hampshire the second most forested state after Maine. The forest industry is the third largest in the state after tourism and manufacturing.

South central New Hampshire receives approximately 43 inches of precipitation per year. Most of this precipitation is evenly distributed throughout the year, though there can be occasional droughts in the summer. The area's climate is ideal for the growth of forest trees. Among the common tree species found in Pelham's forests are White Pine, White Oak, Red Oak, American Beech, White Birch, Black Birch, Sugar Maple, Red Maple and Eastern Hemlock.

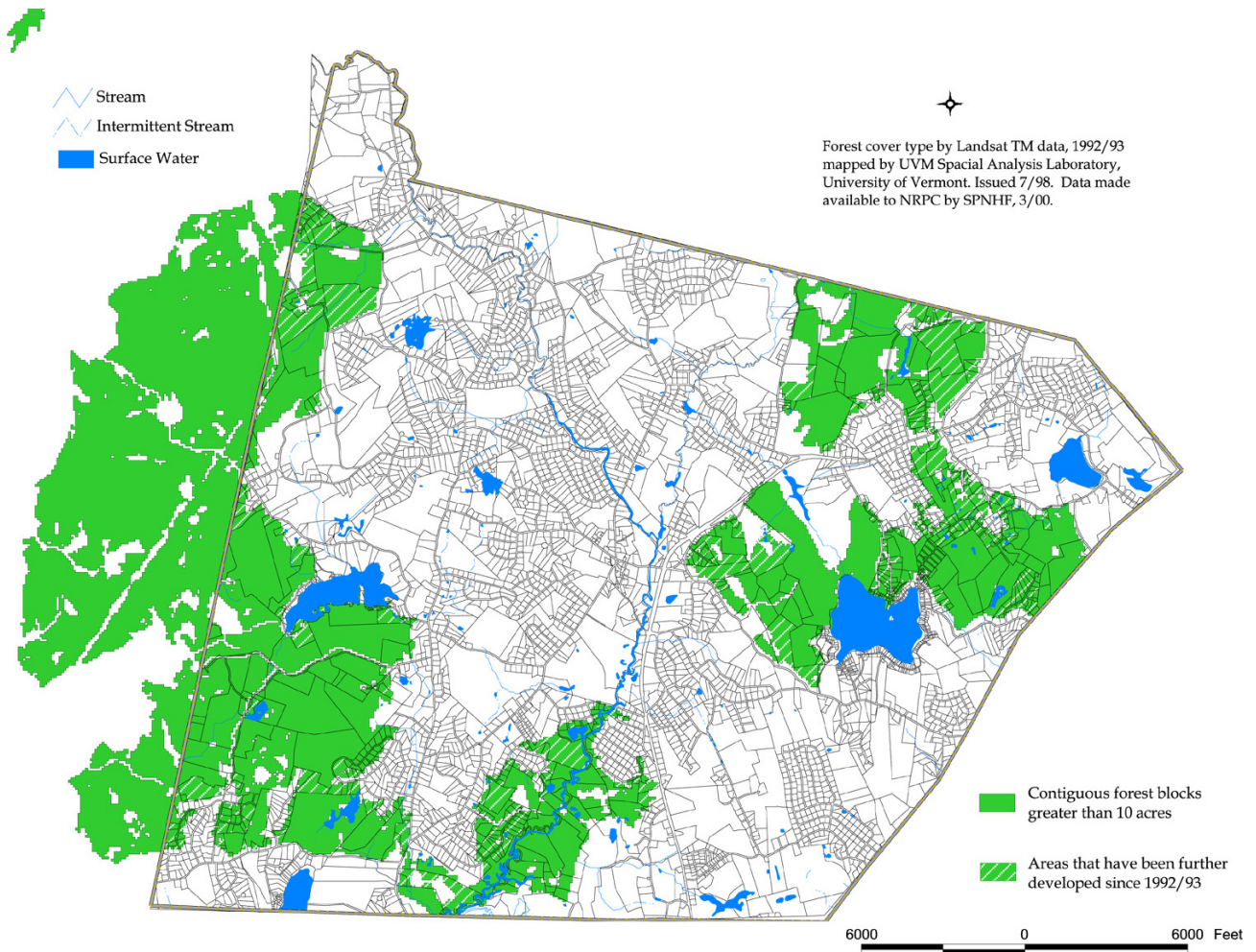
White pine has been the predominant tree harvested since colonial times. Hillsborough County is still a leader in white pine sawlog production. Red oak and sugar maple command a good market price. Deciduous and mixed forest types are dominant in Pelham and are widely scattered throughout the Town as illustrated on Map IV-9 and IV-10. Many species of birds and mammals require large, unbroken tracts of forest in order to sustain their populations. Preserving unfragmented forest blocks helps retain the Town's scenic beauty and provides wildlife corridors for larger mammals.

Silviculture activities in Pelham consist of predominately small Christmas tree and firewood sales. Firewood is still widely used as supplemental heat source in the winter. Small woodlots continue to be selectively cut as supplemental income. Performance standards and plan review for silvicultural activities are regulated by the State through timber harvesting and water quality laws. Regulation prohibits the placement of slash and mill waste in or near waterways and limits clear-cutting near great ponds and streams. These requirements may mitigate to some degree water quality impacts associated with timber harvesting.

Table IV-4 provides a summary of Pelham's forest facts derived from *New Hampshire's Changing Landscape*. The forest and habitat data provided in that report is derived from 1992 - 1993 Landsat satellite imagery, the most recently available data source on forest resources on a regional level. Forest blocks of greater than 10 contiguous acres are illustrated on Map IV-9. Forest blocks of greater than 500 contiguous acres are illustrated on Map IV-10. In both cases, areas of forest have been lost since the map data of 1992-1993 was released (these areas estimated and are illustrated as striped on the maps).

¹⁷ The Society for the Protection of New Hampshire Forests, *New Hampshire's Changing Lands*, 1999.

Map IV-9: Forest Blocks Greater Than 10 Acres



Map IV-10: Forest Blocks Greater Than 500 Acres

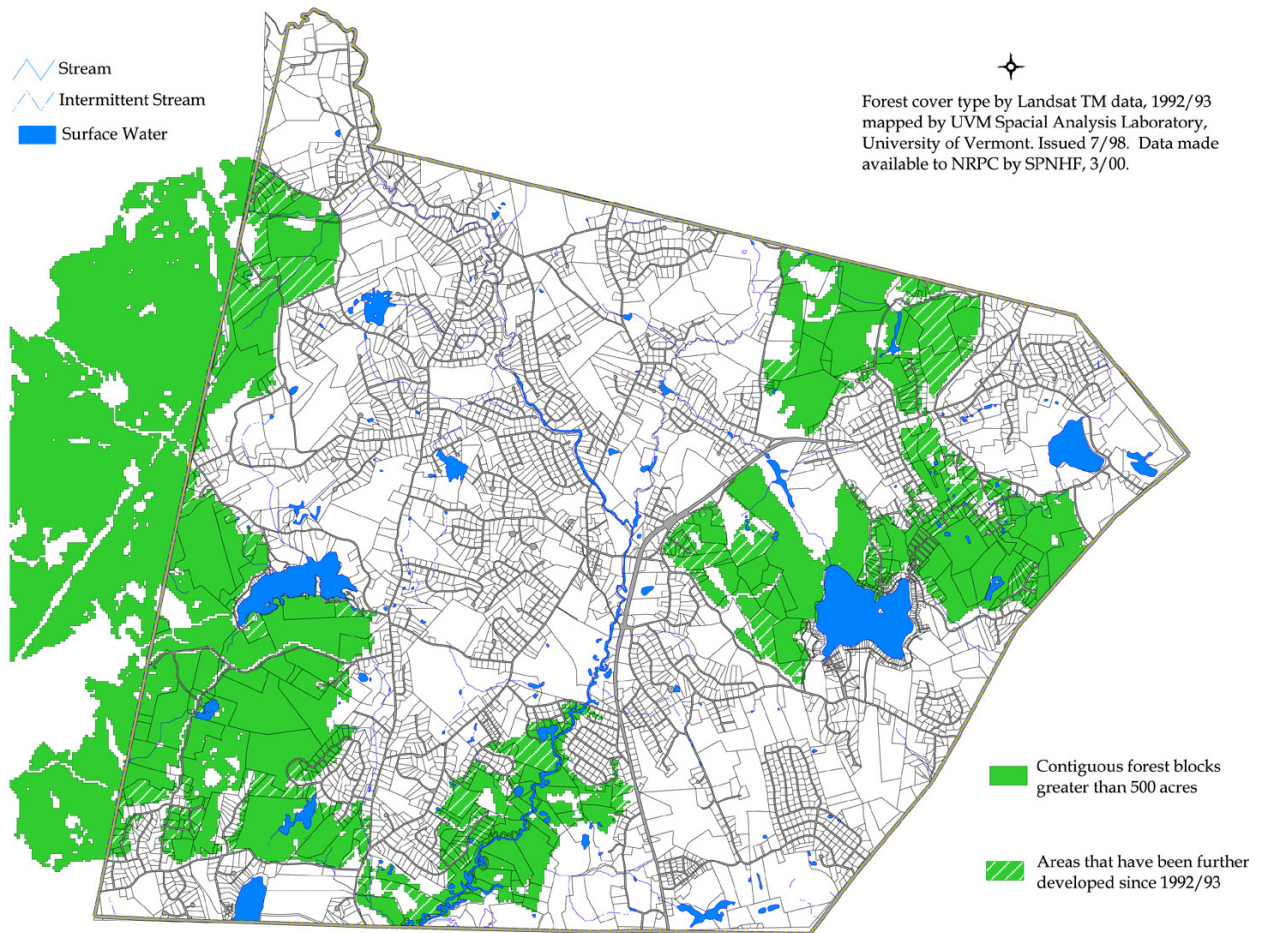


Table IV-4: Pelham Forest Facts

Area and Percentage in Forest (1993)	11,181.0 acres or 66.8 percent
Total area in Forest Blocks > 500 acres	3,118.48 acres
Number of Forest Blocks > 500 acres	5 forest blocks > 500 acres
Average and Median Size of all Forest Blocks	132.4 acre average and 61.2 acre median
Percentage of Forest Blocks > 10 acres that are protected	8.8 percent blocks > 10 protected
Predicted Decline in Forest Area by 2020	1,886.0 acres predicted to decline
Predicted % Decline in Forest Block Size by 2020	27.6 percent decline predicted

Source: Society for the Protection of New Hampshire Forests, *New Hampshire's Changing Landscape*, 1999, based on 1992-1993 landsat data.

10. Wildlife and Plants

Pelham's natural resource base provides a habitat for many plant and animal species. A variety of habitats such as wetlands, forests, fields, rivers, and streams are essential to support a diversity of species in quantities healthy enough to ensure continuation of the species. Maintaining quality habitats is crucial to the continuation of all plant and animal species.

The New Hampshire Natural Heritage Inventory (NHI), a program of the Department of Resources and Economic Development, tracks threatened and endangered species and exemplary natural communities in the State. Using a ranking system developed by the Nature Conservancy, the NHI assesses the rarity of a species on a global and state level. State listing ranks are defined by New Hampshire Code of Administrative Rules (RSA 217-A:3). The NHI records five terrestrial (forest) and two palustrine (wetland) exemplary natural communities. Five of the seven listed are ranked as the highest importance in New Hampshire. The rating is based on a combination of how rare the community is and how large or healthy it is in the Town.

There are 170 natural community types described by the New Hampshire Natural Heritage Inventory Program. Natural communities are basically groupings of plants that occur together in recurring patterns based on water, soils, climate, and nutrients. These communities represent intact examples of New Hampshire's native flora (plants) and fauna (animals). Appendix IV-3 provides a complete NHI listing of the fifty-six exemplary natural communities or rare species for Pelham.

a. Animals

Animal species commonly found in Pelham include: raccoons, opossums, skunks, muskrats, beavers, porcupines, woodchucks, white-tailed deer, squirrels, mice, bats, foxes, rabbits and other indigenous species that are adapted to living near humans and urban activities. Sightings of coyote, otter, black bear, ermine, mink and fisher cats have increased in Pelham as they have in other municipalities. Moose have also been sighted in recent years. Larger animals that require extensive habitat areas or species that require solitude such as black bears and are occasionally sighted in the Town. It is recommended that the Conservation Commission and interested citizens participate in the "Keeping Track" Program.¹⁸ This program uses animal tracks to identify habitats and feeding grounds in a systematic manner for a variety of animals. The information gained can be the start of an inventory and a monitoring system of prime habitats for future conservation.

¹⁸ www.keepingtrackinc.org.

b. Birds

Bird species vary according to the season; however, they are also dominated by those species commonly found in southern New Hampshire. Doves, woodpeckers, chickadees, and jays are found throughout the year while warblers, sparrows, hummingbirds, wrens, swallows, robins, and several species of raptors are generally seasonal residents. In addition there are owls, wild turkeys, woodcocks, spruce grouse, blue herons, pileated woodpeckers, cardinals, bluebirds, and red-tail hawks. Other species such as ducks and geese may nest in the wetlands and ponds and many pass through the Town during spring and fall migrations.

c. Other Species

In addition to the highly visible species, habitats for other less visible species such as turtles, frogs, toads, salamanders, snakes and numerous insects are present in the Town. The NHI lists the Blanding's Turtle, Eastern Box Turtle, Banded Sunfish, and two species of mollusks (invertebrates) as threatened or endangered in New Hampshire.

d. Vernal Pools

Vernal pools or "spring" pools are essential for the life cycle of many invertebrates and amphibians. These temporary forested wetlands serve as a home to many of these species, which feed of the nutrients from fallen leaves. Vernal Pools can range in size from a few square feet to several acres. Vernal pools are generally associated with forested wetlands, but can also be found within larger wetlands, such as oxbows in river floodplains or scrub-shrub wetlands.

Most vernal pool animals do not live their entire lives in the pool but migrate in response to snow melt and early spring rains. The pools generally dry up by mid to late summer. Depending on the groundwater, some pools will refill in the autumn. Mole salamanders and wood frogs spend 90% of their lives in the surrounding uplands, perhaps as far as a quarter mile from the pool. Adults migrate to the pool for a few weeks to reproduce and surviving juveniles leave before the water dries.

Other organisms (e.g., snakes, turtles, insects, and birds) migrate from nearby wetlands to breed or feed in the productive pool waters. These animals return to more permanent wetlands. Other animals develop entirely in the pool and most survive the dry season. Fingernail clams and air-breathing snails burrow beneath the leaves that remain to await the return of water. Fairy shrimp deposit eggs in the dry pool that hatch after the pool refills.

e. Plants

Plants species in Pelham are again dominated by those species commonly found in southern New Hampshire. The NHI records indicate the presence of forty-six threatened, endangered or species of concern plant species in Town. Among the most noteworthy of the Town's important natural communities is the unique collection of plant species found in the vicinity of Jeremy Hill. The unusually high number of plant species listed in Pelham is an indication of the uniqueness and importance of the Town's natural areas. A detailed listing of threatened or endangered plant and animal species is provided in Appendix IV-3.

D. EXISTING AND POTENTIAL FUTURE CONSERVATION LANDS

I. Existing Conservation Land

a. Land Protected through Public and Private Ownership or Zoning

Pelham contains a very few permanently protected conservation lands. 2,312 acres of Pelham's total land area of 17,157 acres is protected either through public ownership, private conservation efforts or through the Town's Recreation-Conservation-Agricultural Zoning District. These parcels are widely distributed throughout Town. The parcels are illustrated on Map VI-11. The preservation of these parcels is of tremendous importance to the protection of the visual quality, water quality, farms and forests, wildlife habitats, greenways, trails and remaining rural character of the Town.

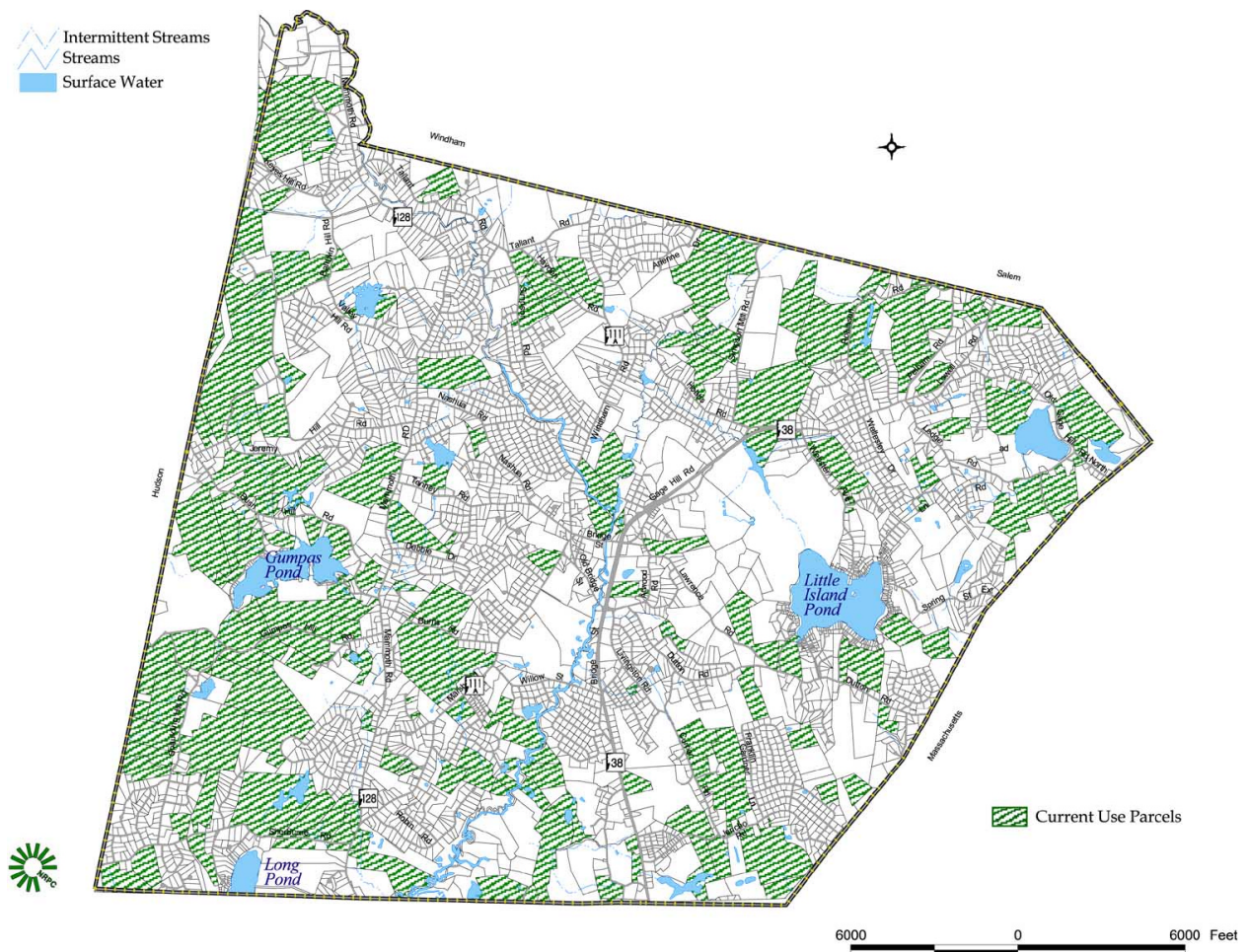
b. Land in "Current Use"

The New Hampshire legislature has recognized the importance of open space and has found that its preservation is in the public interest:

It is hereby declared to be in the public interest to encourage the preservation of open space, thus providing a healthful and attractive outdoor environment for work and recreation of the State's citizens, maintaining the character of the State's landscape, and conserving the land, water, forest, agricultural and wildlife resources. It is further declared to be in the public interest to prevent the loss of open space due to property taxation at values incompatible with open space usage. Open space land imposes few if any costs on local government and is therefore an economic benefit to its citizens. (RSA 79-A:1)

The current use program provides reduced property assessments for forests, farmland and wetlands of ten acres or greater and for active farms of less than ten acres with a minimum \$2,500 gross value of product. However, the program only provides short-term protection because enrolled open land can easily be converted to other uses. Land coming out of current use is subject to a land use change tax of 10% of the fair market value at the time of the change. Seventy five (75%) percent of that tax goes into a Conservation Fund to purchase land for conservation purposes. According to the NRPC GIS database, 4,798 acres of land was enrolled in the "current use" program in 2002. This land is illustrated on Map IV-12.

Map IV-12: Land in Current Use, 2002



2. Priorities for Future Conservation Efforts

a. The Regional Environmental Planning Program (REPP)

As part of a state-wide effort with funding provided by the New Hampshire Department of Environmental Resources (DES), the Nashua Regional Planning Commission has been working with member communities, regional and state organizations to identify the natural and cultural resource protection needs and priorities for the region.

The Regional Environmental Planning Program (REPP) has been a response to these statewide conservation efforts.¹⁹ During Phase One of the program representatives of each of NRPC's member communities were provided a series of maps containing region-wide natural/cultural resource information, a base map of their own community, instructions and a summary of municipal conservation goals. Information collected from communities has been digitized and compiled into a first phase report that includes a map showing the location and type of resource. During Phase Two, the communities were asked to further prioritize the resources identified in the first phase. Phase Two asks each community to identify their top five natural and cultural resource priorities. Phases Three through five have been primarily devoted to creating detailed Geographic Information System (GIS) data layers. Current conservation priorities are shown in Table IV-5.

Table IV-5: Conservation Priorities

Number on Map IV-11	Priority	Size in Acres	Description
1	1	130	Abuts the Pelham Fish and Game Club and includes farmland, wetland, forest and historic house and barn. Last farm of this size in Pelham. Provides a natural corridor that connects to the "southeast lands" in Windham.
2	2	129	Located in proximity to Musquash Conservation District, Gumpas Pond and protected land held by New England Forestry Foundation. Includes mostly forest. Provides additional open space in regional wildlife corridor.
3	3	200	Located immediately north of Little Island Pond and includes summer camp, forest, trails, dock and beach. Purchase of development rights would ensure camp will continue to operate and land preserved.

Source: NRPC, *Regional Environmental Protection Program*, 2001.

b. Potential Wildlife and Recreational Corridors

Musquash Brook and Gumpas Pond Watersheds –These watersheds were chosen as the top regional priority for the Towns of Pelham and Hudson because they are significant in terms of water resources and wildlife habitat. The area contains a vast network of beaver ponds and wetlands and remains in a near natural condition. The New Hampshire Natural Heritage Inventory has identified several species, which are considered rare, threatened, or endangered in the state. This region was one of the first areas settled in Pelham and Hudson. The area is dotted with old cellar holes, farm roads, stone walls, culverts and dams and other significant historical resources. The Nash-Hamblett (Musquash Conservation Land, 416.5 acres) and the Guertin (50 acres) properties already provide some protection to the watershed in Hudson. Pelham has several protected properties in this area, including the Fisher Family Trust and the James and Diane Fisher parcel. The New England Forestry Foundation also owns land in both towns.

¹⁹ NRPC, *The Regional Environmental Planning Program*, 2000.

Northeast Pelham Greenway – This corridor is also has the potential of inter-municipal joining conservation lands in Windham, referred to as the Southeast Lands to the Dracut, Massachusetts line. The area has fields, forests and wetlands that provide prime habitat for moose, deer and other animals. There are two Prime Wetlands within this tract of land. The Girl Scout Camp and the land along Dutton Road comprise a large area of the Little Island Pond watershed. The greenway would run through Pelham just east of Simpson Mill Road the capped landfill, provide wildlife movement through Pelham Fish and Game Land, the Helgence property, Pine Valley Golf Course, Little Island Pond Prime Wetland and its surrounding upland areas, the watershed along Dutton Road, as well as the Girl Scout Camp to the Peabody Town Forest via the powerlines and the land surround the Peabody Town Forest. The area from Dutton Road to the Dracut line provides additional movement for wildlife since it is forested. The powerlines provide much needed field and brush habitat for a variety of animal and bird species as was noted in the Prime Wetland Study in 1999.

c. Land and Community Heritage Investment Program (LCHIP)

The Land and Community Heritage Commission (LCHC) was established under Senate Bill 493 in 1999 "*...to determine the feasibility of a new public-private partnership to conserve New Hampshire's priority natural, cultural and historic resources.*" In 2000, Senate Bill 401 was presented in order to provide the LCHC with \$3 million to begin a matching grant program for local land conservation efforts.

A program called the Land and Community Heritage Investment Program (LCHIP) will carry out the goals of Senate Bill 401 and the LCHC. The New Hampshire General Court created LCHIP in order to:

*"...conserve and preserve this State's most important natural, cultural, and historical resources through the acquisition of lands, and cultural and historical resources, or interests therein, of local, regional, and statewide significance, in partnership with the State's municipalities and the private sector, for the primary purposes of protecting and ensuring the perpetual contribution of these resources to the State's economy, environment, and overall quality of life."*²⁰

LCHIP was designed to achieve this mandate by providing grants to eligible applicants. Applicants must provide at least a 50% match (at least half of which must be in cash) to be eligible for funding through the program. The next grant round for LCHIP funds will take place in the spring of 2002. Communities will use the conservation priorities established through the REPP process to propose parcels and projects for grant funding through LCHIP.

The bill, as introduced, dedicated full funding of LCHIP at the \$12 million level. The House Resources, Recreation, and Development Committee voted to amend the bill to \$4 million for LCHIP in 2002. The amended bill does not include the real estate transfer tax as the dedicated funding source, but relies on the state's general fund after 2002. There are opportunities for Pelham to apply to this program.

²⁰ www.LCHIP.org

E. RECOMMENDATIONS

I. Topography

- Consider an amendment to the Zoning Ordinance, subdivision and site plan regulations to adopt a Slope Conservation Overlay District to protect the most severe slopes in Town from unsuitable development. Development of land with slopes greater than fifteen percent should be approached with extreme caution, giving consideration to the problems presented by these slopes. Active use or development of slopes greater than twenty-five percent should be avoided. As these areas are best suited for open space, reserving them for that purpose will minimize the potential for erosion and allow for maximum absorption of surface water run-off thus protecting down-slope residents.

2. Soils

- The Planning Board should continue to consider soil potentials and limitations when reviewing the intensity of development.
- The Town's agricultural lands are recognized as an important and endangered resource with few State or local incentives for keeping viable agricultural lands in production. To protect this valuable resource, the Town should take steps to protect active and idle agricultural lands from development for other uses and create incentives which encourage agricultural lands to be kept in, or returned to, productive farm use. The Trust for New Hampshire Lands Program or the Land and Community Heritage Investment Program may assist the Town in this endeavor.
- New development should be focused in large areas with slopes of less than fifteen percent, giving consideration to the other factors which affect the development suitability of these areas.
- Site Specific Soil Mapping Standards and enforcement actions should continue to be required in the subdivision regulations as a means of verifying actual site conditions, to determine the extent to which development is feasible and to ensure that approved development is constructed according to the approved site and subdivision plans. The non-residential site plan regulations should be reviewed and revised as necessary to require the use of SSSMS.

3. Water Resources

- Land adjacent to surface water resources is restricted from development or strictly monitored in its active use. As these areas are a vital interface between surface and groundwater supplies, they are best suited for open space and have the potential for forming the basis of an open space system serving all developable areas of the community.
- Enforce the Shoreland Protection Act around all great ponds.
- Consideration is given to the protection of surface water and groundwater supplies within the Town's boundaries as they are the life-blood of the community. Groundwater supplies exist which are capable of supporting higher intensities of development. However, these must be protected from contamination in the absence of a municipal waste treatment system.
- Protect existing wetlands and surface waters by amending the Wetlands Ordinance to increase the 50' buffer from the edge of the wetland or surface water. This buffer will protect the natural habitat surrounding wetlands and surface waters that is crucial to the proper functioning of these water resources.

- Continue to implement the Floodplain Overlay Zoning District to reduce losses due to flooding.
- Water supply wells located on till deposits are shallow in depth and very susceptible to land use related contamination (septic systems, fuel storage, fertilizers, road salt, etc.). The Town should consider increasing the setback of future land-uses to these water supply wells.
- Take advantage of the University of New Hampshire's Community Environmental Outreach Program (CEOP)²¹ and Natural Resources Senior Projects to continue prime wetland evaluations and designations.
- It is recommended that development of wetland areas continue to be restricted in the future through the Town's Wetland Conservation ordinance. This, combined with active enforcement of State regulations governing the location of septic system and along with the possibility of the Town adopting greater setback distances than the State's minimum, will ensure that these areas may continue to perform the natural functions for which they are best suited.
- Improve the licensing checklist to include the review of the National Pollution Discharge Elimination System permit, especially the facility's Stormwater Pollution Prevention Plan.
- Enforce licensing requirements of all junkyard facilities.
- Prepare a stormwater management plan that addresses the 6 minimum controls outlined under the EPA's Phase II Stormwater Regulations.
- Pursue further protection measures through the Department of Environmental Services.

4. Forests and Wildlife

- Utilize the Forestland Evaluation and Site Assessment (FLESA)²² for future forest planning and components of the program on all Town owned lands.
- Maintain 50 foot undisturbed, shady buffer around vernal pools and 100 foot buffer on property lines abutting forests and all surface waters.
- Consider legal easements on all Town Forests to preserve the land for recreation and permanent protection.
- Inventory all existing trails using Geographic Positioning System (GPS) and create a trail system map signage for all Town forests.
- Initiate a long-term insect monitoring plan for Hemlock Woolly Adelgid, weevils, and others.
- Take advantage of the University of New Hampshire's Community Environmental Outreach Program (CEOP) and Natural Resources Senior Projects for a plant biodiversity survey. These are inexpensive programs and the range of possible projects is limited only by the needs of the community and the availability of students to match those needs.

²¹ <http://ceinfo.unh.edu/Water/Documents/WRcomcon.htm>

²² North Country and Southern New Hampshire Resource Conservation and Development Area Councils, *Planning for the Future of Local Forests*, 2001.

5. Conservation

- Pursue the fee purchase, purchase of development rights or other conservation measures to protect the remaining open space properties. Legal easements should be placed on all conservation properties.
- Allocate 100% of the Land Use Change tax to the Conservation Fund to help contribute towards increasing the number of protected open space parcels and provide matching funds for potential funding sources.
- Farm protection should be pursued for existing or undeveloped lands with Prime or State designated soils.
- Establish a Capital Reserve Fund to raise funds for land protection.
- The Conservation Commission and interested citizens should consider participating in the "Keeping Track" Program. This program uses animal tracks to identify habitats and feeding grounds in a systematic manner for a variety of animals. The information gained can be the start of an inventory and a monitoring system of prime habitats for future conservation.
- Take advantage of the University of New Hampshire's Community Environmental Outreach Program (CEOP) and Natural Resources Senior Projects. These are inexpensive programs and the range of possible projects is limited only by the needs of the community and the availability of students to match those needs.
- The Pelham Fish and Game land, the golf course, Camp Runnels and the watershed of the pond, Little Island Pond Prime Wetland and the surrounding uplands along with the Peabody Town Forest and the surrounding lands with powerline easements should be recognized as a greenway corridor and expanded so that movement of wildlife can continue to Dracut.

APPENDIX IV-I

Soil Limitations to Septic Systems

Slight Limitations to Septic Systems

Symbol	Soil Name and Slope
CaB	Canton fine sandy loam 0-8%

Moderate Limitations to Septic Systems

Symbol	Soil Name and Slope
CaC	Canton fine sandy loam 8-15%
CmB	Canton stony fine sandy loam 3-8%
CmC	Canton stony fine sandy loam 8-15%

Severe Limitations to Septic Systems

Symbol	Soil Name and Slope
AgA	Agawam fine sandy loam 0-3%
AgB	Agawam fine sandy loam 3-8%
BaA	Belgrade silt loam 0-3%
BaB	Belgrade silt loam 3-8%
CaD	Canton fine sandy loam 15-25%
CmD	Canton stony fine sandy loam 15-25%
CmE	Canton stony fine sandy loam 25-35%
CnC	Canton very stony fine sandy loam 8-15%
CnD	Canton very stony fine sandy loam 15-35%
CpB	Chatfield-Hollis-Canton complex 3-8%
CpC	Chatfield-Hollis-Canton complex 8-15%
CsB	Chatfield-Hollis complex 3-8%
CsC	Chatfield-Hollis complex 8-15%
CtD	Chatfield-Hollis-Rock outcrop complex 15-35%
DeA	Deerfield loamy fine sand 0-3%
DeB	Deerfield loamy fine sand 3-8%
Has	Hinckley loamy sand 0-3%
HsB	Hinckley loamy sand 3-8%
HsC	Hinckley loamy sand 8-15%
HsD	Hinckley loamy sand 15-35%
MoB	Montauk fine sandy loam 3-8%
NnA	Ninigret very fine sandy loam 0-3%
PbB	Paxton fine sandy loam 3-8%
PbC	Paxton fine sandy loam 8-15%
PfB	Paxton stony fine sandy loam 3-8%
PfC	Paxton stony fine sandy loam 8-15%
PfD	Paxton stony fine sandy loam 15-25%
PhB	Pennichuck channery fine sandy loam 3-8%
PhC	Pennichuck channery fine sandy loam 8-15%
PHd	Pennichuck channery fine sandy loam 15-25%
SsA	Scituate fine sandy loam 0-3%
SsB	Scituate fine sandy loam 3-8%
StA	Scituate stony fine sandy loam 0-3%
StB	Scituate stony fine sandy loam 3-8%
StC	Scituate stony fine sandy loam 8-15%
WdA	Windsor loamy sand 0-3%
WdB	Windsor loamy sand 3-8%
WdC	Windsor loamy sand 8-15%
WdD	Windsor loamy sand 15-35%
WoB	Woodbridge loam 3-8%
WvD	Woodbridge stony loam 3-8%

Source: US Department of Agriculture, Soil Conservation Service, *Soil Survey of Hillsborough County, NH, Eastern Part*, 1980.

APPENDIX IV-2

Important Agricultural Soils in Pelham

Prime Farmlands

Symbol	Soil Name and Slope	
Om	Occum fine sandy loam	high bottom
PbB	Paxton fine sandy loam	3-8%
Pu	Pootatuck fine sandy loam	Unknown
WoA	Woodbridge loam	Unknown
WoB	Woodbridge loam	3-8%

Statewide Importance

Symbol	Soil Name and Slope	
CaB	Canton fine sandy loam	0-8%
CaC	Canton fine sandy loam	8-15%
PbC	Paxton fine sandy loam	8-15%
PhB	Pennichuck channery fine sandy loam	3-8%
PhC	Pennichuck channery fine sandy loam	8-15%
SsB	Scituate fine sandy loam	3-8%

Source: US Department of Agriculture, Soil Conservation Service, *Soil Survey of Hillsborough County, New Hampshire, Eastern Part*, 1980.

APPENDIX IV-3

New Hampshire Natural Heritage Inventory Rare Species and Exemplary Natural Communities List

Flag	Species or Community Name	# Locations Listed in the last 20 Years			
		Federal	State	Town	State
	Natural Communities – Terrestrial				
***	SNE Dry Central Hardwood Forest on Acidic Bedrock or Till	-	-	3	15
***	SNE Dry Central Hardwood Forest on Acidic Bedrock or Till	-	-	1	15
***	SNE Dry Rich Forest on Acidic/Circumneutral Bedrock or Till	-	-	3	11
***	SNE Floodplain Forest	-	-	1	47
**	SNE Rich Mesic Forest	-	-	1	12
	Natural Communities – Palustrine				
**	Atlantic White Cedar Basin Swamp	-	-	1	28
***	Inland New England Acidic Pond Shore/Lake Shore Community	-	-	1	12
	Plants				
	Arethusa (Arethusa bulbosa)	-	E	Historical	21
*	Atlantic White Cedar (Chamaecyparis thyoides)	-	-	1	44
**	Bird's-Foot Violet (Viola pedata var lineariloba)	-	T	2	12
	Blunt-Leaved Milkweed (Asclepias amplexicaulis)	-	T	Historical	12
*	Blunt-Lobe Woodsia (Woodsia obtusa)	-	T	2	8
***	Bulbous Bitter-Cress (Cardamine bulbosa)	-	E	1	5
**	Early Buttercup (Ranunculus fascicularis)	-	E	1	2
**	Fern-Leaved Foxglove (Aureolaria pedicularia var intercedens)	-	E	1	6
	Flaccid Sedge (Carex flaccosperma var glaucoidea)	-	E	Historical	1
**	Four-Leaved Milkweed (Asclepias quadrifolia)	-	T	2	9
	Fringed Gentian (Gentiana crinita)	-	T	Historical	28
	Goat's-Rue (Tephrosia virginiana)	-	E	Historical	6
***	Hairy Bedstraw (Galium pilosum)	-	E	1	5
**	Hairy Stargrass (Hypoxis hirsuta)	-	T	3	13
***	Hoary Mt. Mint (Pycnanthemum incanum)	-	E	4	5
	Inflated Sedge (Carex bullata)	-	E	Historical	5
	Long-Fruited Anemone (Anemone cylindrica)	-	-	Historical	11
	Maryland Tick-Trefoil (Desmodium marilandicum)	-	E	Historical	4
	One-Sided Rush (Juncus secundus)	-	E	Historical	6
	Pink Azalea (Rhododendron nudiflorum)	-	E	Historical	2
***	Prostrate Tick-Trefoil (Desmodium rotundifolium)	-	T	3	9
	Purple Milkweed (Asclepias purpurascens)	-	-	Historical	4
***	River Birch (Betula nigra)	-	T	1	12
**	Rue Anemone (Anemonella thalictroides)	-	T	2	5
	Siberian Chives (Allium schoenoprasum var sibiricum)	-	T	Historical	7
***	Sickle-Pod (Arabis canadensis)	-	T	3	7
***	Skydrop Aster (Aster patens var patens)	-	T	3	10
*	Slender 8-Flowered Fescue (Festuca octoflora var tenella)	-	E	1	3
	Slender 8-Flowered Fescue (Festuca octoflora var tenella)	-	E	Historical	3

continued, next page

APPENDIX IV-3 (Continued)

New Hampshire Natural Heritage Inventory Rare Species and Exemplary Natural Communities List

Flag	Species or Community Name	# Locations Listed in the last 20 Years			
		Federal	State	Town	State
	Plants (continued)				
*	Slender Bush-Clover (<i>Lespedeza virginica</i>)	-	T	2	6
	Slender Knotweed (<i>Polygonum tenue</i>)	-	E	Historical	3
	Slender Pinweed (<i>Lechea tenuifolia</i>)	-	E	Historical	2
	Slender-Flowered Muhlenbergia (<i>Muhlenbergia tenuiflora</i>)	-	-	Historical	3
**	Small Bidens (<i>Bidens discoidea</i>)	-	E	1	9
**	Smooth-Forked Chickweed (<i>Paronychia canadensis</i>)	-	T	2	7
**	Smooth-Forked Chickweed (<i>Paronychia canadensis</i>)	-	T	4	7
	Spiked Needlegrass (<i>Aristida longespica</i> var <i>geniculata</i>)	-	E	Historical	4
*	Sprout Muhlenbergia (<i>Muhlenbergia sobolifera</i>)	-	T	1	6
***	Swamp Azalea (<i>Rhododendron viscosum</i>)	-	T	10	42
	Torry's Mountain Mint (<i>Pycnanthemum torrei</i>)	-	E	Historical	1
*	White-Topped Aster (<i>Sericocarpus linifolius</i>)	-	T	1	6
**	Wild Garlic (<i>Allium canadense</i>)	-	E	1	5
	Wild Lupine (<i>Lupinus perennis</i>)	-	T	Historical	37
	Wild Senna (<i>Cassia hebecarpa</i>)	-	E	Historical	10
	Vertebrates – Reptiles				
**	Blanding's Turtle (<i>Emydoidea blandingii</i>)	-	-	1	57
	Eastern Box Turtle (<i>Terrapene carolina</i>)	-	-	Historical	6
	Vertebrates – Fish				
	Banded Sunfish (<i>Enneacanthus obesus</i>)	-	-	Historical	8
	Invertebrates – Mollusks				
**	Brook Floater (<i>Alasmodonta varicosa</i>)	-	E	1	30
**	Eastern Pondmussel (<i>Ligumia nasuta</i>)	-	-	1	4

Listed? E = Endangered T = Threatened

Flags **** = Highest Importance
 *** = Extremely High Importance
 ** = Very High Importance
 * = High Importance

These flags are based on a combination of: 1) how rare the species or community is, and 2) how large or healthy its examples are in that town. Please contact Natural Heritage Inventory at (603) 271-3623 for more information.

APPENDIX IV-4

Sources

- Amman, A., and A. L. Stone, *A Method for the Comparative Evaluation of Non-Tidal Wetlands in New Hampshire*, 1991.
- Comprehensive Environmental Inc., *Phase II Stormwater Rule Summary and How Municipalities Can Prepare for Compliance*; 2000.
- Hillsborough County Conservation District, *Erosion and Sediment Control Design Handbook for Developing Areas of New Hampshire*, 1981 and amended in 1987.
- Land and Community Heritage Investment Program, www.LCHIP.org
- Nashua Regional Planning Commission, *Regional Environmental Planning Program*, 2000.
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- Pelham Conservation Commission and Nashua Regional Planning Commission, *Proposal for Alternative Winter Road Maintenance Study*, 2001.
- Pelham Conservation Commission, *Pelham Prime Wetland Study*, 1987.
- Society of Soil Scientists of Northern New England, *Site Specific Soil Mapping Standards*, 1999.
- State of New Hampshire, RSA 147:14, *Drainage* and RSA 147:17-a, *Private Sewage Systems*.
- State of New Hampshire, RSA 482-A:15, *Prime Wetlands*.
- The Society for the Protection of New Hampshire Forests, *New Hampshire's Changing Lands*, 1999.
- United States Department of Agriculture, Soil Conservation Service, *Soil Survey of Hillsborough County New Hampshire, Eastern Part*, October 1981.
- United States Geological Survey, *Water Resources Investigations Report 86-4358, Hydrogeology of Stratified Drift Aquifers and Water Quality in the Nashua Regional Planning Commission Area, South-Central New Hampshire*, 1987.
- University of New Hampshire, *Pelham Prime Wetland Assessment*, 1999.

This chapter of the Pelham Master Plan update is intended to supplement, and not replace, the findings and recommendations of any earlier studies.

#230B-4

CHAPTER V TRANSPORTATION

A. INTRODUCTION

Although Pelham retains much of its rural character, the Town has grown from a rural community to a relatively suburban one in the past thirty years. As such, the automobile is the dominant mode of transportation and this is unlikely to change in the near future. The key to preserving and enhancing Pelham's transportation network is to ensure that roadway capacity and regional connections are maintained and that incremental improvements to the non-motorized network, such as sidewalks and bicycle routes, are implemented.

The layout of the road network and the types of transportation mode choices available in the community impact the patterns of development as well as business activities and community character. The purpose of the Transportation Chapter of the Master Plan is to develop strategies for an efficient and safe transportation system that will preserve the community's character, accommodate growth and increase the availability of alternative transportation choices. This chapter includes a discussion of: 1) the existing transportation network, including the roadway classification, existing traffic conditions, highway capacity, accidents, pavement conditions, bridge conditions and travel patterns; 2) future traffic projections; 3) transportation solutions, including regulations, access management, community character guidelines, roundabouts, traffic calming, scenic road designation; 4) alternative transportation; and 5) recommendations.

B. EXISTING TRANSPORTATION NETWORK

I. Roadway Classification

Based on the NH DOT 1998 road mileage inventory, there are 110 miles of roads in the Town of Pelham. The State of New Hampshire classifies roadways in two ways. The first is by a *state* funding category (the *State-Aid* classification system) and the second is by *federal* funding category (the *Functional* classification system). The *State-Aid* classification system was developed by the State of New Hampshire, as defined by RSA 229-231, to determine responsibility for construction, reconstruction and maintenance as well as eligibility for use of state aid funds. Descriptions of the State Aid classification system are included in Appendix V-1. The State-Aid classification road mileage in Pelham is summarized in Table V-1 and illustrated on Map V-1.

Table V-1: State Aid Classification Road Mileage

State Class	Road Mileage	Percent of Total
Class I Primary State Highway	0.661	0.6 %
Class II Secondary State Hwy.	18.739	17.1 %
Class III Recreation Roads	0.000	0.0 %
Class IV Compact Section	39.629	36.0 %
Class V Rural Roads Local	44.618	40.6 %
Class VI Un-maintained	6.245	5.7 %
Total:	109.892	100.0 %

Source: NH DOT 2000

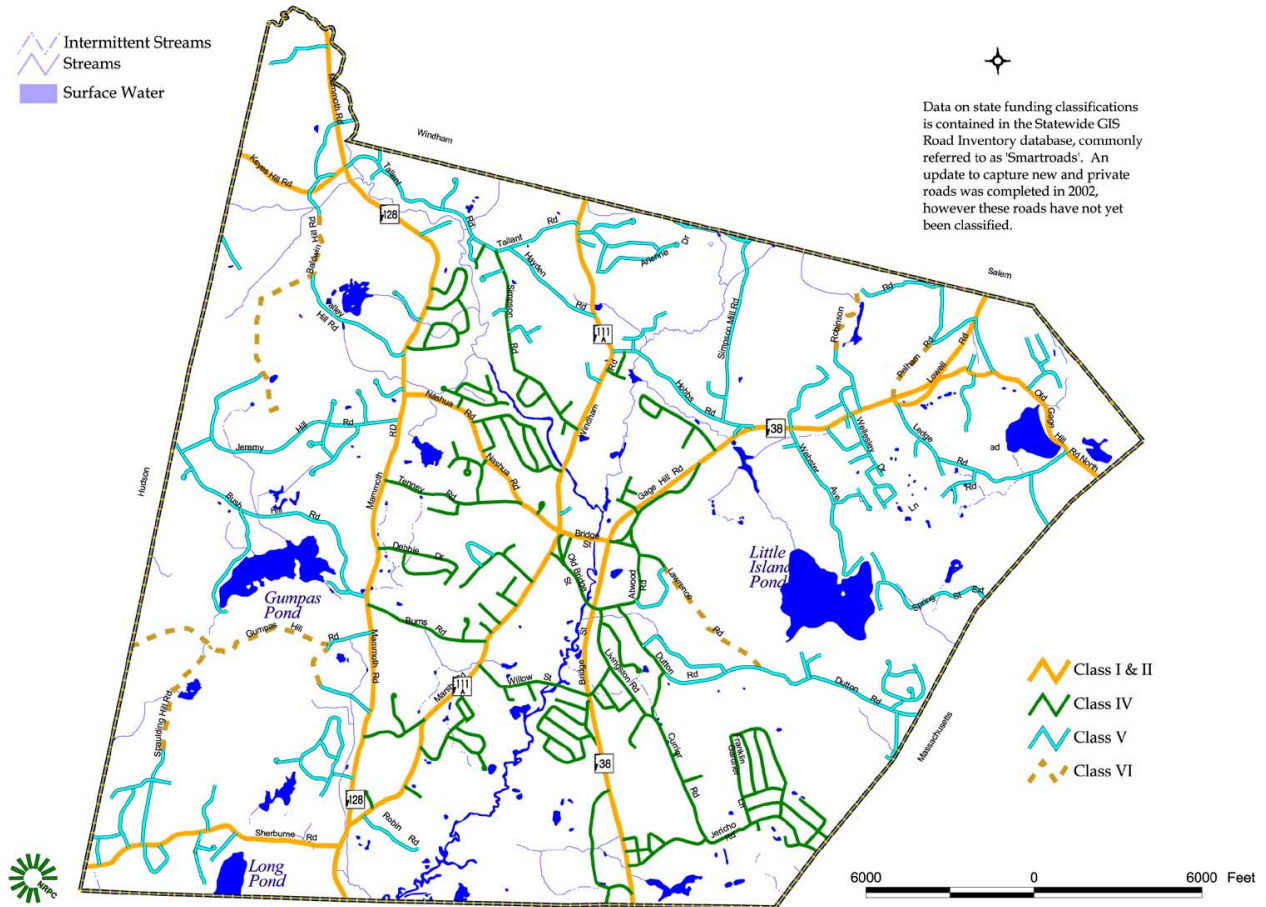
The *Functional* classification system was also developed by the State of New Hampshire in cooperation with the Federal Highway Administration (FHWA). The Functional classes were set according to the criteria defined by the American Association of State Highway and Transportation Officials (AASHTO). This system classifies roads and highways into different categories according to their functions and was developed to define eligibility for funds under federal programs. Descriptions of the functional classification system characteristics are included in Appendix V-1. Collector and Arterial roadways in Pelham are listed in Table V-2 and illustrated on Map IV-2.

Table V-2: Roadway Functional Classification

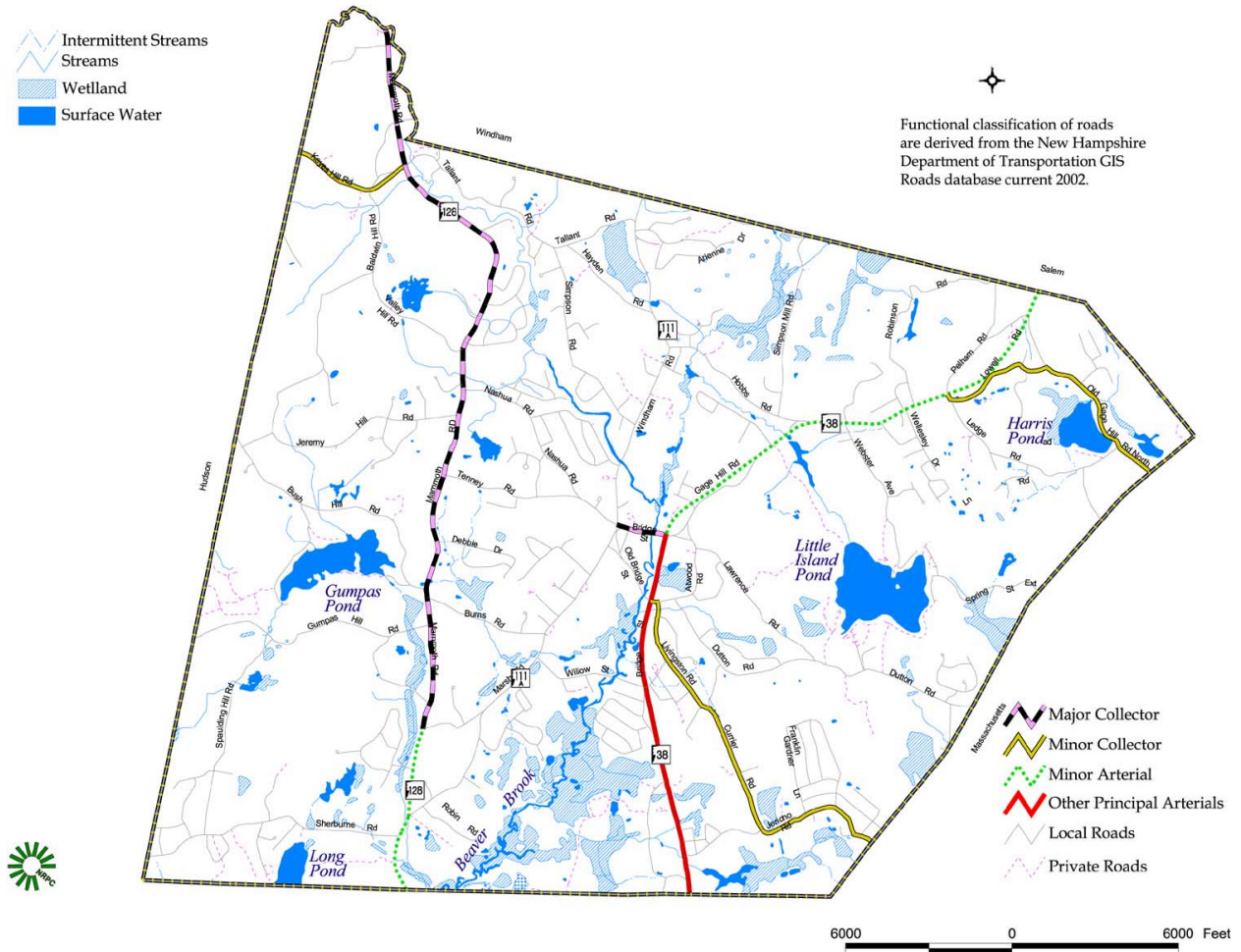
Functional Classification	Roadways
Urban Other Principal Arterial	NH 38 from Massachusetts line to Main Street
Urban Minor Arterial	NH 111A from NH 128 to Main Street; NH 128 from Massachusetts line to NH 111A;
Urban Major Collector	Main Street
Rural Minor Arterial	NH 38 from Main Street to Salem line
Rural Major Collector Road	NH 128 from NH 111A to Windham line
Rural Minor Collector Road	NH 111A from Main Street north to Windham line Keyes Hill Road; Gage Hill Road north from NH 38 to Methuen line Currier Road; Jericho Road from Currier Road to Dracut line
Local	All others

Source: NH DOT, 2000

Map V-1: State Aid Classification of Roadways in Pelham



Map V-2: Functional Classification of Roadways in Pelham



2. Existing Traffic Conditions

Historic traffic volume data for the Town of Pelham has been compiled from both NH DOT and the Nashua Regional Planning Commission (NRPC). The NH DOT collects traffic counts in accordance with federal guidelines under the Federal Highway Performance Monitoring Program (HPMS). The HPMS guidelines describe federal procedures for sampling highway and road volumes. These procedures provide the Federal Highway Administration with highway volumes for design standards and meet the Environmental Protection Agency's requirements for estimating vehicular highway travel. In addition to the NH DOT's annual traffic counting program, the NRPC maintains an ongoing traffic count program for validating the region's traffic model. The NRPC also provides traffic counts for member communities upon request. Historic traffic growth trends are shown in Appendix V-2. Map V-2 illustrates the average daily traffic for key roads in Pelham.

NH 38 has the heaviest traffic volumes in a 24-hour period. There were 13,245 vehicles per day (vpd) recorded at a location on NH 38 at Island Pond Brook in 1999. On NH 128 and Sherburne Road, there were 12,585 vpd in 1997. There were 11,765 vpd on NH 38 east of Rita Avenue in 1999. On NH 128 at the Mass State Line, there were 9,156 vpd recorded in 1998. Of the local roads where counts were taken, Bridge Street west of NH 38 at Beaver Brook has the highest volume for a 24-hour period with 8,297 vpd in 1997. The next greatest volume was at Sherburne Road, at the Hudson Town Line, with a count of 5,812 vpd in 1998.

Historic traffic count trends show that the highest growth rates occurred on local and collector roads due to residential growth. The traffic on Currier Road grew from 801 vpd in 1993 to 1,238 vpd in 1996. Other local roads with collector functions for residential areas such as Dutton Road, Hobbs Road, and Tallant Road also showed marked increases in traffic. The increases in traffic on NH 38 range from 1.1 percent per year (on NH 38 at the Mass. State line) to 6.1 percent per year (on NH 38 at the Salem line). The increases in traffic on NH 128 range from 0.9 percent per year north of Bush Hill to 3.2 percent per year at the Windham line.

a. NH Route 38

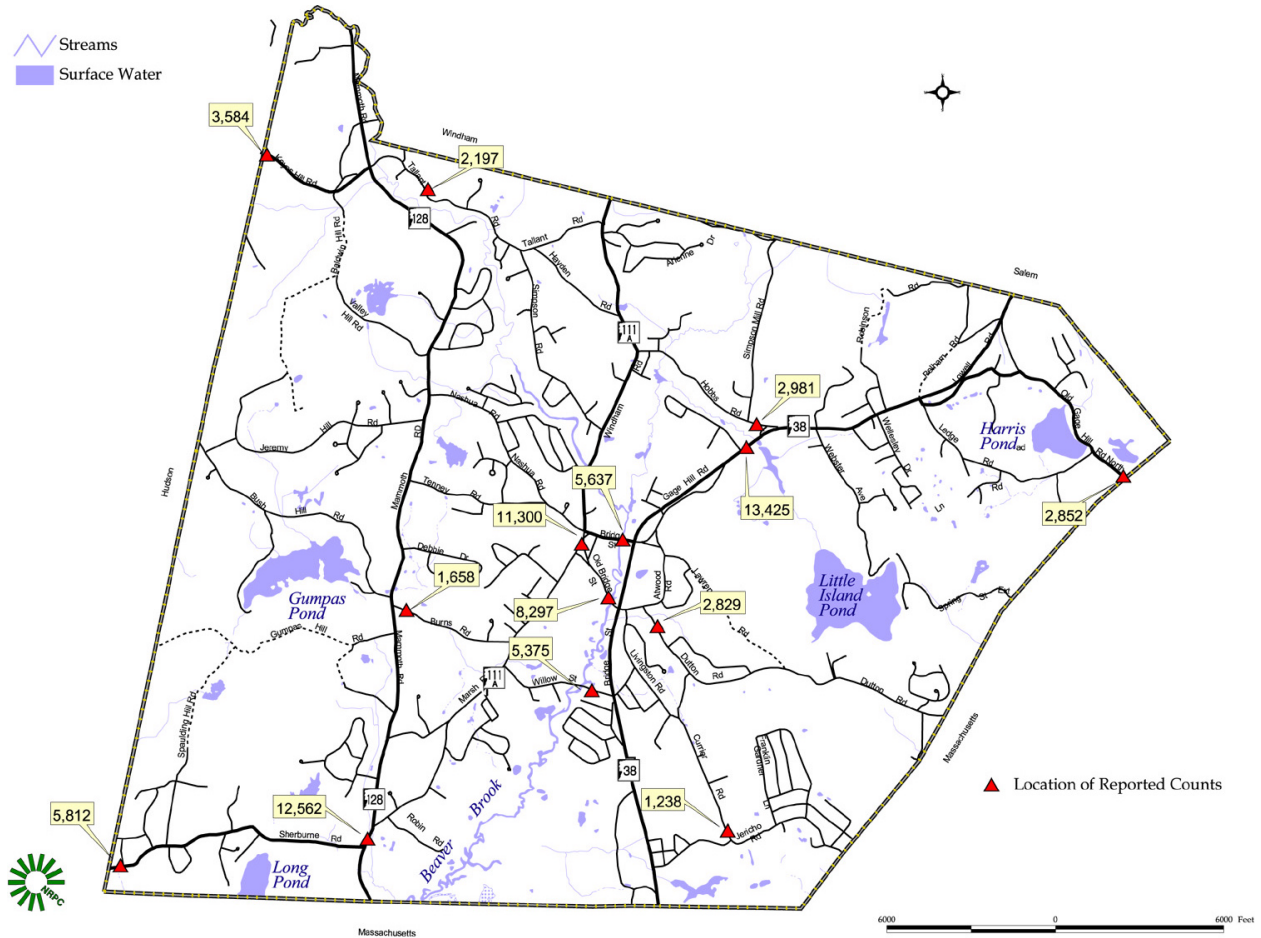
The NRPC completed a Route 38 corridor study in cooperation with the Rockingham Planning Commission in 1991. This study recommended a number of improvements for intersections in Pelham along the NH 38 corridor. These improvements included: improving stopping sight distances at the NH Route 38/Old Gage Hill Road intersection by re-aligning Old Gage Hill Road, widening approaches to the NH 38/Willow Street intersection and adding a left turn lane to the NH 38 approach to the NH 38/Jericho Road intersection.

b. Nashua Road/Main Street/Windham Road

At the request of the Town of Pelham, NRPC conducted a study in 1993 to determine the need for installing a traffic signal at the intersection of Nashua Road and Main Street with Route 111A Windham Road. The study also included signal analysis at the adjacent intersection of Route 111A Marsh Road and Old Bridge Street. NRPC updated this study in May 2000.¹ These intersections in the Town Center area were identified by town officials as being hazardous and congested on the minor street approaches through many hours of the day.

¹ NRPC, *Signal Warrant Analysis Update, Pelham Town Center Intersections*, June 2000.

Map V-3: Average Daily Traffic on Pelham Roads



Based on the analysis of data, it was concluded that the intersection of Nashua Road/Main Street with Route 111A warrants the installation of a traffic signal. The intersection of Route 111A with Old Bridge Street also qualified for a signal. If the Town decides to install signals, it may be desirable to link both signals in a coordinated system due to their close proximity. This could prevent queues from one signal from backing up into the other intersection. However, a roundabout may be another option for this intersection (see Section D-4, below). The most likely source of funding for improvements would be Pelham's allocation of Surface Transportation Funds for Urban Areas. A 20 percent match by the Town is required in order to access these funds.

3. Accidents

Accidents for the Town's roads are compiled by the NH DOT based on the reports filed at the police station. Table V-5 is based on the NHDOT's accident database for the latest three years of available data (1997 - 1999). Accidents involving personal injury are symptomatic of serious hazards. The data presented in the tables indicates fatality and personal injury accidents. Those accidents without fatalities or personal injury involved property damage only.

As shown in Table V-5 the NH 38/Old Bridge Street North/Atwood Road intersection experienced the most accidents in the three-year period with sixteen accidents. Eleven of these accidents involved property damage only and five involved personal injuries. There is a concern that the intersection should be redesigned to reduce the number of accidents. The NH 128/Tallant Road intersection experienced the second highest number of accidents in the three-year period. There were fourteen accidents at this location in the three-year period with nine resulting in personal injuries.

Table V-5: Three Year Accident Summary (1997-1999)

Intersection	Avg, Daily Traffic (vpd)	Million Vehicles Entering per Year	Total Property Damage Only	Total Personal Injury	Three Year Total	Accidents Per Million Entering Vehicles Per Year
Bridge St., NH 38/Old Bridge N./ Atwood Rd.	17600.0	6.42	11.0	5.0	16.0	0.83
Bridge St., NH 38/Willow St.	16666.7	6.08	3.0	0.0	3.0	0.16
Gage Hill Rd. /Main St./NH 38	13600.0	4.96	9.0	0.0	9.0	0.60
Lowell Rd., NH 38/Hobbs Rd.	14700.0	5.37	1.0	0.0	1.0	0.06
Main St./Windham Rd./Marsh Rd., NH 111A	12300.0	4.49	5.0	1.0	6.0	0.45
Mammoth Rd., NH 128/Marsh Rd., NH 111A	13000.0	4.75	3.0	3.0	6.0	0.42
Mammoth Rd., NH 128/Nashua Rd.	8000.0	2.92	3.0	0.0	3.0	0.34
Mammoth Rd., NH 128/Sherburne Rd.	15600.0	5.69	4.0	0.0	4.0	0.23
Marsh Rd., NH 111A/Willow St.	12200.0	4.45	3.0	0.0	3.0	0.22
NH 128/Tallant Rd	10000.0	3.65	5.0	9.0	14.0	1.28
Old Bridge Rd. N./Marsh Rd., NH 111A	11400.0	4.16	4.0	3.0	7.0	0.56

Source: NHDOT.

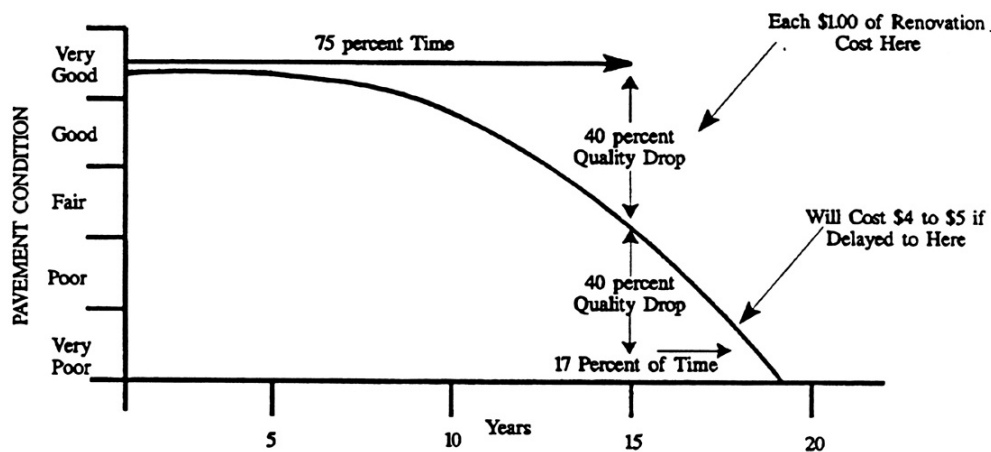
4. Pavement Conditions (Road Surface Management System)

It has been well documented that for about 75 percent of a pavement's life, its serviceability and cost of maintenance is less than one-fifth of the cost of maintaining/rehabilitating a pavement which has been allowed to enter the rapid deterioration stage of the last quarter of its design life. Good maintenance

management includes knowing when a pavement has reached that critical 75 percent point. Each pavement deteriorates differently depending upon climate, traffic structure, drainage and many other variables. A pavement is often beyond the critical cost point if it is allowed to deteriorate to a point of serious visible distress.

A pavement maintenance management system helps the Highway Department track this kind of deterioration. After critical pavements have been identified, the pavement management system will assist with selecting cost effective maintenance strategies based on rate of deterioration, load carrying ability, skid resistance and the expected life of a particular maintenance strategy. Figure V-1 shows how the need for maintenance and repair is affected over time. The cost for maintenance and repair of roads which are repaired within the first 75 percent of the service life (within the 40 percent quality drop, fair to very good) is one-fourth to one-fifth the cost of maintenance and repair of roadways that have deteriorated beyond the 75 percent mark. Roadways deteriorate at a faster rate beyond 75 percent of the service life. They experience a 40 percent drop in quality after 75 percent of the service life has passed but experience an additional 40 percent drop in quality in only an additional 17 percent of the time beyond the 75 percent mark.

Figure V-1: Pavement Deterioration



Source: University of New Hampshire, *Road Surface Management System*, 1998.

In 1993, NRPC completed a pavement management study of Pelham utilizing the Road Surface Management System (RSMS) software. The RSMS software includes a number of different databases including a road inventory, an inventory of road surface distress and the number of repairs recommended for the extent and severity of the surface distress. The software allows the user to tailor a repair strategy database based on the Town's preferences. The RSMS software matches a repair strategy to a roadway segment based on the extent of distress and priority preference based on traffic volume. The final decision on the repair strategy is made by the Highway Department.

The study was used in 1993 to help create a priority of road repairs and to develop a budget. It is generally recommended that pavement management studies be updated every five to ten years. The NRPC provides pavement management studies for member communities upon request with no additional cost. The pavement management studies support communities in setting road repair priorities, developing inventories and forecasting repair budgets. Pelham should conduct another pavement management study as soon as possible and every five years hence.

5. Bridge Conditions

The NH DOT inspects locally owned bridges on local roads as well as state owned bridges. However, the bridges must have a clear span of at least 10 feet. Inspection and maintenance of culverts and other structures that do not meet this 10-foot span definition on local roads are the responsibility of the Town (NH RSA 234). The NH DOT inspects bridges on Class IV and V roads every two years and the records of the inspections must be kept by the Town. The state inspections are a pre-requisite for the State Bridge Aid program.

Although the NH DOT inspects all locally owned bridges as well as state bridges, it only recommends a load restriction posting on locally owned bridges. The municipality bears the responsibility for installing signs for the posting of load restrictions in accordance with NH DOT recommendations. The Town should develop routine inspection and maintenance for culverts and other structures on local roads that are not inspected or maintained by the state.

The State of New Hampshire lists ten bridges in the Town of Pelham that are regularly inspected by the NH DOT (Table V-6). There are a number of bridges in the Town listed as “Structurally Deficient” or “Functionally Obsolete.” The “Structurally Deficient” status for a bridge denotes that there are deficiencies in the bridge structure and a load restriction is recommended, or repairs for those bridges that need significant maintenance. The “Functionally Obsolete” status refers to the bridge’s capacity for traffic operations in relation to the function of the approach road.

Table V-6: Bridges

Road	Feature Crossed	Deficiencies	Owner
NH 128	Over Beaver Brook	Functionally Obsolete	NH DOT
Castle Hill Rd.*	Over Beaver Brook	Structurally Deficient	Town of Pelham
Tallant Rd.	Over Beaver Brook	Functionally Obsolete	Town of Pelham
NH 128	Over Gumpas Pond Brook	Not Applicable	NH DOT
Willow Street	Over Beaver Brook	Functionally Obsolete	Town of Pelham
NH 111A	Over Beaver Brook	Not Deficient	NH DOT
Old Bridge Street*	Over Beaver Brook	Structurally Deficient	Town of Pelham
Gage Hill Rd.*	Over Beaver Brook	Structurally Deficient	NH DOT
Gage Hill Rd.	Over Beaver Brook	Not Applicable	NH DOT
Moeckel Rd.	Over Golden Brook	Bridge Closed Structurally Deficient	Town of Pelham

*Red List Bridges

In addition to inspecting and rating bridges for weight restrictions, the NH DOT publishes a list of bridges statewide that are included on its “red list.” The NH DOT defines red list bridges as those bridges “...requiring interim inspections due to known deficiencies, poor conditions, weight restrictions, or type of construction. These structures are inspected twice yearly.” Three bridges in Pelham are listed as “red list” bridges; Castle Hill Road over Beaver Brook, the Abbott Bridge at Old Bridge Street over Beaver Brook, and Gage Hill Road over Beaver Brook. The Abbott Bridge over Beaver Brook is an historic stone bridge and has recently been reconstructed. The bridge is in very good condition but remains on the red list because it warrants interim inspection due to weight restrictions and the type of construction. There is one bridge in Pelham, Moeckel Road over Golden Brook, which is listed as being closed.

The Town’s Capital Improvements Program (CIP) includes the replacement of the Castle Hill Road Bridge (2002), the Tallant Road Bridge (2004) and the Willow Street Bridge (2006). The CIP states that the replacement of the Castle Hill Road Bridge is urgently needed and an engineering study is presently underway. The replacement of the Tallant Road Bridge and the Willow Street Bridge is necessary because both bridges are too narrow for today’s standards.

6. Travel Patterns

Information on commuting is available from the 2000 US Census and is shown in Table V-7. Eighty-six (86%) percent of Pelham's workers commuted by single occupant vehicle, significantly higher than the US average of seventy-five (75%) percent. The mean travel time to work in 2000 was 27.2 minutes, slightly higher than the US average of 25.5 minutes. Information on origin and destination patterns for travel to workplace is available from the 1990 US Census (but not the 2000 Census) and is shown in Table V-8. The largest group of Pelham commuters (33%) traveled to the Lawrence/Lowell area in 1990. The Boston area drew 17% while 25% of residents worked in Town. The remainder were employed in Nashua, Manchester, Hudson and at other New Hampshire locations.

Table V-7: Commuting to Work, 2000

	Number	Percentage
Workers 16 years and older	5,721	100.0
Car, truck or van - drove alone	4,690	86.7
Car, truck or van - carpooled	477	8.3
Public transportation (incl. taxi)	60	1.0
Walked	40	0.7
Other means	55	1.0
Worked at home	129	2.3

Source: 2000 US Census Commuting to Work Data.

Table V-8: Commuting Patterns from Pelham, 1990

Place of Work	Number of Pelham Commuters 1990	Percentage
Pelham	1,015	25 %
Nashua	321	8 %
Merrimack	21	1 %
Hudson	138	3 %
Manchester Area	153	4 %
Other New Hampshire	371	9 %
Boston Area	687	17 %
Lowell/Lawrence Area	1,324	33 %
Total:	4,030	

Source: 1990 US Census Journey to Work Data.

C. FUTURE TRAFFIC PROJECTIONS

Running the NRPC regional traffic model with 2022 regional land use forecasts produces the weekday traffic forecasts for Pelham shown in Table V-9. The table shows several sets of data that should be considered when developing transportation plans for the Town. Each column in the table is described as follows:

I. Estimated Daily Capacity

Roadways have a limited capacity. This capacity is estimated for intersections and roadway segments using guidelines established in the *Highway Capacity Manual*.² The roadway segment capacity is based on a number of different factors including the number of lanes and their width, the presence of a median, the presence of turning lanes and the amount of "side-friction" that results of the presence of land uses and driveways along the road segment. One factor in roadway capacity that is difficult to analyze

² Transportation Research Board, National Research Council, *Highway Capacity Manual* (Washington DC, 1995) as amended.

based on 24 hour forecasts of traffic volume is the percentage of traffic that will occur in the peak hours. A high percentage of traffic in the peak hours results in a roadway that becomes congested during those peak hours even though the total 24 hour traffic levels are less than the estimated capacity. On the other hand, roadways with unusually low peak hour volumes have traffic distributed evenly through the course of the day and can usually carry a higher 24 hour traffic volume than would be expected from the estimated daily capacity. NRPC's forecasts assume that the peak one hour traffic volume during the day will be 10% of the total daily volume.

The second column in Table V-9 shows the estimated daily capacity for key road segments in Pelham. These volumes vary quite a bit but are typical for two lane roads. Those with lower estimated capacities are those that are unusually narrow, winding or have a high level of side-friction that prevents movement of high numbers of vehicles. As might be expected the state highways (NH 38, NH 111A and NH 128) have the highest estimated capacities.

Table V-9: Forecasted 2022 Weekday Traffic Volumes and Roadway Volume to Capacity Ratio

Location	Estimated Daily Capacity	Weekday Traffic	2022 Forecast Traffic	Existing Volume to Capacity Ratio	Future Volume to Capacity Ratio
NH 38 at Island Pond Brook	16,800	13,245	21,982	0.79	1.26
NH 128 north of Sherburne Road	16,800	12,585	26,462	0.75	1.51
NH 111A south of Main Street	16,800	11,300	20,302	0.67	1.13
Bridge Street west of NH 38	14,400	8,297	21,815	0.58	1.45
Burns Road east of NH 128	12,000	1,658	17,685	0.14	1.38
Currier Road north of Jericho Road	7,000	1,238	1,400	0.18	0.20
Dutton Road south of Atwood Road	12,000	2,511	7,212	0.21	0.57
Gage Hill Road north	7,000	2,852	3,100	0.41	0.44
Hobbs Road west of NH 38	12,000	2,981	20,960	0.25	1.69
Keyes Hill Road at Hudson Line	12,000	3,584	18,253	0.30	1.48
Sherburne Road at Hudson Line	11,200	5,301	20,914	0.47	1.80
Tallant Road at Beaver Brook	8,000	2,197	2,400	0.27	0.30
Willow Street west of NH 38	14,400	5,375	22,148	0.37	1.49

Source: NRPC, 2002. Note: all traffic data in vehicles per day (vpd).

2. Weekday Traffic

The third column in Table V-9 shows actual counts of traffic. These are collected by NRPC using automatic traffic counters. Typically, counting is conducted for a full week. The weekday traffic is the average of the three midweek days (Tuesday, Wednesday and Thursday) and is usually used to represent average traffic conditions on most roadways.

3. 2022 Traffic Forecast

The fourth column in Table V-8 contains data on the daily traffic forecast produced by NRPC's traffic model as described above. One issue that must be emphasized is that the traffic model adjusts its forecast of traffic for the anticipated levels of congestion. As a roadway becomes highly congested, with traffic in excess of roadway volume, the model calculates the degree to which delay is resulting from the

traffic congestion and switches traffic to alternate routes. These alternate routes are often longer mileage routes but, due to lower levels of congestion, they are actually the fastest path the model can find an origin point and a destination.

4. Existing Volume to Capacity Ratio

The fifth column in Table V-8 shows the existing volume to capacity ratio. The volume to capacity ratio is exactly what the term says: a ratio of the traffic volume on a roadway divided by the estimated capacity of the roadway. If the capacity is higher than the traffic volume (uncongested), then the volume to capacity ratio is less than one. If the traffic volume is higher than the capacity (congested), then the volume to capacity ratio is greater than one.

As can be seen from a review of the existing volume to capacity ratio, all the roadways represented in the table are well below capacity. Only NH 38 and NH 128 are even beginning to approach capacity at this point.

5. Future Volume to Capacity Ratio

The last column in Table V-8 depicts the future volume to capacity ratio and paints a much different picture of traffic in Pelham in the future than what exists today. Anytime the volume to capacity ratio exceeds 1.0 it is an indication that congestion could be problem. As can be seen in the table, by 2022 traffic volumes are expected to exceed capacity at 9 of 13 locations. In several cases, volumes will exceed capacity by very large amounts. In those cases, congestion will be severe.

There are four factors that bring about this projected rapid increase in traffic in Pelham to the highly congested levels shown in Table V-9. First, the growth in the community will result in increases in traffic volume. Second, Pelham is also a location that will experience high levels of through traffic. Although this traffic is not created by any action of the Town, there is very little that the Town can do to prevent through traffic. Third, the roadways in Pelham are relatively low capacity roadways. As a result, relatively small absolute increases in traffic volume will result in high levels of congestion. Finally, Pelham's street network is relatively "sparse". This means that there are few alternate paths leading from one location to another. Since there are few paths from point to point, all new traffic tends to use the same roadways. In addition, the trips that are made are longer and impact more roads. The overall result is that even modest growth can quickly produce more vehicle trips than can be accommodated by the sparse roadway network. To some extent, the sparse roadway network in the community is the result of geography – the rich, abundance of ponds, streams and wetlands limit the Town's ability to provide a highly interconnected (dense) roadway network. However, the development patterns that have prevailed in Pelham in the recent past have also limited connections through and between subdivisions.

The high levels of traffic congestion that NRPC is expecting in Pelham may not become evident for some years yet. Due to the length of time and expense required to improve town and state roads the Town should begin planning for increasing traffic congestion now. Efforts should be made to evaluate the Town's development standards in light of recent research and change the standards to mitigate future traffic congestion. Improvements to local bicycle and pedestrian networks can reduce the dependence of Town residents on the single occupant vehicle and should be implemented. In addition, improvements to existing roadways and developments of new roadways should be considered.

The NRPC suggests that the Town should undertake a townwide transportation study in the next two years. This study would look at transportation and traffic issues in the community in greater detail than is possible in the transportation chapter of this Master Plan. Specific recommendations would be developed in the document that could be implemented over the course of time to address the anticipated conditions. The Town could then begin budgeting for these improvements in it's Capital Improvement Program and undertake a systematic transportation system improvement program.

D. TRANSPORTATION SOLUTIONS

I. Existing Regulations

At present, the Town's subdivision regulations require that the width of the right of way for a new street be at least 50 feet wide with a minimum pavement width of twenty feet. The twenty foot pavement width is appropriate for residential streets and reduced the amount of impervious surface dedicated to streets. In addition, the subdivision regulations require that sidewalks be at least four feet wide and be constructed in new subdivisions within one mile of a church or school. The sidewalks must be constructed five feet behind the curb line of the street in order to provide for pedestrian comfort and safety.

A number of criteria should be considered in developing the design standards for local streets:³

- *Design and maintain street space for the comfort and safety of residents.* Local residential streets should be designed with the needs of children, pedestrians, and bicyclists foremost.
- *Provide a well connected, interesting pedestrian network.* Provide convenient pedestrian access to schools, shopping, and employment including the development of an interconnected pedestrian pathway system linking cul-de-sacs with adjacent streets, neighborhoods, open spaces and other destinations.
- *Provide convenient access for people who live on the street, but discourage through traffic; allow traffic movement, but do not facilitate it.* Traffic control measures should be considered to eliminate extensive through traffic on local streets.
- *Differentiate streets by function.* Streets should be clearly distinguished within the network in terms of the functional differences between local residential streets and major collectors or arterials in the overall street design.
- *Relate street design to the natural and historical setting.* Street design should relate and express the terrain, natural character, and historic traditions of the locale. Irregularities of a site such as large rocks or trees and slopes should be incorporated rather than removed. Street details including curb design, sidewalk paving or signs must relate to the regional vernacular rather than being anonymous from a handbook.
- *Reduce impervious surfaces by minimizing the amount of land devoted to streets.* There are several factors that should shape a plan including a design concept, on-street parking needs, traffic volumes and land constraints (steep slopes, wetlands, etc.).

2. Access Management

Access Management “...involves providing (or managing) access to land development while simultaneously preserving the flow of traffic on the surrounding road system in terms of safety, capacity and speed.”⁴ The speed and volume of traffic on a roadway is greatly reduced due to vehicles entering and exiting side streets and driveways. In general, access management techniques involve the regulation of the number, spacing and width of access points, the design of those access points, and the provision of alternative transportation methods in order to reduce vehicle trips. The primary goal of access management is to preserve roadway capacity by reducing turning movement conflicts with through traffic.⁵

NH 38, NH 111A and NH 128 represent the main north-south roadways in Pelham. There are also a number of Minor Arterial and Collector roads that serve as east-west corridor roads. In order to preserve

³ Southworth and Ben-Joseph, *Streets and Shaping of Towns and Cities*, page 143.

⁴ AASHTO, *Policy on the Geometric Design of Highways and Streets*, 2001.

⁵ NRPC, *Access Management Guidelines*, April 2002.

the existing road capacity, which has a theoretical limit, access management techniques should be applied to future developments along all collector and arterial roadways. The following general access management techniques can be implemented through the subdivision, site plan and/or driveway regulations, and/or the zoning ordinance:

- Reduce the number of curb cuts along arterials and encourage the use of common driveways.
- Encourage the development of service roads parallel to arterials that allow for access to adjacent commercial developments.
- The minimum distance allowed between curb cuts along roads and arterials should be at least at the minimum distances recommended in Table V-10. With the exception of a 100 minimum separation between driveways and intersections, there are no minimum driveway separation requirements in the subdivision or site plan regulations.

Table V-10: Minimum Access Separation Distances

Posted Speed (mph)	Spillback Rate*			
	5%	10%	15%	20%
30	335	265(a)	210(b)	175(c)
35	355	265(a)	210(b)	175(c)
40	400	340	305	285
45	450	380	340	315
50	520	425	380	345
55	590	480	420	380

(a) Based on 20 driveways per mile.

(b) Based on 25 driveways per mile.

(c) Based on 30 driveways per mile.

*Based on an average of 30-60 right turns per driveway.

*Spillback occurs when a right-lane through vehicle is influenced by right-turn-in to or beyond a driveway upstream of the analysis driveway. The spillback rate represents the percentage of right-lane through vehicles experiencing this occurrence.

Source: Gluck, J.S., Haas, G., Levinson, H.S., and Jamal Mahmood, Driveway Spacing and Traffic Operations, TRB Circular E-C019, Dec. 2000.

- Require developers to fund road improvements such as turn lanes, medians, consolidation or alignment of access points and/or pedestrian facilities that reduce the impedance of through traffic.
- Place parking behind or beside buildings to allow for adequate driveway throat length and screen parking when possible to make the building the focal point of the destination. Use green spaces to articulate the differences between driveways, parking and pedestrian areas.
- Encourage easements between parcels for the interconnection of non-residential sites that allow employees and customers to move from site to site without repeatedly entering and exiting the roadway.
- Encourage easements or future right of way access between residential subdivisions in order to encourage an interconnected street system.
- Allow for pedestrian access between developments. Crossing points for pedestrians should be across driveways rather than through parking areas. Encourage separate sidewalks and walking paths in parking lots for non-residential uses.
- Enter into a Memorandum of Understanding (MOU) with the NH DOT. Until recently, the NH DOT would issue permits with limited input from the local decision makers. To improve the coordination of local and state planning objectives along the state's road system, the NH DOT has developed a MOU which is a formal agreement between the DOT and the community to coordinate on the review and issuance of driveway permits to access state roads.

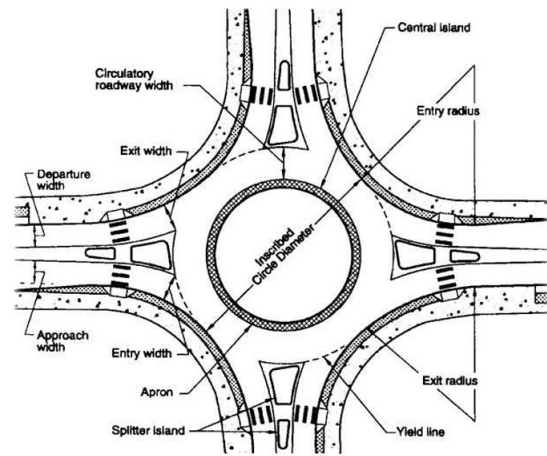
3. Community Character Guidelines

The Town has already adopted general requirements and design criteria for non-residential development. The adoption of additional “community character guidelines” for non-residential development can result in development that is compatible with the community’s character, enhances traffic safety and preserves highway capacity. The NRPC’s publication, *Non-Residential Development Community Character Guidelines*, includes guidelines relating to building orientation, building design, access management, parking lot landscaping, off site parking, site lighting guidelines, loading and service facilities guidelines, and public spaces and landscaping guidelines. In addition, the Town prepared *Compatibility Guidelines for the Town of Pelham*⁶ in June 1999. The Town should re-assess existing site plan, subdivision and zoning requirements based on recommendations included in these documents.

4. Roundabouts

Many communities in the United States are beginning to embrace the concept of “roundabouts.” A roundabout is an intersection control measure used successfully in Europe and Australia for many years. A roundabout is composed of a circular, raised, center island with deflecting islands on the intersecting streets to direct traffic movement around the circle. Traffic circulates in a counter-clockwise direction making right turns onto the intersecting streets. Entering traffic yields to vehicles already in the roundabout.

⁶ NRPC, *Compatibility Guidelines for the Town of Pelham, NH*, June 15, 1999.



Typical Single Lane Roundabout

Source: FHWA.

Unlike the typical New England “traffic circle” or “rotary,” design standards for roundabouts are very specific, and the Federal Highway Administration (FHWA) has prepared a design guide for modern roundabouts in the United States.⁷ Roundabouts should only be used where the minimum capacity and design constraints can be met.

The FHWA has determined that the maximum flow rate that can be accommodated at a roundabout depends on the geometric elements (circle diameter, number of lanes), the circulating flow (vehicles going around the circle) and entry flow (vehicles entering the circle). A single lane roundabout can accommodate up to 1,800 vehicles per hour and a double lane roundabout can accommodate up to 3,400 vehicles per hour.⁷ The capacity of a roundabout will lower, however, as the entry flow increases (i.e. more vehicles trying to get on the roundabout conflicting with those already going around the circle). In addition, high pedestrian traffic can reduce the capacity but the effect of pedestrian traffic is reduced as the flow rate increases. That is, if the vehicles are stopping anyway to allow the circulating flow to continue then the effect of pedestrians stopping the entry flow is reduced.

The National Transportation Research Board examined traffic delays before and after roundabouts were installed at eight intersections. The study determined that delays (the time spent stopped and moving up to the intersection) decreased on average by 78% and 76% during the AM Peak Hour and PM Peak Hour, respectively.⁸ The results indicate that roundabouts can reduce congestion in certain circumstances.

The FHWA studied a sample of eleven roundabouts in the United States and determined that the number of personal injury accidents and property damage-only accidents decreased in all cases after a roundabout replaced a conventional intersection (table V-11).

⁷ US DOT, *Roundabouts: An Informational Guide*, publication number FHWA RD-00-067, 2001.

⁸ Transportation Research Board, *Modern Roundabout Practice in the United States*, NCHRP Synthesis 284, 1998.

Table V-11: Average Annual Crash Frequencies at 11 Intersections converted to Roundabouts

Type of Roundabout	Sites	Before Roundabout			After Roundabout			Percent Change ⁹		
		Total	Injury	PDO	Total	Injury	PDO	Total	Injury	PDO
Small/Mod. ¹⁰	8	4.8	2.0	2.4	2.4	0.5	1.6	-57%	-73%	-32%
Large ¹¹	3	21.5	5.8	15.7	15.3	4.0	11.3	-29%	-31%	-10%
Total	11	9.3	3.0	6.0	5.9	1.5	4.2	-37%	-51%	-29%

Source: FHWA, Roundabouts: An Informational Guide, pg. 112.

Note: PDO = Property Damage Only crashes.

Roundabouts may be appropriate as a relief for traffic congestion or safety issues at major intersections in Pelham. For example, Peak Hour entering volumes were estimated for the Town Center based on the turning movement counts conducted for a signal warrant update. Based on this data, the flow for a roundabout in the Town Center would peak at 1,620 vehicles per hour during the AM Peak Hour and 1,370 vehicles per hour during the PM Peak Hour. This preliminary analysis shows that a single lane roundabout could effectively process traffic through the Town Center under existing traffic conditions and should be considered as an option in any Town Center traffic study.

5. Traffic Calming

Excess traffic and speeding on local roads through residential neighborhoods have been a by product of growth experienced by the Town and the region as a whole. Traffic calming is an integrated approach to traffic planning that seeks to maximize mobility while reducing the undesirable effects of that mobility.¹² There are a number of techniques that are described to achieve the goals of traffic calming:

- Reduce the speed at which automobiles travel by altering roadway design. These techniques include speed bumps and speed tables, rumble strips or changes in the roadway surface, diagonal diverters, dead-end streets or cul-de-sacs, neck downs, chicanes, chokers and protected parking, narrower streets and roundabouts.
- Change the psychological feel of the street through design or redesign. The use of traffic control devices, signs, pavement markings and landscaping should enhance the image of the residential street as a place that is safe for pedestrians.
- Discourage the use of private motor vehicles. Encourage the use of alternative transportation.
- Create strong viable local neighborhoods. Create compact neighborhoods with a range of facilities on hand so that people can drive shorter distances to where they want to go and make more trips by foot, bicycle or public transportation.

A primary way to slow down traffic is to narrow the real or perceived horizontal width of the pavement. Streets can be narrowed in various ways. A so-called "curb extension" is generally the best and perhaps most widely used option. It slows down traffic, shortens the crossing distance for pedestrians and a sidewalk can be added along the road if necessary.¹³

⁹ Only injury crash reductions for small/moderate roundabouts were statistically significant.

¹⁰ Mostly single-lane roundabouts with an inscribed circle diameter of 100 to 115 feet.

¹¹ Multi-lane roundabouts with an inscribed circle diameter greater than 165 feet.

¹² Cynthia L. Hoyle, *Traffic Calming*, PAS report 456, pg. 9.

¹³ Conservation Law Foundation, *Take Back Your Streets*, May 1995, pg. 32.

6. Scenic Road Designation

As New Hampshire's residential, commercial and industrial development has grown, so has the need to improve the road system, thereby reducing the number of country roads that constitute an important asset to the State. To prevent the elimination of scenic roads, communities are enabled by NH RSA 231:157 to designate roads other than state highways as Scenic Roads. This law protects such roads from repair or maintenance which would involve the cutting or removal of medium and large-sized trees, except with the written consent of an official body. The law is an important tool in protecting the scenic qualities of roads. The large trees and stone walls that line many rural roads are irreplaceable and contribute heavily to the New England character of the region's towns. The only road in Pelham designated as a scenic road is Old Bridge Street North from its intersection with NH 38 to its intersection with NH 111A.

E. NON-MOTORIZED TRANSPORTATION

Although most trips in Pelham are taken by automobile, opportunities are available to enhance the provision of bicycle, pedestrian and public transportation facilities. Each trip taken by bicycle, foot or bus removes one private vehicle from the roadway, thereby enhancing the capacity of the road network and providing options for those who cannot or do not wish to drive.

I. Bicycle and Pedestrian Facilities

The existing pedestrian network of sidewalks and crosswalks in Pelham is limited and connections are few. Those sidewalks and crosswalks that do exist are primarily within the Town Center along Main Street and NH 111A (Marsh Road). The sidewalks are along the east side of NH 111A from the Memorial School to Main Street (approximately $\frac{3}{4}$ of a mile) and along Main Street on both sides from Nashua Street east for approximately 200 to 300 feet.

In 1995 the NRPC communities (including Pelham) which make up the region's Metropolitan Planning Organization endorsed the Regional Bicycle & Pedestrian Plan (RBPP). The plan was created to develop and implement a comprehensive bicycle and pedestrian system within the region. The primary goals of the plan are to increase the incidence of bicycling and walking by establishing a continuous, coordinated non-motorized transportation network and by creating a traveling environment in which bicycling and walking are attractive alternatives. The RBPP recommends physical and institutional improvements as well as a non-motorized network comprised of local and state roads on which bicycle and pedestrian improvements should be focused. The key recommendations of the RBPP are to:

- Use the existing and planned street system to the maximum extent possible, consistent with safety considerations, for bicycle travel. The preferable facility for bicycle travel is a four-foot paved shoulder on existing roads, separated from motorized travel lanes by a 6 to 8 inch painted white stripe. Paved shoulders will serve the needs of all non-motorized users and minimize acquisition and construction costs, and are especially appropriate for the rural roads located in Pelham. Shared roadways, with appropriate signage and safety improvements, are recommended where paved shoulders and bicycle lanes are not possible. "Bike Route" signage is recommended for all non-motorized road segments.
- Install five-foot sidewalks on both sides of arterial roads where possible. These facilities are desirable on high-volume corridors to improve walking safety. Sidewalks are also desirable on at least one side of collector roads. For rural and low-volume routes, paved shoulders may be used by both pedestrians and bicyclists.
- Provide pedestrian crossings at high-volume intersections on all arterial roads.

- Establish a regular non-motorized facility maintenance program. This program would include regular inspection of facilities to identify hazardous conditions, road shoulder sweeping and maintenance of facilities based on safety considerations.
- Adopt land use strategies which facilitate non-motorized travel. Strategies such as encouraging mixed-use development, programming non-motorized improvements into the local Capital Improvements Program, requiring non-motorized improvements as a part of development approval and adopting bicycle and pedestrian-friendly design standards would result in a more attractive traveling environment for non-motorized modes.
- Implement non-motorized educational programs in schools. This program would teach children basic principles for safely sharing roadways with vehicles and would ideally incorporate on- and off-road training time. A key component of this program is teaching the importance of wearing bicycle helmets.

As part of the RBPP, an inventory was conducted to assess the suitability of each road for bicycle and pedestrian travel. The highlights of the survey are shown in Table V-12 and complete results are available in the RBPP's Technical Supplement. An analysis of the routes in the plan states that all designated state routes in Pelham were chosen for the bicycle network as well as five local roads. NH 111A stands out as the most suitable state road. There are three schools, a park and the Town Center along NH 111A. Although the other state routes are considered suitable enough to be included in the regional bicycle route, the northern section of NH 38 has limitations due to steep inclines, heavy traffic and higher speeds. These limitations may require safety improvements such as widening of the paved shoulders.

The local roads designated for the bicycle network make up the east west connections. The Nashua Road – Gage Hill Road connection provides access to the Town Center. The Keyes Hill Road route contains steep grades. However, there are no suitable alternatives to this route. Tallant Road provides continuity from Keyes Hill to NH 111A.

Table V-12: Inventory of Pelham Non-motorized Network

Road Section	Road Type	Speed Limit	ADT	Pavement Condition	Grades	Right of Way
NH 128	2 Lane	40	12,562	Good	Moderate	Adequate
NH 111A	2 Lane	35	5,481	Good	Moderate	Adequate
NH 38- Main Street to Salem Line	2 Lane	50/40	11,825	Good	Moderate	Adequate
NH 38 – Mass Line to Main Street	2 Lane	40	12,903	Good	Slight	Extensive
Keyes Hill Rd.	2 Lane	35	3,584	Good	Extreme	Adequate
Main St./Gage Hill Rd.	2 Lane	30	5,367	Poor	Moderate	Adequate
Nashua Rd.	2 Lane	35	6,231	Good	Moderate	Adequate
Sherburne Rd.	2 Lane	40	5,812	Good	Extreme	Extensive
Tallant Rd.	2 Lane	35	2,197	Good	Moderate	Adequate

Source: NRPC.

The Town presently contains 6.4 miles of Class VI roads (un-maintained). Opportunities for obtaining right of way to develop a town wide bicycle and pedestrian system are dwindling due to ongoing residential, commercial, and industrial development. The Class IV un-maintained roads in the Town represent an opportunity to add to the recreational trail system in the Town and can provide both bicycle and pedestrian access at limited cost.



Lack of sidewalks force pedestrians to walk in the traffic flow.

At the present time no new sidewalks, crosswalks or bicycle routes are planned in Pelham. The Town should consider implementing a Town Center sidewalk program and consider widening and re-striping roadways for bicycle access whenever roadways are repaved or reconstructed. Funding for alternative transportation could be obtained through a town pedestrian and/or bicycle facilities fund or through an application to the NH DOT Transportation Enhancements Program. The Federal Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 provided funds for transportation enhancement activities. Ten percent of the State of New Hampshire's apportionment of the Surface Transportation Program (STP) from the federal highway trust fund must be set aside for transportation enhancement activities. The 1998 Transportation Equity Act for the 21st Century (TEA-21) continued the enhancement program (Appendix V-4). The federal share for the program is a maximum 80 percent of the total cost and the applicant is responsible for supplying the local 20 percent match. Some of the projects eligible for enhancement funding include bicycle and pedestrian facilities, acquisition of scenic easements, historic preservation, and scenic and transportation museum programs.

2. Public Transportation

Currently, Pelham and surrounding areas have inadequate on-demand paratransit services. The Greater Derry Greater Salem Regional Transit Council (GDGSRTC) is an attempt to address this deficiency. In the area, there are a number of private and non-profit transit providers that are providing services to specific clienteles. For the most part, the services being provided operate with predictable peaks and lulls in service and often have sufficient resources to meet all needs during the peak periods. Project proponents believe that the resources (vehicles, drivers, etc.) already owned by these private and non-profit transit providers could be sufficient to meet the needs of the region, if properly coordinated.

The GDGSRTC project is an attempt to inventory the existing resources and their utilization as well as identify the potential demand for future paratransit or fixed route service. Once the available resources and potential demand have been identified, the project participants will attempt to identify an approach to coordination which can efficiently use the existing resources to meet demand. If such an approach can be identified, it will be necessary for the participants to agree on strategies for sharing resources and costs and for acquiring any additional resources, such as central management/dispatch and coordinated vehicle maintenance, that are needed. Overall, the main impact of this project on Pelham will be low, because Pelham's population and need is relatively small compared with other areas involved in the project. Nonetheless, the Town should give careful consideration to participation in the project due to the need for transportation by those who cannot afford it or are unable to meet their own transportation needs due to physical disability or infirmity.

F. RECOMMENDATIONS

- The Town should conduct a townwide traffic study immediately to look at future transportation and traffic issues in the community in detail. Specific recommendations should be developed that could be implemented over the course of time to address the anticipated conditions. The Town should then budget for these improvements in its Capital Improvement Program and undertake a systematic transportation system improvement program

- The Town should develop a town-wide hiking and walking trail system utilizing Class VI roads and Town Center sidewalks.
- New roads in the Town should be local roads in function and classification, limited to providing access to adjacent parcels in subdivisions.
- The Town should employ access management techniques for the purpose of preserving roadway capacity and ensuring safe movement for vehicles entering and exiting curb cuts and side roads. Access management techniques that should be pursued include implementing minimum driveway separation distances based on roadway speed and entering into a Memorandum of Understanding with the NH DOT.
- The Town should re-assess existing site plan, subdivision and zoning requirements based on recommendations included in NRPC, *Non-Residential Development Community Character Guidelines* and *Compatibility Guidelines for the Town of Pelham*. Any revisions based on these site design guidelines could also enhance the access management goals.
- The Town should update its Road Surface Management System study as soon as possible and every five years hence in order to plan for future road maintenance and reduce the future cost of extensive repairs to deteriorated roadways.
- The Town should utilize traffic calming measures and roundabouts where appropriate based on traffic flow and right of way constraints to channelize and control traffic through neighborhoods and the Town Center.
- The Town should request that the NH DOT consider design options for the NH38/Old Gage Hill Road N. intersection in order to ensure traffic safety. In addition, the Town should monitor the accident rate at the recently redesigned NH128/Keyes Hill Road/Tallant Road intersection to ensure that improvements are successful in reducing accidents.
- The Town should conduct a Buildout Analysis by TAZ using the NRPC's parcel-based Geographic Information System technology.
- The Town should participate in the Greater Derry Greater Salem Regional Transit Council (GDGSRTC) in order to increase public transportation options those who cannot afford it or are unable to meet their own transportation needs due to physical disability or infirmity.
- The Planning Board should maintain close contact with the State of NH to ensure ample opportunity for public and Town input regarding any planned changes to state roads within Pelham or feeding traffic into Town.

APPENDIX V-I

Classification Schemes

State-Aid Classification

Class I, Primary State Highway System, consists of all existing or proposed highways on the primary state highway system, excepting all portions of such highways within the compact sections of towns and cities, provided that the portions of turnpikes and interstate highways within the compact sections of those cities are Class I highways.

Class II, Secondary State-Highway System, consists of all existing or proposed highways on the secondary state highway system, excepting portions of such highways within the compact sections of towns and cities. All sections improved to the satisfaction of the Commissioner are maintained and reconstructed by the State. All unimproved sections, where no state and local funds have been expended, must be maintained by the Town or city in which they are located until improved to the satisfaction of the highway commissioner. All bridges improved to state standards with state-aid bridge funds are maintained by the State. All other bridges shall be maintained by the city or town until such improvement is made.

Class III, Recreational Roads, consist of all such roads leading to, and within state reservations designated by the Legislature. The NH DOT assumes full control of reconstruction and maintenance of such roads.

Class IV Highways, consist of all highways within the compact sections of cities and towns listed in RSA 229:5, V. The compact section of any such city or town shall be the territory within such city or town where the frontage on any highway, in the opinion of the Highway Commissioner, is mainly occupied by dwellings or buildings in which people live or business is conducted, throughout the year. No highway reclassification from Class I or II to Class IV shall take effect until all rehabilitation needed to return the highway surface to reputable condition has been completed by the State.

Class V, Rural Highways, consist of all other traveled highways which the Town or city has the duty to maintain regularly.

Class VI, Un-maintained Highways, consist of all other existing public ways, including highways subject to gates and bars, and highways not maintained in suitable condition for travel for five years or more.

APPENDIX V-I (Continued)

Classification Schemes

Functional Classification

Principal Arterial, provides corridor movement suitable for substantial statewide or interstate travel and provides continuity for all rural arterials which intercept the urban area. Serves the major traffic movements within urbanized areas such as between central business districts and outlying residential areas, between major inter-city communities or between major suburban centers. Serves a major portion of the trips entering and leaving the urban area, as well as the majority of the through traffic desiring to bypass the central city.

Minor Arterial, serves trips of moderate length at a somewhat lower level of travel mobility than principal arterials. Provides access to geographic areas smaller than those served by the higher system. Provides intra-community continuity, but does not penetrate identifiable neighborhoods.

Collector, collects traffic from local roads and channels it into the arterial system. Provides land access and traffic circulation within residential neighborhoods and commercial and industrial areas.

Local, comprise all facilities not on higher systems. Provides access to land and higher systems. Through traffic usage is discouraged.

APPENDIX V-2

Existing Weekday Traffic Counts and Historic Trends

Bridge St. West of NH 38 (at Beaver Brook) 359084				Burns Rd. East of NH 128 359067			Bush Hill Rd. at Hudson Town Line 359065		
Year	Mo.	Total	Yearly % Change	Mo.	Total	Yearly % Change	Mo.	Total	Yearly % Change
1989							7	481	
1990							10	455	-5.4%
1991				4	1,391		5	534	17.4%
1992	9	7,615							
1993							7	480	-2.6%
1994	6	7,843	1.5%						
1995									
1996	9	8,091	1.6%	9	1,357	-0.5%			
1997	5	8,297	2.5%	5	1,548	14.1%	4	595	5.5%
1998									
1999				5	1,658	3.5%			
Avg Yrly %			1.7%				2.2%		

Castle Hill Rd. at Beaver Brook 359082				Currier Rd. North of Jericho Rd. 359059			Dutton Rd. at Mass State Line 359503		
Year	Mo.	Total	Yearly % Change	Mo.	Total	Yearly % Change	Mo.	Total	Yearly % Change
1990							9	1,503	
1991									
1992	9	278							
1993				7	801				
1994	6	297	3.4%						
1995				10	816	0.9%			
1996				8	1,238	51.7%			
1997							5	2,128	5.1%
1998	9	249	-4.3%						
Avg Yrly %			-1.8%				15.6%		

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Dutton Rd. South of Atwood Rd. 359064				Gage Hill Rd. North at Mass. State Line 359066			Hobbs Rd. West of NH 38 359595		
Year	Mo.	Total	Yearly % Change	Mo.	Total	Yearly % Change	Mo.	Total	Yearly % Change
1987				5	2,341				
1988									
1989									
1990	10	429		10	2,623	3.9%			
1991	5	1,686	293%				4	2,170	
1992									
1993				7	2,528	-1.2%			
1994	6	2,089	7.4%	8	2,819	11.5%			
1995	10	2,165	3.6%						
1996				8	2,852	0.6%			
1997							4	2,981	5.4%
1998	10	2,511	5.1%						
Avg Yrly %			24.7%				2.2%		
							5.4%		

Jericho Rd. At Mass State Line 359063				Keys Hill Rd. at Hudson Town Line 359060			Main St., Gage Hill Rd. W. of NH 38 (at Beaver Brook) 359057		
Year	Mo.	Total	Yearly % Change	Mo.	Total	Yearly % Change	Mo.	Total	Yearly % Change
1987				5	4,592				
1988									
1989									
1990	9	550					10	4,412	
1991									
1992				9	3,140	-7.3%	9	4,876	5.1%
1993							10	5,249	7.6%
1994				9	3,183	0.7%	6	5,334	1.6%
1995									
1996				8	3,584	6.1%			
1997							6	5,301	-0.2%
Avg Yrly %			8.25				-2.4%		
							2.7%		

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Sherburne Rd. at Hudson Town Line 359056				Tallant Rd. at Beaver Brook 359083			Tallant Rd. West of NH 111A 359506		
Year	Mo.	Total	Yearly % Change	Mo.	Total	Yearly % Change	Mo.	Total	Yearly % Change
1987	5	4,407							
1988									
1989									
1990							10	507	
1991									
1992	9	4,261	-0.7%	9	1,410				
1993									
1994	8	5,022	8.6%	6	1,662	8.6%			
1995							10	612	3.8%
1996	8	5,749	7.0%						
1997									
1998	9	5,812	0.5%	9	2,197	7.2%			
Avg Yrly %			2.5%				7.7%		
							3.8%		

Willow St. West of NH 38 359068				NH 111A at Beaver Brook 359072			NH 111A at Windham Town Line 359051		
Year	Mo.	Total	Yearly % Change	Mo.	Total	Yearly % Change	Mo.	Total	Yearly % Change
1988							8	3,810	
1989									
1990							10	3,836	0.3%
1991	4	4,827							
1992				9	6,098				
1993							9	3,934	0.8%
1994	6	5,485	4.4%	6	6,116	0.1%	6	4,356	10.7%
1995									
1996				8	6,230	0.9%			
1997							4	4,106	-2.0%
1998	5	5,375	-0.5%				10	4,528	10.3%
Avg Yrly %			1.5%				0.5%		
							0.2%		

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	NH 111A South Of Main Street 359502			NH 128 at Mass State Line 359052			NH 128 at Windham Town Line 359055		
Year	Mo.	Total	Yearly % Change	Mo.	Total	Yearly % Change	Mo.	Total	Yearly % Change
1983					5,854				
1984									
1985					7,675	14.5%			
1986									
1987				8	7,797	0.8%			
1988				8	8,906	14.2%			
1989				6	9,588	7.7%			
1990				10	8,402	3.7%	10	4,390	
1991				5	9,081	8.1%	5	4,431	0.9%
1992				5	8,743	-3.7%	9	4,554	2.8%
1993	10	9,405		7	8,855	1.3%			
1994				8	8,897	0.5%	8	4,622	0.7%
1995				9	9,932	11.6%			
1996									
1997				6	9,872	-0.3%	4	5,074	3.2%
1998				9	9,156	-7.3%	9	5,666	11.7%
1999									
2000	5	11,300							
Avg Yrly %			2.6 %	3.0%			3.2%		

	NH 128 North Of Bush Hill Rd. 359080			NH 128 North of Old Country Rd. 359075			NH 128 North of Sherburne Rd. 359061		
Year	Mo.	Total	Yearly % Change	Mo.	Total	Yearly % Change	Mo.	Total	Yearly % Change
1989	6	4,597							
1990							10	10,558	
1991							5	11,562	9.5%
1992	9	4,505	-0.7%				9	11,566	0.0%
1993									
1994							6	11,973	1.7%
1995	9	4,724	1.6%	10	4,424				
1996									
1997							6	12,585	1.7%
1998	6	4,979	1.8%	5	4,625	1.5%			
Avg Yrly %			0.9%	1.5%			2.5%		

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NH 33 At Mass State Line 359053				NH 33 at Salem Town Line 359050			NH 38 East of Rita Ave. 359014		
Year	Mo.	Total	Yearly % Change	Mo.	Total	Yearly % Change	Mo.	Total	Yearly % Change
1983		11,031							
1984									
1985		11,368	1.5%						
1986									
1987	8	15,265	15.9%						
1988	8	13,589	-11.0%						
1989	10	13,388	-1.5%						
1990	9	13,053	-2.5%	9	7,341				
1991	4	14,791	13.3%	4	7,878	7.3%			
1992	9	13,614	-8.0%	9	8,991	14.1%			
1993	9	12,631	-7.2%						
1994				8	10,139	6.2%			
1995	9	12,203	-1.7%				10	10,546	
1996							11	10,486	-0.6%
1997	6	13,955	6.9%						
1998	10	12,903	-7.5%	6	11,825	3.9%			
1999							5	11,765	3.9%
Avg Yrly %			1.1%				6.1%		

NH 38 North Of Bridge St. 359048				NH 38 South of Old Bridge St. N. 359045			NH 38 @ Island Pond Brook 359081		
Year	Mo.	Total	Yearly % Change	Mo.	Total	Yearly % Change	Mo.	Total	Yearly % Change
1990	9	7,004							
1991	4	9,240	31.9%						
1992	9	7,435	-19.5%						
1993				9	11,102				
1994	8	7,920	3.2%	6	13,933	25.5%			
1995				10	10,976	-21.2%			
1996	9	7,737	-1.2%						
1997	5	8,149	5.3%						
1998				10	12,599	4.7%			
1999	5	8,972	4.9%				5	13,245	N/A
Avg Yrly %			2.8%				2.6%		
							N/A		

Source: NRPC.

APPENDIX V-3

Federal Aid

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) significantly restructured the federal-aid transportation program. ISTEA was re-authorized and revised in 1998 (the Transportation Equity Act for the 21st Century, TEA-21). Descriptions of the various programs which emerged from these transportation bills are as follows:

National Highway System (NHS): This program funds projects on the designated national highway system on an 80% federal, 20% state/local basis. There are no highway routes in Pelham designated as part of the National Highway System

Surface Transportation Program (STP): This program targets the funding of projects by states and localities for any facility with a higher functional classification than rural minor collector. Roads in Pelham targeted under the STP category include NH Route 38, NH 128 and NH 111A, south of the Town Center. The flexibility of the STP also allows for funding of lower functional classification roadways at the discretion of states and localities. Funding is based upon an 80% federal and 20% state/local share. Projects selected by the Town using their allocated municipal funds or Enhancements require a 20% municipal match. There are four subcategories of STP funds as described below:

- STP < 200,000 - This category of STP exists to fund projects in small urban areas with a population under 200,000. There are statewide and municipal apportionments.
- STP Any Area - This category of STP funds may be used in urban or rural areas.
- STP Transportation Enhancements - This category funds projects submitted by municipalities and chosen through a statewide selection process. Eligible projects include: bicycle and pedestrian facilities, scenic improvements, and preservation of abandoned railroad corridors, historic preservation, rehabilitation of historic transportation facilities and mitigation of water pollution from highway runoff.
- STP Hazard Elimination - These funds are earmarked for minor projects designed to eliminate hazardous roadway or traffic conditions

Bridge Rehabilitation and Replacement: This category includes bridges which are on-system, i.e. those that are functionally classified as higher than local, and off-system, which are municipally owned. The 80% federal/20% local share applies to the bridge category.

Congestion Mitigation and Air Quality (CMAQ): CMAQ funds are eligible for transportation related projects in ozone and carbon monoxide non-attainment areas. Projects must contribute to meeting attainment of national ambient air quality standards, through reductions in vehicle miles traveled, fuel consumption, reduced delay or other factors. Construction of roadway capacity serving single occupancy vehicles is not eligible for CMAQ funding. Funding is 80% federal, 20% state/local.

#255F-5

CHAPTER VI COMMUNITY FACILITIES

A. INTRODUCTION

The provision of facilities and services for the protection of the public health, safety and welfare and for the education of children is the central function and purpose of a municipal organization. Pelham, like most municipalities, provides for police and fire protection, libraries, education, recreation and general town government. In addition to town and school district staff, local government also includes facilities for volunteer board or commission members such as the Selectmen, School Board, Planning Board, Zoning Board of Adjustment, Conservation Commission and several others. "On-call" staff are also relied upon for other town services such as fire protection. This chapter examines each of the major areas of local government based upon information derived from the 1992 Master Plan, 1985 Community Facilities Study, 2001 Municipal Complex Planning Study, the 2002-2008 Capital Improvements Plan (CIP), the Town's annual reports and other studies. Although a variety of subjects are examined, a particular emphasis is placed on the space needs of municipal facilities.

The future space needs of various Town departments and services are determined largely by the demand for the services they provide. Demand for services is objectively determined by the size of the community as measured by population, number of housing units and/or geographical size. Other factors also influence the demand for local government services, such as resident, State and Federal mandated programs and the local government's ability to pay for service expansions. While this last factor, financial capability, can be measured and maximized through a sound Capital Improvements Plan, other unmeasurable factors should be considered. Resident expectations for future service levels have been partially measured through the 2001 community opinion survey, the Community Profile, and the results of the 2002 Town Meeting which indicate that there is a strong sentiment for providing expanded community facilities. This chapter provides a discussion of: 1) Town Hall; 2) Library; 3) Police; 4) Fire; 5) Parks and Recreation; 6) Solid Waste; 7) Highway Department; 8) Public School; 9) Public Water; and 10) Public Sewer facilities. The location of existing public facilities are illustrated on Map VI-1.

B. TOWN HALL FACILITIES

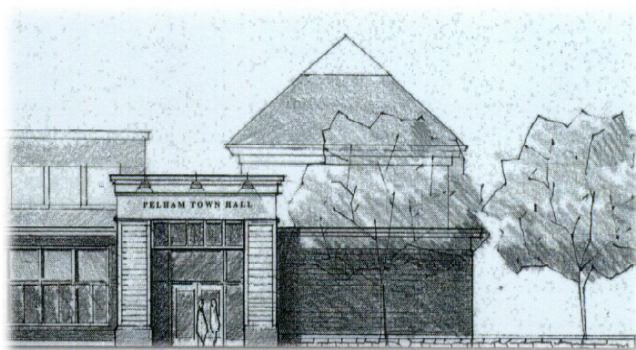


Illustration courtesy of Breadloaf Corp.

In 2002, the traditional Town Hall functions of Pelham were distributed between 8,784 square feet of the main Town Hall and the Town Hall Annex. In 2001, a space needs study of the Town Hall facilities was conducted by an independent consultant¹ in cooperation with the Building Committee and the various departments involved. The study assumed a total of twenty-three (23) employees and five (5) Selectmen and a need for various shared resources and public areas. The results of the study in relation to Town Hall facilities can be seen in Table VI-1.

¹ Bread Loaf Corporation, *Pelham Municipal Complex Planning Study*, November 20, 2001.

Map VI-1: Location of Existing Facilities

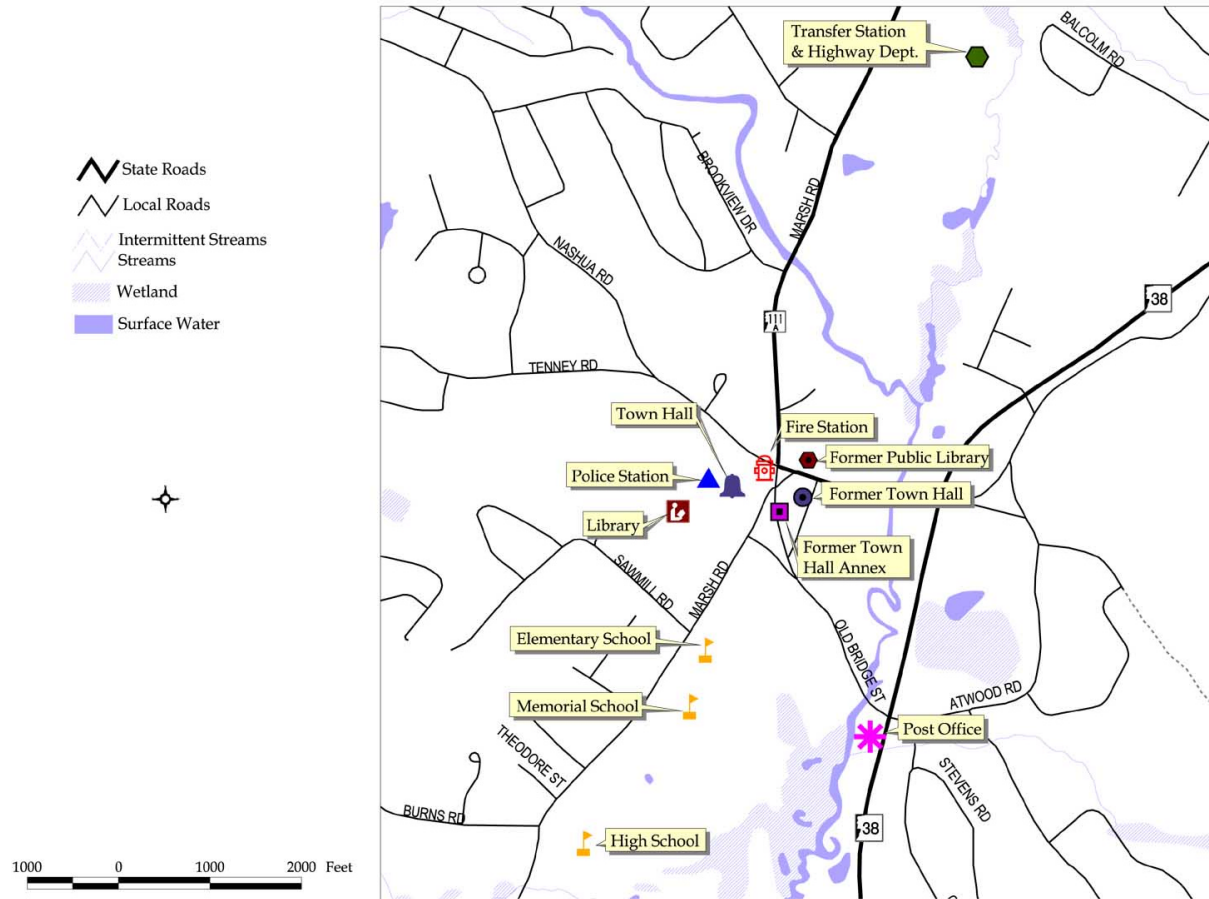


Table VI-1: Town Hall Space Needs, 2000²

Department	Floor Area (square feet)
Administration Department (4 Employees, 5 Selectmen)	
Administrator's Office	254 sf.
Executive Secretary	125 sf.
Selectman's Office/Retreat (and Meeting Room)	476 sf.
Financial Director	100 sf.
Human Resources Director	91 sf.
Records	183 sf.
Archive	200 sf.
Administrative Restroom	42 sf.
Supplies/Coffee	55 sf.
Total Administration Department	1,526 sf.
Town Clerk Department (7 Employees)	
Public Counter	228 sf.
Staff Work Stations (2)	200 sf.
Town Clerk's Office	100 sf.
Tax Collector's Office	93 sf.
Tax Assessor's + Assistant Office	293 sf.
Town Treasurer	76 sf.
Vault - Tax Records and Maps	130 sf.
File Storage	240 sf.
Town Clerk Department Lobby	178 sf.
Total Town Clerk Department	1,538 sf.
Planning Department (10 Employees)	
Public Counter	100 sf.
Planner Work Stations (4)	240 sf.
Planning Director's Office	130 sf.
Building Inspector's Offices (3)	216 sf.
Health Inspector's Office	88 sf.
Conservation Commission's Office	120 sf.
Meeting/Plan Review Room	300 sf.
Plan Storage/Flat Files (on mezzanine)	515 sf.
Planning Department Lobby	136 sf.
Total Planning Department	1,845 sf.
Parks and Recreation Department (2 Employees)	
Registration Counter	50 sf.
Recreation Director + Assistant Office	240 sf.
File Storage	66 sf.
Total Parks and Recreation Department	356 sf.
Town Office Common Resources	
Copy/Fax/Mail/Printer Area	260 sf.
Total Town Office Common Resources	260 sf.
Common Public Areas	
Main Lobby	1,070 sf.
Public Restrooms	684 sf.
Mechanical Room	627 sf.
Small Public Meeting Room (8-10 people)	412 sf.
Large Public Meeting Room (200 people)	3,079 sf.
Chair Storage	100 sf.
Cable TV Service Room	58 sf.

² Source: Bread Loaf Corporation, 2001

Department	Floor Area (square feet)
Computer Server Room	80 sf.
Stage	552 sf.
Existing Kitchen/Servery for Auditorium Space	422 sf.
Vestibule	92 sf.
Entrance Pavilion	800 sf.
Existing Exit Corridors	2,875 sf.
Total Common Public Areas	10,851 sf.
Total Town Hall Facility Need	16,376 sf.

As is evident from Table VI-1, the existing 8,784 square feet of Town Hall facilities were insufficient to serve the needs of Town residents in 2000. The study indicated that a Town Hall facility of 16,376 square feet is required to serve existing needs. In response to the projected floor area shortage, a Municipal Building Capital Reserve Fund was created and included in the CIP. In 2002 the voters approved the renovation of the old Sherbourne School into a new Municipal Complex and Village Green. This complex is designed to provide 17,230 square feet of floor area for Town Hall and public meeting facilities, with an additional 5,210 square feet of "shell space" for future expansion. The proposal also includes police and library facilities. The new Municipal Complex will serve the Town Hall space needs for the 20 year planning period.

Figure VI-1: Municipal Complex



Illustration courtesy of Breadloaf Corp.

C. LIBRARY



Illustration courtesy of Breadloaf Corp.

In 2002, the Pelham Public Library was located in a 2,504 square foot historic building on Main Street in Pelham Town Center. The library contained an estimated 16,000 volumes, 75 periodicals, various videos and five public access computers. In 2001, a space needs study of the library facility was conducted by an independent consultant¹ in cooperation with the Building Committee and the Library Director. The study assumed a total of three (3) full-time employees and utilized American Library Association guidelines for volumes, shelf space and floor area based on 2000 and projected 2020 population. The results of the study in relation to the library facility can be seen in Table VI-2.

Table VI-2: Library Space Needs, 2000

Facility	Existing Floor Area (Square feet)	Floor Area Needed 2000 (square feet)
Stacks (adult and Children)	1,304	4,500
Reading Room (adult and children)	250	1,800
Public Computer Area	0	900
Circulation Desk	0	100
Reference Area/NH Law Reference	0	500
Private Staff Area	350	400
Special Use Space (processing and storage)	600	880
Children's Program Room	0	240
Children's Restroom	0	40
Adult Program Room	0	340
Staff Break Room (kitchenette and restroom)	0	120
Public Notice/Information Area	0	100
Total Library Space:	2,504	9,920

Source: Breadloaf Corporation.

As is evident from Table VI-2, the space in the existing library was extremely insufficient to serve the needs of Town residents in 2000. In response to this floor area shortage, plans for a new library were considered in the CIP. In 2002 the voters approved a new 9,930 square foot, two-story library located on a Village Green adjacent to the new Town Hall and Police Department facility. This new library facility will serve the current need for library space. However, adjacent land should be reserved for possible future library expansion. Consideration needs to be made as to the use of the historically significant former library building. Deed restrictions limit the use of the building to "...library and memorial building or for some educational purpose."³

³ Dated November 23, 1896.

D. POLICE DEPARTMENT

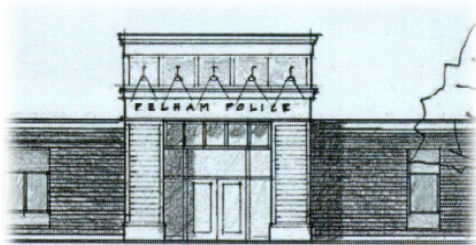


Illustration courtesy of Breadloaf Corp.

The Pelham Police Department employs 28 people, including a chief, five sergeants, one lieutenant, seven full-time officers, two part-time officers, four special officers, two detectives, one clerk, one secretary, three full-time dispatchers and three part-time dispatchers. The Police Department has several specialized divisions. They consist of a full time school resource officer, a community policing unit, detective division, prosecutor's office, animal control division, a traffic accident reconstruction unit, a K-9 team and a regional Special Operations Unit. A breakdown of Police Department staff can be seen in Table VI-3.

Table VI-3: Police Department Personnel Composition

Position	Quantity
Chief	1
Secretaries	1
Record Clerk	1
Lieutenant	1
Prosecutor/Sgt.	1
Patrol Sergeants	4
Detectives	2
School Resource Officer	1
Patrol officers	7
Animal Control Officer	1
Communication Dispatchers	3
Part time officers	2
Part time Dispatchers	3
Total:	28

Source: Email from Pelham Police Chief to NRPC, January 09, 2002.

The US Department of Justice, *Uniform Crime Report*⁴, indicates that the national average for police officer provision is 2.3 officers per 1,000 population for all reporting agencies, and 1.9 officers per 1,000 population for agencies serving a population between 10,000 and 25,999. Figures for New England are 2.2 and 1.8 officers per 1,000 population, respectively. New Hampshire and the Nashua region have a very low crime rate in comparison to the United States average. Therefore it is not surprising that communities in the Nashua region report an average of 1.4 officers per 1,000 population.⁵ This Nashua regional average will be used as the standard for the purposes of this master plan. To meet the standard, Pelham needs to provide 15 full time law enforcement officers to support its 2000 population. Pelham currently provides 19 full time law enforcement officers (assuming two part-time officers equal one full-time) and thereby exceeds the average. By 2020, the Police Department would need to provide a minimum of 24 full time officers to meet the average.

⁴ **Source:** US Department of Justice, *Uniform Crime Report*, 1997 at http://www.fbi.gov/ucr/Cius_97/97crime/97crime7.pdf

⁵ **Source:** Nashua Regional Planning Commission, *draft Regional Plan*, August 2001.

In 2002, the Police Department was based in 1,674 square feet of the public safety facility shared with the Fire Department. The department also utilized a 450 square foot temporary trailer for a total facility of 2,124 square feet. In 2001, a space needs study of the police facility was conducted by an independent consultant⁶ in cooperation with the Building Committee and the Police Chief. The results of the study are an amalgamation of space needs analyses conducted by the consultant, an architectural firm⁶ and the Police Chief. The results of the study, showing the space needs for 2000, can be seen in Table VI-4.

Table VI-4: Police Station Space Needs, 2000

Facility	Floor Area (square feet)
Lobby/Reception/Waiting	456
Vestibule	128
Public Toilets	96
Communications Positions	345
Toilet	48
Kitchenette/Coats/Supplies	100
Communications/Computer Equipment	180
Communications Supervisor	109
Classroom/E.O.C.	714
Table and Chair Storage	72
Public Interview Rooms	126
Public Information Counter	468
Central Photocopy	110
Department Supplies	23
Court Prosecutor's Office	128
Patrol Squad Room	734
Armory	150
Chief's Office	304
Lieutenants' Offices	236
Sergeants' Offices	392
Clerical/Reception	192
Conference	179
Waiting Area	238
Supply Closet	33
Detective Squad Room	372
Interview Rooms	162
Video/Observation Room	145
Processing/Laboratory	96
Evidence Storage	634
Sally Port - 2 secure bays	858
Bulk Traffic Storage	40

⁶ Kaestle Boos Associates, Inc., *Police Facility Quick-assessment*, Town of Pelham, NH, July 9, 2001.

Facility	Floor Area (square feet)
K-9 Area	26
Temporary Holding Enclosure	84
Prisoner Processing	265
Toilet/Shower	61
Linens/Blanket Storage	48
Interview Rooms	48
Male Cells	158
Female Cells	158
Juvenile Cells	158
Juvenile Status Offender Holding Room	73
Male Lockers	259
Male Toilets/Showers	417
Female Lockers	121
Female Toilets/Showers	262
Fitness Center	376
Break Room	144
Community Response	163
Community Meeting Room	475
D.A.R.E. Storage	48
Total	11,706

Source: Breadloaf Corporation

As is evident from Table VI-4, the existing 2,124 square feet of police facility was insufficient to serve the needs of Town residents in 2000. The study indicates that a police facility of 11,706 square feet was required to serve existing needs. In response to the floor area shortage, plans for a new police facility were considered in the CIP. In 2002, the voters approved the renovation of the former Sherbourne School into a new Municipal Complex and Village Green. In addition to Town Hall facilities, this complex is designed to provide 12,800 square feet of floor area for police facilities, with an additional 7,700 square feet of "shell space" for future expansion. The new Municipal Complex will serve the Police Department space needs for the 20 year planning period.

E. FIRE DEPARTMENT



The Pelham Fire Department operates 3 engines, 2 ambulances, 3 brush units, a heavy rescue truck and 2 command cars. The Fire Department is based in 4,650 square feet of the public safety facility formerly shared with the Police Department, a 323 square foot garage at the Town Hall Annex and 720 square feet in a structure on the Mills property.⁷ The department therefore occupies a total of 5,693 square feet of facility. The structural condition of the public safety facility is good.

⁷ Letter from Pelham Fire Chief to NRPC dated December 11, 2001.

Shifts consist of 24 hours on duty, then 72 hours off. There are four shifts which consist of two firefighters with the exception of one shift which has three. Each shift also includes a paramedic. Despite full time coverage, the on-call department is still very much needed. If there is more than one emergency occurring at the same time, then the on-call department is vital to ensure public safety. The Fire Department includes a Chief, Assistant Chief, Deputy Chief, two Captains, four Lieutenants, eight full-time firefighters, eighteen part-time firefighters and one Secretary. The ambulance service is an emergency-only service and will transport to various hospitals in Lowell and Methuen, MA and in Nashua and Derry, NH.

Because there are so many variables involved (service radii, population, development density, traffic and response time), very few standards are available for long term planning of fire departments. However, the Insurance Services Office (ISO) provides some criteria for fire protection. The ISO standard recommends that municipalities have municipal water available within a 1½-mile radius from each fire station. This standard is set to ensure that all areas in a municipality are equally provided with water in case of fire emergencies. As Map VI-2 indicates, only the south-central portion of the Town is covered by the response radius of the single existing fire facility. In addition, the Town is committed to maintaining a maximum four (4) minute response time as the Town develops further away from the central station.⁸ In addition, according to *Managing Fire Services*,⁹ the NE average number of full time and on-call fire fighters is 23.4 per 10,000 population. Using this standard, the number of full time and on-call firefighters needed in 2000 and projected for 2020 can be estimated (Table VI-5).

Table VI-5: Fire Department Space Needs

	Existing	2000	2020
Population	-	10,914	17,285
# Firefighters	35	26	41
Floor Area (square feet)	5,693	5,693	10,168

Source: US Census, NH Office of State Planning and *Managing Fire Services*.

As is evident from Table VI-5, a sufficient number of fire fighters were provided to serve the needs of Town residents in 2000 and six new firefighters will be needed by 2020 to meet the NE average. According to the Fire Chief, the current facility is adequate to house the required number of firefighters. Therefore, a projection can be made to determine facility needs in 2020. There are currently 5,693 square feet of fire station facilities for a required 26 firefighters, or an average of 248 square feet per firefighter. Projecting this average forward yields a required 10,168 square feet of facilities needed for 41 firefighters in 2020.

In response to the need expand floor area and to limit response times, plans for two new sub-stations and an expansion into 1,674 square feet of space formerly occupied by the Police Department are being considered. Although not yet programmed, the CIP includes these facilities pending results of ongoing research, planning and coordination. In addition, further space may be available in the former main Town Hall and/or Town Hall Annex, either of which could be used for Fire Department offices. Impact Fees are currently used as one source of revenue for additional Fire Station facilities (see Section J, below).

⁸ Town of Pelham, 2002-2008 Capital Improvements Plan, pg. 13.

⁹ Coleman, Ronny J. (Editor) and John A. Granito (Editor), *Managing Fire Services* (Municipal Management Series), 1988.

F. PARKS AND RECREATION

The Town of Pelham provides for a wide range of active and passive recreational opportunities through town and school sponsored programs, at town and school district owned properties and facilities and through private facilities, sites and programs. Currently, there are hundreds of acres of public and privately owned land used for recreation facilities. Public recreational facilities are listed in Table VI-6.



Private recreational facilities provide recreational opportunities for members of specific groups (including non-residents) as well as for the general public. The largest of these is Camp Runnels, a 320 acre Girl Scout camp on Little Island Pond. The Camp provides campsites, a ballfield, beach and extensive trails. A baseball diamond, football field, playground equipment and basketball court are provided at St. Patrick's School. Pine Valley Golf Links, Inc. operates a 95-acre, 9-hole course adjacent to Camp Runnels. Shooting ranges are available at the Pelham Fish and Game Club. The Pentecostal Church recently constructed an indoor gym. Finally, the American Legion Hall includes indoor facilities which serve both general and specialized needs.

Table VI-6: Public Recreational Sites And Facilities

Name	Facilities
Pelham Veterans Memorial Park	Town beach, 2 tennis courts, basketball court, multi-purpose ball field, functionhall, changing areas, picnic areas and trails.
George M. Muldoon Park	Soccer field, 4 baseball diamonds (lighted), 1 football field (lighted), skating pond, tiny tot playground, shelter with concession stand, storage, restrooms, nature trails and foot path.
Golden Brook Park (Newcomb Field)	Softball field (lighted).
Elmer G. Raymond Park	Clubhouse, 3 multi-purpose fields, nature trails and open field.
Pelham High School	4 tennis courts, football field, softball field and two multi-purpose fields. Indoor basketball/gymnasium.
Memorial School	Soccer field, softball field and gymnasium.
Elementary School	Multi-purpose ball field and gymnasium.
Former Sherburne School	Playground.
Jeremy Hill State Forest	No facilities.
Town Forest	No facilities.

Source: Pelham Recreation Director, fax February 26, 2002.

Although privately owned facilities are often available to the general public on a fee or non-fee basis, private recreation is only a partial substitute for public recreation. The results of the Community Profile event indicate that improving, adding and increasing the use of public recreation facilities is a high priority. The Town's public recreational facilities and programs are administered by a full-time Parks and Recreational Director and Secretary. The department is assisted by the Parks and Recreation

Committee. In 2000, the Parks and Recreation Department was located in the old Town Hall Annex and moved to the function hall in Pelham Veteran's Memorial Park during the summer. The department now has offices in the new Municipal Complex. Other recreational activities are administered by the schools, the senior center and through the efforts of volunteer recreation and athletic groups. In addition to traditional active recreational activities such as Little League and softball, the Town also offers tennis and swimming lessons and programs for senior citizens. Providing for the full range of recreational needs in the community requires the participation and cooperation of the Town administration, the schools, private recreational facility providers and a large number of local volunteers. Table VI-6 lists the Town's major public recreational facilities and sites.

Planning for future recreational needs requires an in-depth analysis of community preferences, physical conditions, local demand and the use of standards. The NH Office of State Planning provides state guidelines for the provision of various recreation facilities per 1000 population. These standards are provided in Table VI-7, along with the provision of existing facilities and those recommended for 2000 and 2020 based on existing and projected population figures.

Table VI-7: Recommended Recreational Facility Needs, 2000 and 2020

Facility (quantity unless otherwise indicated)	Standard Per 1000 Population	Existing Facilities	Facilities Needed 2000	Facilities Needed 2020
Archery Range	0.1	0	1	2
Baseball Diamond	1.1	9*	12	19
Basketball/Hard Courts	0.8	3	9	14
Boat/Fishing Access	0.1	1	1	2
Football Fields	0.1	2	1	2
Golf Courses (18 hole)	0.04	0.5	0	1
Gymnasiums	0.25	2	3	4
Ice Hockey Rinks	0.05	0	1	1
Ice Skating Area	0.14	1	2	2
Picnic Tables	8.0	10	87	138
Playgrounds	0.5	2	5	9
Shooting Ranges	0.08	1	1	1
Skiing (cross country)	0.1	0	1	2
Soccer Fields	0.16	3	2	3
Swimming (beach)	0.5	1	5	9
Swimming (outdoor pools)	0.14	0	2	2
Tennis Courts	0.95	6	10	16
Track	0.04	1	0	1
Hiking Trails (miles)	2.2	n/a	24	38

*includes 2 multi-purpose fields at Pelham High School and all softball fields.

Source: New Hampshire Office of State Planning and Pelham Recreation Director.

As is evident from Table VI-7, if the state guidelines are used, Pelham provided sufficient boat access, football, golf course, shooting and track facilities to serve the 2000 population but was deficient in the provision of all other facilities. In 2020, extra provision of all recreation facilities with the exception of football, soccer, track and shooting range facilities will be necessary to meet the guidelines. As discussed previously, a wide range of factors influence the need for future recreational facilities. The state guidelines are limited in that they do not account for local interests, conditions or participation levels. In November 2001, the Parks and Recreation Department projected the need for recreational fields and gyms based on participation.¹⁰ This report estimates that football, baseball, soccer and indoor court facilities were deficient in 2000 and will continue to be deficient through 2020 (Appendix VI). The projections were based on hours used per week vs. hours of availability. In addition, based upon the results of the 2001 Town Survey and 2002 Community Profile event, it can be concluded that the Town should place a high priority on the provision of additional playing fields, indoor courts, hockey rinks, beach areas, playground areas and picnic tables. Additional access to natural areas in general and to surface waters in particular, should also be a high priority. Impact Fees may be an appropriate source of revenue for additional recreation facilities (see Section M, below).

G. SOLID WASTE

The Town of Pelham is an independent Solid Waste Management District as provided for under RSA 149:M. In 2000, the Town converted from an incinerator and recycling program to a transfer station and recycling program, eliminating an incineration system facing steeper costs and environmental regulations. The transfer station and recycling facility is located on a 14.34 acre site on the east side of NH Route 111A. The facility was originally constructed in the early 1970s as a drop-off center to replace reliance on a private landfill. The main building consists of 3,200 square feet accompanied by a 1,000 square foot recycling facility. Trash drop-off is open to all Town residents at no cost and commercial users pay a tipping fee. Pelham does not provide municipal trash pick-up. Curbside pickup is provided by private operators who charge a fee. However, as fees have risen, more residents are choosing to bring their trash to the transfer station where the cost of disposal is included in their tax bill.

Planning for solid waste disposal and recycling is difficult as the amount of waste collected, transferred or recycled will vary depending on tipping costs, the market for recycled materials, the state of the local economy and environmental regulations. However, the greater the amount of waste disposed, the higher the cost to the Town, and therefore the Town is pursuing further options for recycling. Although not yet programmed, the CIP includes an upgrade to the recycling facility pending results of ongoing research, planning and coordination.

H. HIGHWAY DEPARTMENT

The Highway Department utilizes an 864 square foot storage area as its office. This storage area is attached to a 3,840 square foot salt shed/vehicle storage facility located at the transfer station site on the east side of NH Route 111A. There is also a 240 square foot shed used for tool storage. The department owns five dump trucks and two backhoes. Three of the dump trucks and one backhoe are housed in the main transfer station building and the remainder are housed in the salt shed facility. However, once recycling is expanded, the transfer station may no longer be able to accommodate Highway Department equipment and there will be a need for additional storage. A new 7,200 square foot garage is being considered by the Planning and Building Committee. Although not yet programmed, the CIP includes this facility pending results of ongoing research, planning and coordination. In addition, the Highway Department is in need of a new office.

¹⁰ Pelham Parks and Recreation Department, *Fields and Gyms Needed for Organized Sports*, November 2001.

I. PUBLIC SCHOOLS



The School Department is governed by a five member locally elected school board with a superintendent shared with the adjacent Town of Windham. Pelham provides three public schools: Pelham Elementary School (grades 1-4), Pelham Memorial School (grades 5 to 8) and Pelham High School (grades 9-12). St. Patrick's School, a parochial school, offers education for grades K-8. Other private schools also offer kindergarten and pre-school programs.

All three of Pelham's schools are centrally located on Marsh Road near the center of Town. The Elementary School was completed in 2002 and contains 42 classrooms, two music rooms, two art rooms, a library, media center and gymnasium. The Memorial School was completed in 1964 and contains 28 classrooms, four science labs, one computer lab, one art room, a music instructional area and a small library. Finally, the High School was constructed in 1973 and contains 34 classrooms. Current and projected enrollment figures for each grade can be seen in Table VI-8. Projected enrollment figures are determined based on the Cohort Survival Technique.

Table VI-8: Existing and Projected School Enrollment Figures.

	Existing Enrollment															
Year	1	2	3	4	5	1-5	6	7	8	6-8	9	10	11	12	9-12	1-12
2000-01	177	143	166	157	179	822	187	157	178	522	165	167	113	141	586	1930
2001-02	172	166	142	177	166	823	177	184	163	524	165	161	154	108	588	1935
	Projected Enrollment															
Year	1	2	3	4	5	1-5	6	7	8	6-8	9	10	11	12	9-12	1-12
2002-03	185	157	170	148	188	848	169	180	191	540	158	162	148	143	611	1999
2003-04	190	168	161	177	157	853	192	172	187	551	185	155	149	138	627	2031
2004-05	172	173	172	167	188	872	160	195	179	534	181	181	143	139	644	2050
2005-06	176	157	177	179	177	866	192	162	203	557	174	177	167	133	651	2074
2006-07	196	160	161	184	190	891	181	1195	168	544	197	171	163	155	686	2121

Source: Pelham School District, October 2001.

The NH Department of Education (DoE) provides funding to communities for new schools through the Office of School Building Aid. In order to receive funding, schools must meet certain classroom floor area standards as defined by Section Ed 305.03 of the DoE Administrative Rules.¹¹ The rule requires a minimum of 30 square feet per student, in general. The rule also provides for more details on classroom size requirements for specific subjects. This floor area standard does not include the floor area required for libraries, recreation facilities and secondary uses such as bathrooms and administrative office space. Analysis based on these additional standards is beyond the scope of this master plan. Therefore, this analysis is limited to that for classroom space only. Using the 2001-02 and projected 2006-07 enrollment figures from Table VI-8, and the state classroom floor area standard of 30 square feet per student, a projection of the classroom floor area required for each school can be made. See Table VI-9.

¹¹ Source: NH Department of Education, Administrative Rules Ed 305.03 at: <http://www.ed.state.nh.us/EdLaw/admini.htm>

Table VI-9: Existing and Projected Classroom Floor Area Requirements

School	Existing Classroom Floor Area (square feet)	Enrollment 2001-02	Minimum Required Classroom Floor Area 2001-02 (square feet)	Projected Enrollment 2006-07	Minimum Required Classroom Floor Area 2006-07 (square feet)
Elementary ¹²	41,400	823	24,690	891	26,730
Memorial ¹³	30,600	524	15,720	544	16,320
High ¹⁴	26,350	588	17,640	686	20,580
Total:	98,350	1,935	58,050	2,121	63,630

Source: NH Department of Education; discussion with Jerry Boucher, School Superintendent, on March 3, 2002; compiled by NRPC.



As is evident from Table VI-9, the new Elementary School provides more than adequate classroom space to accommodate the 2001-02 enrollment and projected 2006-07 enrollment. In addition, the school is designed in a manner that new classrooms can be added to accommodate enrollment beyond 2007. Similarly, the Memorial School provides more than adequate classroom space to accommodate existing and projected enrollment. However, according to an evaluation of school facilities conducted in 1995,¹⁵ the Memorial School is

lacking in library, performing arts, art, faculty, nursing, recreation and computing facilities. In addition, the school presents barriers to people with disabilities. Finally, the High School also provides sufficient classroom space to accommodate existing and projected enrollment. However, according to the evaluation of school facilities, the High School is lacking in performing arts, storage, faculty and recreation facilities. In addition, the school has various fire code violations that need to be addressed. At the 2002 Town Meeting the voters approved funds for a study to evaluate various systems (i.e. civil, mechanical, electrical, heating/ventilation and plumbing) and generate recommendations regarding the best future utilization of the High School.

The results of the Community Profile event indicate that the provision of public kindergarten is a high priority. A complete school space needs analysis for public kindergarten and the middle and high school facilities may be useful in determining the appropriate school facility needs for the near and distance future.

J. WATER SUPPLY

Most of Pelham's water supply comes from wells serving individual housing units and businesses. Approximately thirty-five (35) public water supply wells serve multi-family and commercial developments, the Parks and Recreation Department and the golf course. No average daily withdrawal and discharge information is available through the Water Resources Division of the NH Department of Environmental Services. In addition, some areas of Pelham are served by the Pennichuck Water Works

¹² 46 classrooms x 900 square feet per classroom = 41,400 square feet.

¹³ 28 classrooms, 5 labs plus 1 art room x 900 square feet per room = 30,600 square feet.

¹⁴ 34 classrooms x average of 775 square feet per room = 26,350. Rooms vary between 650 square feet and 900 square feet.

¹⁵ Center for Educational Field Services, UNH, *School Enrollment Projections and Evaluation of School Facilities with Recommendations for Improved Educational Opportunities for the Children in Pelham*, November 9, 1995.

(PWW) which holds the exclusive franchise to public water supply in Pelham.¹⁶ These areas include: 1) the north-west Industrial Park, which is connected to the Town of Hudson water system (capacity > 500 gallons per minute (gpm)); 2) residences along Mt. Vernon Drive, Nashua Road, Sawmill Road and NH Route 111A served by the Williamsburg Pump House (capacity 280 gpm); and 3) residences on Wellesley Drive, Radcliffe Drive and Vassar Drive, served by the Gage Hill Pump House (capacity 22 gpm). A total of 173 housing units and 23 businesses are served by PWW. The housing units consumed 14.34 million gallons (mg) in 2001 and the industrial users consumed 3.48 mg in 2001. The PWW long range plan is to interconnect the systems financed through new development.¹⁷

As described in Chapter III, much of the Town is underlain by high yield stratified drift aquifers which have the potential to supply Pelham as well as other communities. Some analysis of Pelham's stratified drift aquifer groundwater resources is available from various studies completed in the 1980s¹⁸ and from the NH DES Favorable Gravel Well Analysis Map.¹⁹ This map shows areas of the Town that overlay significant stratified drift aquifers that are unaffected by potential contamination sites, existing wells or incompatible development. Map III-4 in the Natural Resources Chapter illustrates Pelham's stratified drift aquifers and the NH DES map is available from the NH DES or the Nashua Regional Planning Commission.

The first, and most significant stratified drift deposit present in the Town, is located along a line running north-south along the center of Town. This aquifer makes up approximately 14,000 acres and extends from the mouth of Golden Brook southward along Beaver Brook. A transmissivity of more than 8,000 ft²/day make this area of central Pelham the best available location for developing groundwater supplies for the Town. Indeed, most of the existing public water supply wells are located in this area. The NH DES Favorable Gravel Well Analysis map illustrates significant areas of land suitable for future public water supply wells.

A second stratified drift deposit is located along Beaver Brook to a point northwest of its confluence with Golden Brook. This deposit is not as extensive and does not have as great a storage capacity as the lower Beaver Brook area. However, it does have a transmissivity greater than 6,000 ft²/day. The NH DES map illustrates a few small areas of land suitable for future public water supply wells in this area.

A third stratified drift deposit is located between the southern end of Beaver Brook and New Meadow Brook. This area has a transmissivity of greater than 4000 ft²/day and the NH DES map illustrates a number of areas of land within the wetlands and/or on conservation land suitable for future public water supply wells in this area.

The final major stratified drift deposit is located in the north west of Town and runs north-south between Mammoth Road and Beaver Brook. This area has a transmissivity of greater than 4000 ft²/day and the NH DES map illustrates a number of areas of land, some on conservation land, suitable for future public water supply wells in this area.

The water quality of Pelham's aquifer, although not extensively studied, was considered good in the studies completed in the 1980s¹⁸ with the exceptions of possible high iron content cited in the Facilities

¹⁶ **Source:** Letter from Town of Pelham to Public Utilities Commission, June 19, 1989; NH PUC, Docket DE88-162, Order 19,487, July 21, 1989. Note: this franchise agreement does not limit the right of the Town of Pelham to supply water to other communities.

¹⁷ **Source:** Pennichuck Water Works, Water Facilities Map, 2000 and information provided by Stephen Densberger, PWW.

¹⁸ Town of Pelham, *Pelham Water Resources Management and Protection Plan*, 1988; United States Geological Survey (USGS) Water Resources Investigations Report 86-4358, *Hydrogeology of Stratified Drift Aquifers and Water Quality in the Nashua Regional Planning Commission Area*, 1987; Metcalf & Eddy, Inc., *Nashua, New Hampshire Regional Groundwater Investigation*, 1983; and Davis, Benoit, and Tessier, Inc., *Facilities Plan*, 1980.

¹⁹ NH Department of Environmental Services, *Favorable Gravel Well Analysis Map, Pelham, NH*, June 13, 2001.

Plan. However, a great number of incompatible land uses and some groundwater hazard inventory and underground storage tank sites exist above the aquifers.¹⁹ The larger part of the existing residential development, the Town Center, schools and much of the Town's commercial and industrial development is located in the Beaver Brook Valley and above the aquifer. Although a few large tracts of land with good development potential overlay the aquifer, the extent of the wetlands and floodplain areas within the valley indicates the most new development will occur outside of the valley and outside of the Beaver Brook Watershed. In addition, Pelham has an aquifer protection ordinance.

The various studies completed in the 1980s,¹⁸ and the NH DES map, provide a good overview of water quality and potential water supplies. The studies, however, must be updated and expanded to determine whether groundwater supplies remain of a quality suitable for a public water source. In addition, a survey of underground storage tanks with capacities below 1,100 gallons should be conducted. Hydrology studies would also allow the Town to determine the extent to which wetland areas within the watershed serve as groundwater recharge areas.

K. SEWER

There is currently no public sewer system in Pelham. However, the provision of a public sewer system has been contemplated for specific portions of the Town. Investigation into the possibilities of providing sewer have been prompted by a concern that public water supply should be developed coincidentally with public sewer to avoid impacts on the water table. Other justifications for investigation into the development of a sewer system are based on the proper development of existing commercial and industrial areas and the need to provide alternatives to individual subsurface disposal system in high density residential areas and areas with a high potential for septic system failure.

The 1980 Facilities Plan²⁰ investigated and analyzed a number of alternative waste water treatment alternatives, including the development of a public sewer system for portions of the Town. Although the plan did not recommend that a sewer system be developed, a limited system was found to be technically feasible. Such a system could potentially service the central portion of Town including the business and industrial districts along Route 38, almost all of the Town's municipal and school district facilities, and higher density residential areas such as the Little Island Pond area.

There may be some advantages to a limited Town sewer system. A public sewer system extending through the central portion of Town, the Little Island Pond area and the commercial and industrial areas along Route 38 may accommodate the Town's major water users and would significantly reduce the contamination threat to the Town's major aquifer areas, surface waters and wetlands. A sewer system may also allow higher densities and a wider variety of commercial and industrial uses which could encourage the redevelopment of the Route 38 commercial area as well as allow for a wider range of housing types. However, the principal disadvantage is cost and further study of a sewer system was rejected by the voters in 1993.

In the Facilities Plan, two major options for sewer treatment were identified: the development of a small local treatment plant and the use of a regional facility. Although a thorough technical, regulatory and financial investigation into these alternatives is beyond the scope of the Master Plan, it is likely that regulatory and cost factors would preclude the development of a local treatment plant, unless a large water-consuming business such as a brewery located in Town and would cover the cost of such a facility. In addition, the cost associated with connections to one of the regional facilities within reasonable distance of Pelham (Salem, Nashua and Lowell) would also be considerable. Prior to any recommendation, a thorough study of all of the sewer related alternatives should be pursued. Such a study must identify and assess the technical, legal and financial feasibility of each alternative. It would

²⁰ Davis, Benoit & Tessier, Inc., Town of Pelham Facilities Plan, 1980.

also be necessary, based on estimated costs, to estimate the demand or interest level of potential users and to determine the level of general support within the community at large.

L. CULTURAL/RECREATION CENTER

One of the priorities identified at the 2002 Community Profile event is the development of a town cultural/recreation center. The results of the event indicate that a cultural/recreation center could be developed near the Town Center and include an auditorium, multi-media room, club meeting rooms, outdoor amphitheater, skate park and a pool, among other facilities. A volunteer non-profit organization, perhaps a Pelham Arts Council, could be established to foster the arts as a vital component of Pelham's community fabric. This council could advocate diverse arts programs for the public including drawing, painting, sculpture, ceramics, glass and the performing arts, among others. This council could also provide guidance in the design and management of a future cultural/recreation center to ensure adequate facilities for arts programs in addition to sports and entertainment facilities. A study of the potential for such a facility would assist the Town in determining the need for the project, the type of facilities and cost.

M. REUSE OF OLD BUILDINGS



With the construction of the new Municipal Complex, there is a tremendous opportunity for an appropriate re-use of the former library, Town Hall and Town Hall annex buildings. A study of their potential reuse would assist the Town

in determining the most appropriate use given their historic significance and development constraints on each site. Options for re-use of the former library may include a genealogy library or historical museum in keeping with the deed restrictions. Options for re-use of the former Town Hall and annex may include expanded facilities for Public Television, public meeting facilities or a youth/teen center.

N. IMPACT FEES

Impact fees are a charge on new development that is proportional to the impact of that new development on the infrastructure needs of the community. Impact fees are considered an Innovative Land Use Control and are defined in NH RSA 674:21.V as "*... a fee or assessment imposed upon development, including subdivision, building construction or other land use change, in order to help meet the needs occasioned by that development for the construction or improvement of capital facilities owned or operated by the municipality, including and limited to water treatment and distribution facilities; wastewater treatment and disposal facilities; sanitary sewers; storm water, drainage and flood control facilities; public road systems and rights-of-way; municipal office facilities; public school facilities; the municipality's proportional share of capital facilities of a cooperative or regional school district of which the municipality is a member; public safety facilities; solid waste collection, transfer, recycling, processing and disposal facilities; public library facilities; and public recreational facilities not including public open space.*"

Impact fees were adopted in 1999 by an amendment to the Pelham Zoning Ordinance to enable the Town to levy the fees, and then the Town developed an Impact Fee Schedule to determine the amount of the fees and which capital improvements they will apply to. The Fee Schedule involves an intensive study of the impact of new development, by type, on facilities scheduled in the Capital Improvements Program. Currently, impact fees in Pelham are used to raise funds for future school and fire protection needs. Impact fees may also be useful for funding future recreation facilities.

O. RECOMMENDATIONS

1. Town Hall

- Construct and maintain the new Town Hall facility as approved by voters in 2002 and expand into the shell space as needed to serve population growth through the planning period.

2. Library

- Construct and maintain the new library as approved by voters in 2002.
- Reserve land adjacent to the new library for possible future expansion.
- Retain and continue to utilize the former historic library building for public use in keeping with deed restrictions on the property.

3. Police Department

- Construct and maintain the new police facility as approved by voters in 2002 and expand into the shell space as needed to serve population growth.

4. Fire Department

- Continue planning for new sub-station(s) and an expansion or replacement of the existing fire station in order to limit response times and provide adequate space for additional fire fighters.
- Continue to use impact fees as a source of revenue for new Fire Department facilities.

5. Parks and Recreation

- Perform an in-depth facility study of recreation needs to serve the existing and projected population.
- Complete and implement a Parks and Recreation Department Long Range Plan.
- Continue planning for the design and construction new recreation facilities based on the results of the study.
- Consider using impact fees as a source of revenue for new recreation facilities.

6. Solid Waste

- Continue to encourage the use of recycling as a method of limiting the cost of transfer station facilities.

7. Highway Department

- Continue planning for the design and construction of a new highway department garage.
- Consider a new location for Highway Department offices.

8. Schools

- Conduct a study of the potential to provide public kindergarten.

- Continue to plan for, design and construct additional middle and high school facilities based on NH Department of Education standards to meet the needs of the current and projected enrollment.
- Implement recommendations of the high school systems study.

9. Water Supply

- Consider updating and/or expanding existing water studies to determine whether groundwater supplies remain of a quality and quantity suitable for a public water source.
- Consider conducting a survey of underground storage tanks with capacities below 1,100 gallons.

10. Sewer

- Consider further study of municipal sewer system if demand is generated.

11. Cultural/Recreation Center

- Conduct a study of the feasibility of developing a community cultural/recreation center.
- A volunteer non-profit organization, perhaps a Pelham Arts Council, could be established to foster the arts as a vital component of Pelham's community fabric. This council could also provide guidance in the design and management of a future cultural/recreation center to ensure adequate facilities for arts programs in addition to sports and entertainment facilities

12. Re-Use of Old Buildings

- Conduct a study to determine the most appropriate re-use of the former library, Town Hall and Town Hall annex buildings.

APPENDIX VI

Projected Playing Field Facility Needs²¹

Soccer

	Year				
	2000	2005	2010	2015	2020
Teams	40	48	52	58	63
Hours used per Week/Team	2.5	2.5	2.5	2.5	2.5
Total Field Hours required	100	120	129	144	158
Fields currently available	2	2	2	2	2
Available Fields per Team	0.05	0.04	0.04	0.03	0.03
Hours of Availability					
5 Weekdays (3.5 hours/day)	35	35	35	35	35
1 Saturday (10 hours)	20	20	20	20	20
Field Hours currently available	55	55	55	55	55
Field Hours short	45	65	74	89	103
New Fields needed	1.6	2.4	2.7	3.2	3.8

Baseball/Softball

	Year				
	2000	2005	2010	2015	2020
Teams	38	46	49	55	60
Hours used per Week/Team	2.5	2.5	2.5	2.5	2.5
Total Field Hours required	95	114	123	137	150
Fields currently available*	4	4	4	4	4
Available Fields per Team	0.1	0.1	0.1	0.1	0.1
Hours of Availability					
5 Weekdays (2.5 hours/day)	50	50	50	50	50
1 Saturday (10 hours)	40	40	40	40	40
Field Hours currently available	90	90	90	90	90
Field Hours short	5	24	33	47	60
New Fields needed	0.2	1.1	1.5	2.1	2.7

*Does not include Newcomb Field.

²¹Source: Pelham Parks and Recreation Department, *Fields and Gyms Needed for Organized Sports*, November 2001.

Football/Cheerleading

	Year				
	2000	2005	2010	2015	2020
Teams	10	12	13	14	16
Hours used per Week/Team	3.7	3.7	3.7	3.7	3.7
Total Field Hours required	36.7	44	47	53	58
Fields currently available*	1	1	1	1	1
Available Fields per Team	0.1	0.1	0.1	0.1	0.1
Hours of Availability					
5 Weekdays (2.5 hours/day)	17.5	17.5	17.5	17.5	17.5
1 Saturday (10 hours)	10	10	10	10	10
Field Hours currently available	27.5	27.5	27.5	27.5	27.5
Field Hours short	9.2	16.5	20.0	25.4	30.6
New Fields needed	0.3	0.6	0.7	0.9	1.1

*Does not include Newcomb Field.

Basketball (Youth-Inside Teams)

	Year				
	2000	2005	2010	2015	2020
Teams	31	37	40	45	49
Hours used per Week/Team	2.75	2.75	2.75	2.75	2.75
Total Gym Hours required	85	102	110	124	136
Gyms currently available	2	2	2	2	2
Available Gyms per Team	0.1	0.1	0.1	0.0	0.0
Hours of Availability					
5 Weekdays (2.5 hours/day)	16	16	16	16	16
Saturday/Sunday (20 hours)	20	20	20	20	20
Gym Hours currently available	36	36	36	36	36
Gym Hours short	49	66	74	88	100
New Gyms needed	2.7	3.7	4.1	4.9	5.6

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CHAPTER VII HISTORIC RESOURCES

A. INTRODUCTION

A plan for Pelham's future would not be complete without a look to its past. In terms of planning, historic structures and sites should be considered an integral part of the community's environmental resources for, like other resources of this nature, they are non-renewable. It is the responsibility of each community to plan a program of historic and cultural protection based on local needs and desires. This chapter provides: 1) background on important historic structures and sites in Pelham; 2) a discussion of the preservation tools available to local citizens; 3) a summary of the status of preservation activity; and 4) recommendations.

B. HISTORICAL BACKGROUND

According to local tradition, in 1719 a group of settlers passed by Pelham on their way to Derry and cleared a spot to observe the Sabbath. That location is today known as Pulpit Rock. The first building erected in Pelham was reportedly a garrison house built near Mammoth and Sherburne Roads in 1719, erected by the Masonian Proprietors for the purpose of opening up the land they claimed to own for settlement. In 1721, Jonathan Tyng of Woburn, Massachusetts, deeded land in nearby Dunstable, Massachusetts to John Butler. The land was located in the western part of Town, known as the Gumpus District. Butler built his house on the eastern side of Mammoth Road, near the intersection of Bush Hill and Burns Roads in 1721; his wife and nine children followed two years later. The cabin stood for more than eighty years.

The north and west part of what is today Pelham was historically part of the ancient township of Dunstable while the south and east part was included in the Dracut District. Trouble over the Mason and Wheelwright grants and disagreement over the New Hampshire/Massachusetts line discouraged many from wanting to settle here. The state boundary was finally settled in 1741. In 1746, a group of local citizens including John Butler, Thomas Gage and Ephram Cummings, tired of being claimed and therefore taxed by both the Towns of Dunstable and Londonderry, requested and were granted a separate Town Charter by Governor John Wentworth. Pelham was named after the Duke of Newcastle, Thomas Pelham Holles. The first meetinghouse was located about 15 rods southeast of the Pelham Junior High School in the open triangle on the opposite side of Marsh Road and near where the "Block" now stands. A second meetinghouse was erected in 1751. In 1819 the Town was divided into five school districts - the Center, Gumpas, North Pelham, Gage Hill and Currier Highland. A sixth school was later established on Spaulding Hill Road.

The desire to establish a more direct highway between Concord and Lowell resulted in the establishment of the Mammoth Road through Dracut, Pelham, Windham, Londonderry, Manchester and Hooksett beginning in the 1820's. Despite opposition by Londonderry and Manchester, the road was finally completed in the 1830's, only to be replaced by the railway a few years later. Among the inns which became established along the stage route was that owned by the Foster family on Mammoth Road (known as the Gibson House across from Hartley's farm), which hosted dignitaries including Daniel Webster and President Andrew Jackson.

Farming was for many years the principal occupation of residents. Although not a single dairy farm remains today, in 1898 over 500,000 gallons of milk were produced on Pelham's hundred and fifty farms. The advent of the Northeastern Electric Railway in 1902, connecting Pelham Center with Nashua, Lawrence, Salem Haverhill, and Lowell, greatly expanded employment and entertainment opportunities for Pelham residents and in many ways resulted in the gradual decline of farming. Some found work in

the cities at mills and stores, on the electric cars and at the Pelham Car Barn and Power Station. Students were able to travel more easily to high school in Nashua or Lowell, and families could enjoy a weekend outing to the amusement park at Canobie Lake or to Hampton Beach. A collision in Pelham in 1903 killed four passengers and injured forty. Service on the line continued until 1923.

After reaching a population peak of 1,071 persons in 1850, Pelham, like most of the rural towns in the region, began a long, slow period of population decline. Westward migration, the inability of New Hampshire farms to compete with midwest farms and the availability of jobs in urban centers all contributed to this statewide trend. Pelham's population hit a low point at 791 people in 1890, comparable to its 1790 population level. The population hovered near 900 between 1900 and 1940, finally surpassing its 1850 peak population level with a population of 1,317 in 1950. The Town witnessed a period of rapid population growth beginning in the 1960s, encouraged by the development of high-technology industries in the Nashua area and the expansion of the Boston metropolitan area made possible by major improvements to the state and federal highway systems. From a population of 2,605 in 1960, Pelham's population grew to 9,408 persons in 1990 and 10,914 persons in 2000.

C. SIGNIFICANT HISTORIC RESOURCES

Pelham's location on the old Massachusetts/New Hampshire state line as well as on the Mammoth Road connecting Concord and Lowell makes its history distinctive from others in the region. The many fine, old residences along the Mammoth Road from North Pelham to the state line remind the visitor of when this was the main highway to Concord. The road was dotted by taverns and public houses for the weary stagecoach traveler. Many of the large 2-1/2 story clapboard structures along the route date to the early 19th Century. They display elements of the Georgian, Federal and Greek Revival styles of architecture, including handsomely molded entrances. Gumpas (Gumpus) Cemetery, also on Rt. 128, was the first cemetery in Town and contains the graves of many early settlers, including John Butler who died in 1759. The first person to be buried there was Sarah Butler, John's daughter, who died in 1723.

The main concentration of historic structures in Town has always been Pelham Center, located at the junction of the Windham Road (Rt. 111A) and Nashua Road. The Pelham Public Library is a hip-roofed brick building, erected by the Town in 1896 to commemorate the 150th anniversary of the incorporation of the Town. Pelham's present Town Hall replaces an earlier Town Hall which burned in 1906. It was located near the present fire/police station. The Butler Monument, located on the Town Common, was erected in 1886 by the descendants of John Butler, the first settler of Pelham. Other historic structures in the Town Center include the Congregational Church (1842) and a number of older homes ranging in age from the mid 19th Century to the early 20th. The old muster grounds, now owned by St. Patrick's church (1913), were also the area occupied by the street railway earlier in the century. On the northeast section of Gage Hill Road is the old Grand View House.

In addition to residences, public buildings and cemeteries, a wealth of interesting historic sites are also found throughout Pelham. A bronze marker at the Pulpit Rock Site on Route 38 marks the outcropping on which the first sermon was preached in Pelham in 1719. A granite marker on Nashua Road, off Rt. 128, marks the location of the old bound stone between Pelham and Hudson, an area that was part of Massachusetts prior to 1741. Another marker on Colburn Avenue, off Rt. 38, known as the Mitchell Bound, marks the starting point from which Massachusetts and New Hampshire were first surveyed. Pelham's only remaining old stone bridge, the Abbott Bridge over Beaver Brook, is the oldest remaining double arched, dry masonry bridge in the state. The bridge was built in 1837 with \$3,800 of surplus revenues from the government and was renovated in 2000. Although not listed on the National Register of Historic Places, eligibility for listing the bridge was established during the renovation process and a marker was placed at the site.

According to the 1990 Census, there were 301 dwelling units (or 9.7%) in Town constructed prior to 1939. Compared to other communities in the region, Pelham ranked as the fourth lowest, behind only Hudson, Litchfield and Merrimack, in terms of percent of housing units built before 1939. Rapid growth over the past twenty years serves to make surviving historic structures even more precious.

D. PRESERVATION ACTIVITIES TO DATE

Much of the responsibility for historic preservation is undertaken by private individuals or groups. The Pelham Historical Society was established in 1969. Its collection of objects related to the Town's history are stored in a room in the Pelham Senior Citizens Community Center. Projects the Society has been involved in include the preservation of the Old Bridge Street (Abbott) Bridge. There is also interest in updating the Town history and a historic site list has been prepared. To protect and preserve the historic stone bridge over Beaver Brook, a portion of Old Bridge Street North, from the Rt. 38 intersection to the Rt. 111A intersection in Pelham Center was designated as a Scenic Road in 1990. In 1986 Pelham celebrated the 100th Anniversary of the Butler Monument time capsule. The time capsule was opened and a new one was buried. In 1996, the Town celebrated its 250th Anniversary. The celebrations included a two-day "Colonial Embankment," a "Colonial Costume Ball," a grand parade and fireworks. A different activity took place every month for the year preceding the July 3rd 1996 final celebration.

The Town does not currently have any resources listed on the National or State Register of Historic Place and has not conducted an historic resources survey, although there was an effort to identify pre-1850 houses in 1976. An historic district commission was established in 1974. A subsequent proposal to establish a local historic district, however, met with defeat. However, in 1999, the restoration of the Abbott Bridge was bestowed with a NH Preservation Achievement Award. This award recognizes the outstanding collaborative effort that resulted in the rehabilitation of New Hampshire's oldest double arch stone bridge.¹ The following discussion provides information on some of the tools available to the Town to assist with the preservation of its historic resources. A list of potential historic sites is provided in Table VII-1 and their location is illustrated on Map VII-1.

Table VII-1: Potential Historic Sites in Pelham

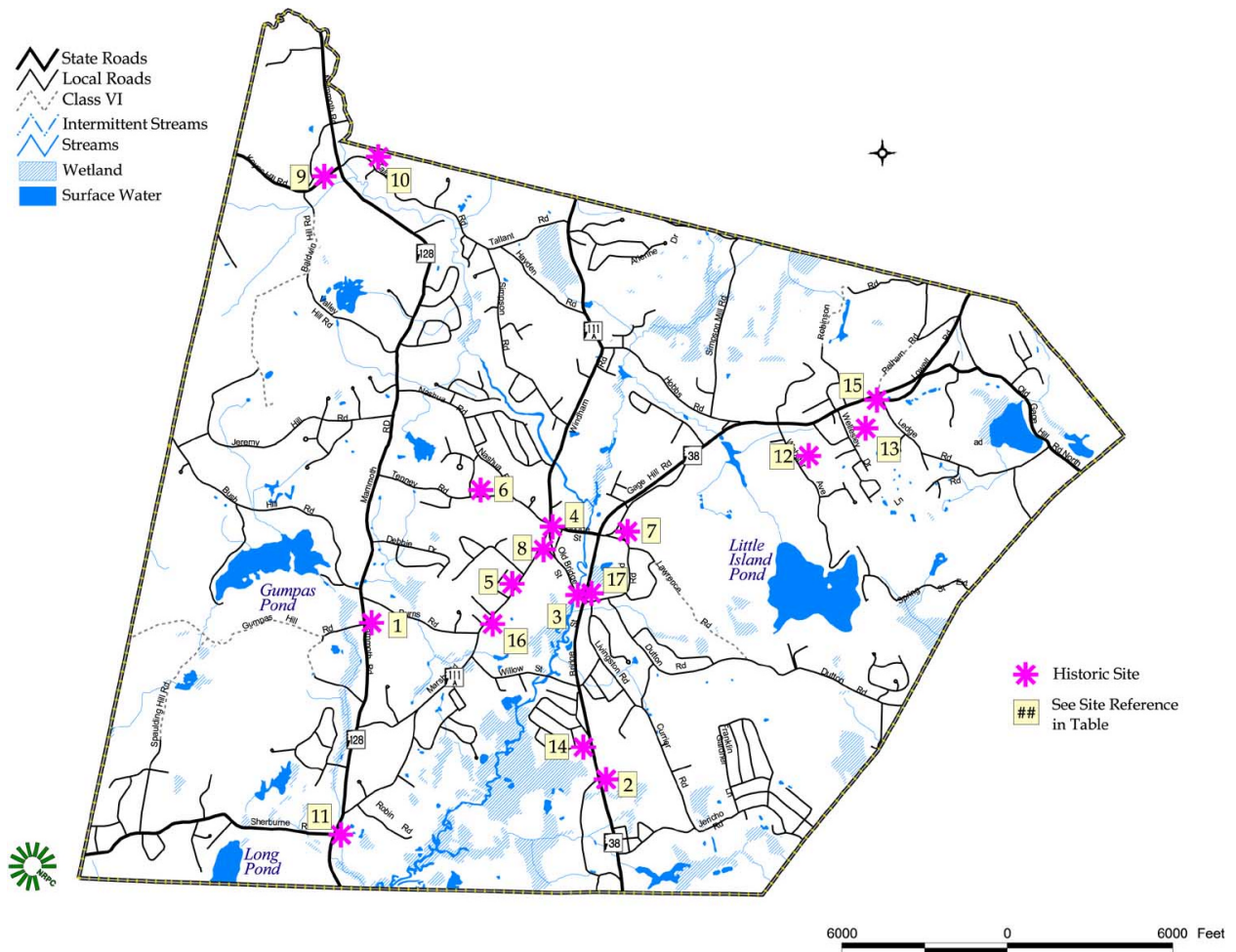
Number on Figure VII-1	Name
1	Gumpas (Gumpus) Cemetery
2	Pulpit Rock Site (Route 38)
3	Abbott Bridge*
4	Butler Monument
5	Wyman House
6	Stickney House
7	Atwood Cemetery
8	Gibson Cemetery - back section
9	North Pelham cemetery
10	Old Cotton Mill
11	Hilman's Corner - Hilman Factory (Sherburne Road)
12	Webster Farm
13	Bedard's Quarry
14	Old Stone Cottage
15	Sexton's House
16	First Block House Site
17	Cranberry Bog

Source: 1992 Pelham Master Plan (corrected).

*Note: Abbot Bridge is eligible for listing on the National Register of Historic Places.

¹ **Source:** NH Preservation Alliance, *Press Release*, May 27, 1999.

Map VII-1: Historic Resources



E. PRESERVATION METHODS

There are various methods that can be used to encourage the preservation or restoration of historic resources. These include: 1) historic resources survey; 2) National Register of Historic Places; 3) local historic districts; 4) Certified Local Government program; 5) local heritage commissions; 6) historic building rehabilitation federal tax credits; 7) historic markers; 8) easements; 9) protection of archeological areas; 10) Scenic Road designation; 11) innovative land use controls; and 12) building code provisions.

I. Historic Resources Survey

Preservation through documentation is the most basic and essential of preservation strategies. There are several reasons for undertaking an historic resources survey. In addition to providing a permanent written and photographic record of a town's architecture, a good inventory is the foundation for other preservation tools. It can be of service to the historic district commission and can be used to prepare nominations for listing of historic structures in the National Register of Historic Places. Data gathered in a survey may encourage a greater appreciation of historic structures and sites by local citizens. Historic resource assessments are also necessary for accomplishing environmental reviews required in projects receiving federal funding, such as highway projects. As the beginning of a comprehensive historic preservation strategy, information gathered should act as a firm foundation for future decision making, by identifying buildings suitable for and worthy of preservation and/or rehabilitation.

A complete historic resources survey can help a community weigh proposed actions more carefully, so that it does not inadvertently expend its long-term assets in realizing immediate objectives. If a comprehensive townwide survey is not feasible, Pelham would be wise to at least begin to survey areas which may be critical to future road improvements.

2. State Register of Historic Places

The State of New Hampshire Register of Historic Places program encourages the identification and protection of historical, architectural, archaeological and cultural resources. The program provides for listing in order to encourage awareness of the historical significance of the listed structure, but does not mandate protection. Benefits of listing include public recognition, consideration and advocacy in the planning of local and state funded projects, qualification for state financial assistance for preservation projects (i.e. LCHIP) and special consideration or relief in the application of some access, building and safety code regulations. Listing takes place through application to the NH Division of Historic Resources.² The former Library building may be a candidate for listing.

3. National Register of Historic Places

The National Register of Historic Places is the official list of the Nation's resources worthy of preservation. Established by the National Historic Preservation Act of 1966 and administered by the National Park Service within the Department of the Interior, the Register lists properties of local, state and/or national significance in the areas of American history, architecture, archaeology, engineering and culture. Resources may be nominated individually, or in groups, as districts or as multiple resource areas and must generally be older than 50 years.

² Source: NH Division of Historic Resources, *The NH State Register of Historic Places*, February 8, 2001. See: www.state.nh.us/nhdhr.

The primary benefit of National Register listing is the recognition it affords and the appreciation of local resources which is often stimulated through such recognition. The National Register also provides for review of effects which any federally funded, licensed or assisted project, most notably highway projects, might have on a property which is listed on the Register or eligible for listing. Register standing can also make a property eligible for certain federal tax benefits (investment tax credits) for the rehabilitation of income-producing buildings and the charitable deduction of donations or easements.

Contrary to many commonly held beliefs, National Register listing does not interfere with a property owner's right to alter, manage, dispose of or even demolish his property unless federal funds are involved. Nor does National Register listing require that an owner open his property to the public. A National Register district must have the approval of a majority of property owners in the district. For a single, privately owned property with one owner, the property will not be listed if the owner objects. National Register listing can be an important catalyst to change public perception and increase historic awareness but cannot in itself prevent detrimental alterations or demolition. Yet, it remains an important first step toward historic awareness, respect and protection.

Statewide there are nearly five hundred National Register listings of which approximately fifty are districts. Twenty individual buildings or sites and four districts in the region are listed on the Register. Pelham does not currently have any properties listed on the Register although the Abbot Bridge is eligible and there are other locally significant sites and structures which are potentially eligible.

4. Local Historic Districts

The term "historic district" can refer either to an historic district established by Town Meeting vote, or has been previously discussed, to a National Register Historic District. Both are useful preservation tools but differ in the way in which they are established and the protection they afford. An historic area may be both a locally designated historic district and a National Register District. Several communities within the region, including Amherst, Hollis, Mont Vernon and Nashua have enacted local historic district ordinances.

The most comprehensive preservation tool available to local governments under New Hampshire state law is the creation and administration of a local historic district (RSA 674:45). The purpose of an historic district is to protect and preserve areas of outstanding architectural and historic value from inappropriate alterations and additions which might detract from an otherwise distinctive character. Historic districts should not attempt to "freeze" time but should preserve what is significant to a district while accommodating change and new construction in accordance with regulations based on a local consensus.

Historic districting can be an effective technique for protecting the character of an area. Unlike zoning which focuses on land use, an historic district emphasizes exterior appearance and setting. Yet unlike site plan review, historic districts allow officials to exercise authority over construction and alteration of single family dwellings. However buildings alone need not comprise a district. Effective district preservation should involve streetscapes, landscapes, contributing views and viewsheds as well as buildings. It should be noted that historic districting is not an appropriate method for protecting all historical resources in an area, especially where properties are widely scattered. Historic districting also may not be the most effective means of protecting a significant land area, but districting can be effectively combined with other techniques.

5. Certified Local Government (CLG) Program

The National Historic Preservation Act of 1966 provides for matching grants-in-aid to the states from the Historic Preservation Fund for historic preservation programs and projects. Federal law

requires that at least ten percent of each state's Historic Preservation Fund grant be designated for transfer to eligible local governments which apply for the money. A local government can participate in the program once the State Preservation Office certifies that the community has established its own historic preservation commission, district and a program meeting certain federal and state standards. Matching grants are made each year to certified local governments for survey and planning projects, including preparation of National Register nominations and historic resource surveys. Currently, the CLG program represents the only source of state funds available for communities interested in preservation planning.

6. Local Heritage Commissions

In 1992, the Legislature enacted RSA 674:44-A to enable towns or cities to establish heritage commissions "for the proper recognition, use and protection of resources, tangible or intangible, primarily man-made, that are valued for their historic, cultural, esthetics or community significance within their natural, built or cultural contexts."

The statute defines the power of the commission and authorizes acquisition of property in the name of the town. Heritage commissions may, if authorized by the Town assume the composition and duties of historic district commissions or the municipality may choose to maintain separate and distinct commissions. If separate, the heritage commission is advisory to the historic district commission, the planning board and other local boards.

The Town may appropriate funds and the proper handling of these or other related funds is specified in the statute. The makeup of members is similar to other local boards, and a planning board member may be a member of the heritage commission. The requirements for meetings, disqualification of a member, abolition of heritage commissions, effect of abolition, transfer of documents are the same as for other local boards. The statute also amends the historic district statutes to incorporate references to cultural and community values as a public purpose, and authorizes creation of more than one district in a municipality.

7. Historic Building Rehabilitation Federal Tax Credits

The rehabilitation of older buildings, frequently less expensive than new construction, is a cost-effective solution benefiting the tax base while filling older structures with a new life. The Economic Recovery Act of 1981, as amended, provides incentives in the form of Federal investment tax credits for the substantial rehabilitation of income-producing older buildings. The act was passed to support preservation by eliminating certain tax incentives which encouraged the demolition of historic structures. In order to receive the credits, owners are required to furnish detailed rehabilitation plans for review and certification by the National Park Service. Municipally owned structures are not eligible for these credits.

Currently the tax incentives take two forms:

<u>Credit</u>	<u>Building Use</u>	<u>Eligible Properties</u>
10%	Commercial/Industrial	40 years and older
20%	Commercial/Industrial Income Residential	50 years and older

To be eligible for the larger federal tax credit, a building must be a certified historic structure, either listed individually on the National Register, or contributing to a National Register or certified local district. Certified rehabilitation work must adhere to the Secretary of the Interior's Standards for

Rehabilitation, a list of ten standards developed to ensure that significant features of a building will not be compromised. In order to qualify for any of the tax credits, rehabilitation expenditures must exceed \$5,000 or the adjusted basis of the property (cost of the building excluding the value of the land less depreciation), whichever is greater.

The investment tax credits provide some incentive to rehabilitate older buildings instead of undertaking new construction. Unfortunately because these credits do not cover privately owned, non-income producing residences which constitute the majority of Pelham's resources, their use in Town is somewhat limited. Larger structures with income-producing potential could benefit from the use of the credits, which would also insure the sympathetic rehabilitation of the buildings.

8. Historic Markers

Markers are an easy, inexpensive way to tell both residents and visitors about significant people, places and events in a community's past. The State Marker Program was originated by the New Hampshire Legislature in 1955. The aim of the program is the erection of appropriate markers designating events, people and places of historical significance to the State of New Hampshire. Communities who would like to be considered for a marker submit a request for consideration by the State Highway Department and Division of Historical Resources. There is generally no cost involved for a marker on a state-maintained road. There is a charge of \$1,100 for a marker on a private road. Statewide there are approximately 160 historical markers. Few have been erected in NRPC communities. Pelham currently has one State marker at the Abbott Bridge and three local markers at the Old Pulpit Rock, old stone bound and Mitchell bound sites.

The sole purpose of the marker program is recognition. The program is non-restrictive; it does not protect historic sites nor does it obligate owners in any way. The criteria which apply to marker selection are also much less stringent than those for getting a property listed on the National Register. A marker may be used to point out historic sites which have changed considerably over time or even to commemorate events for which there is no standing evidence, anything which has historical significance to a community. For the simple recognition of an historic property, the historical marker program may be a better tool than the National Register, more readily visible and much easier to use. Another type of marker which has found widespread use involves the placement of wooden date markers on houses. Such a program was initiated in Pelham back in 1976 as part of the Bicentennial celebration.

9. Easements

Across the country, preservation easements have proven to be an effective tool for protecting significant historic properties. An easement is a property right that can be bought or sold through a legal agreement between a property owner and an organization eligible to hold easements. Just as a conservation easement can be used to protect open space, scenic areas, waterways, wildlife sanctuaries, etc. from incompatible use and development, an architectural easement protects the exterior appearance of a building.

Easements provide property owners with two important benefits. First, the character of a property is protected in perpetuity. In addition, the donation of an easement may make the owner eligible for certain tax advantages. If the property is listed in the National Register, in return for giving an easement, an owner is eligible under the Tax Treatment and Extension Act of 1980 to make a deduction from his taxes. Donation of an easement may also reduce estate and local property taxes.

Easements are also extremely beneficial to a community. The costs of acquiring easements may be significantly lower than buying properties outright to protect valuable resources, particularly when easements can be acquired by donation. Significant resources can remain in private hands but are

protected from inappropriate alteration as the organization holding the easement is given the right to review any proposed changes to the structure or property.

If properly administered, easements are a superior method of conserving and protecting land, water and historic resources; perhaps better and longer than zoning or locally designated historic districts.

10. Protection of Archaeological Areas

Although much of this chapter deals specifically with architectural resources, it should be recognized that the preservation of areas of high potential for prehistoric and historic archaeological sites poses unique problems. In comparison to historic structures, archaeological resources are more difficult to identify and protect. Each site is unique and fragile. Once a site is disturbed, information is lost. While there is often an urgent need to keep the location of an important archaeological resource confidential, the same confidentiality will often preclude public awareness. Acquisition of the land or land development rights is often the only way to effectively preserve archaeological resources. Ironically, increased appreciation may also represent a very real threat to archaeological resources.

Rapid growth is the greatest threat to archaeological resources. The few applicable laws that protect archaeological resources are primarily federal. As a result of these laws, large highway projects or projects which require review by a federal agency usually have a review of impacts to cultural resources. In addition, there are mining laws which allow review of projects for impacts and there is the possibility of review within the dredge and fill process.

However, since much of the region's growth is from private rather than public sources, archaeological evaluation is not required. In some cases in the state, cooperative developers have permitted recording of archaeological data which would otherwise be destroyed. The State Division of Historical Resources has very limited ability to review private projects for impact on archaeological resources. However, local officials should consult the Division if a proposal will impact a known archaeological resource or if a project is in a location with a high probability of archaeological potential such as areas with proximity to water. In extreme cases, the Town may wish to ask developers to fund recovery of archaeological data by hiring a professional archaeologist as a consultant to evaluate a property for archaeological potential and/or survey the area for unknown archaeological sites. This procedure is dictated by law in many neighboring states but is not currently required in New Hampshire.

11. Scenic Road Designations

New Hampshire State law enables a community to designate any road as scenic unless it is a Class I or II highway. A scenic road designation protects trees and stone walls located on the public right-of-way. After designation of a scenic road, any repair, maintenance, reconstruction or paving work, tree removal or stone wall removal cannot take place without prior written consent of the planning board or official municipal body.

Designation of a road as "scenic" will not affect the Town's eligibility to receive State aid for road construction. It does however give communities a way to protect an important statewide resource and may also help to preserve the scenic quality around historic structures and stimulate respect for the existing landscape. A number of communities within the region are currently taking advantage of this potential preservation tool. The only road in Pelham designated as a scenic road is Old Bridge Street North from its intersection with NH 38 to its intersection with NH 111A.

I2. Innovative Land Use Controls

The use of an "open space development" ordinance allows for development to be located away from sensitive areas, agricultural lands or historic areas. In the State of New Hampshire RSA 674:21 gives communities authority to adopt a variety of innovative land use controls which may support the preservation of community character and consequently historic resources. The concept of the transfer of development rights is another strategy that may be used to help a community retain its historic character.

I3. Building Code Provisions

In seeking to protect the public's health and safety, standards such as building codes may present unique complications to the use or rehabilitation of an historic building. As a result, some communities have elected to amend local building codes to exempt historic structures from certain code requirements, other than life safety provisions. This allows historic buildings to continue to be used safely while not imposing a modern set of standards that are impossible for an older building to meet without a significant loss of integrity. It should be noted that Chapter 32 of the Basic Building Code of Building Officials and Code Administrators (BOCA), used by many of the region's communities including Pelham, specifically addresses the need for sympathetic treatment of historic structures. Under this section, buildings identified as historic buildings are not subject to the code when they are *"judged by the building official to be safe and in the public's interest of health, safety and welfare regarding any proposed construction, alteration, repair, enlargement, relocation and location within fire limits."*

F. RECOMMENDATIONS

- Conduct a comprehensive townwide historic resources survey using a Geographic Information System. Information should be updated periodically to indicate changes to buildings, including remodeling, fire, demolition or changes to surroundings.
- The Town should continue to encourage the protection, enhancement and rehabilitation of significant architectural and historic resources such as the Town Hall, Library, Butler Monument, Town Common and cemeteries. Any building changes, site improvement or other alteration (especially to town owned buildings) should respect the historical qualities of the structure.
- The Town should consider the establishment of a heritage commission to encourage the protection and appropriate use of Pelham's cultural and esthetics as well as historic resources. Attention in particular, should be focused on Town Center.
- Historical interest and pride should be promoted in a variety of ways including:
 - photographs and exhibits in public places;
 - markers and dates at historic structures;
 - brochures describing local history;
 - tours of historic structures and sites;
 - local history courses in the school curriculum;
 - oral history projects; and
 - support of the Pelham Historical Society.
- Copies of literature from the State Historic Preservation Office regarding appropriate rehabilitation techniques should be placed on file in the Town Hall and made available by the Historical Society to encourage the sensitive rehabilitation/renovation of older homes and buildings.
- Encourage National and State Register listing for eligible local structures, including appropriate private residences and the former Library building.

- Continue to locate, identify, catalogue, preserve and protect Town records, documents, manuscripts and artifacts and provide a suitable and safe repository for them. Early handwritten records should be reproduced (transcribed or microfilmed but not photocopied) and copies kept in more than one location. Make collected historical information (in a protected environment) accessible to Town residents and future generations.
- Encourage the use of innovative land use controls including cluster development and partial development to conserve open space and minimize the visual impact of new development on significant historic areas, open space and scenic views.
- Consider the creation of a local Historic District for the Town Center.
- Strengthen incentives for historic preservation in the zoning ordinance and site plan and subdivision regulations, including the adoption of an “open space development” ordinance.
- Consider the adoption of a Scenic Road ordinance, per RSA 231:157, in order to help preserve the scenic and historic qualities of Pelham’s rural roads.
- Investigate protection measures for Pelham’s Class VI roads, which were often the location of historic development, and which today can serve as recreational trails for Pelham’s citizens. The stone walls, cellar holes, and large trees that are often located along these Class VI road should be safeguarded from destruction or removal.
- Consider the acquisition of available, significant property for conservation and preservation purposes in limited but critical cases.
- Promote the donation of easements by historic property owners to a designated authority such as the conservation commission, or established land trust such as the Society for the Protection of New Hampshire Forests.
- Encourage archaeological investigation/ documentation in Pelham including historic and prehistoric sites and cemeteries.
- Promote the work of the Town cemetery trustees and the preservation and protection of the Town's historic graveyards and private burying grounds including retention of the natural vegetation, preservation of the dry laid stonewalls and retention of the small stones used as footstones and children's headstones.
- Promote the collection, preservation and protection of oral histories and early photographs and encourage the continued recording of townspeople and structures for permanent reference.

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CHAPTER VIII FUTURE LAND USE

I. INTRODUCTION

Planning for the preferred future use of land within Pelham is a central component and culmination of the Master Plan. The content of the preceding chapters of the plan are essentially layers of a comprehensive land use plan which is implemented through the local zoning ordinance and land use regulations. Based upon an examination of existing land use patterns and projected community needs, this chapter provides a discussion of the preferred land use pattern for the next twenty years. The chapter describes where those preferred uses should be located, how they should function and concludes with a series of recommendations. Future land use is discussed in the context of: 1) natural resources protection; 2) the town center; 3) residential development; 4) commercial development; and 5) industrial development. The preferred future land use pattern is illustrated on Map VIII-1, Future Land Use.

II. NATURAL RESOURCES PROTECTION

Chapter IV, Natural Resources, identifies the conservation of steep slopes, forests, surface water resources, ground water resources, soils with high limitations for septic systems, and the remaining agricultural land as a high priority. These resources are located throughout the town, but it is those undeveloped areas of the town where two or more of these resources are concurrently located that should be protected. These areas are generally identified on Map VIII-1 and should be candidates for permanent protection. Sources of protection may include fee simple purchase, purchase of development rights, conservation or agricultural easements or a rezoning within the Recreation-Conservation-Agricultural (RCA) Zoning District, or some combination of the above.

III. TOWN CENTER

Chapter VI, Community Facilities, and Chapter VII, Historic Resources, identifies Pelham town center as a significant historic resource and center of institutional activity. The town center continues to provide an opportunity for containing most public facilities such as the schools, police department, town hall and library within reasonable walking distance of each other in a historically significant, mixed institutional-residential environment. The new municipal facility, library and village green has further enhanced the town center. Additional community facilities such as a new community center, other recreation facilities and new uses within various significant historic buildings should be encouraged to locate in the town center, while respecting existing and future residential amenities. The redesign of the NH 111A/Nashua Road/Old Bridge Street intersection with a roundabout or other traffic control measure should enhance access to the town center and improvements to this intersection are encouraged.

IV. RESIDENTIAL DEVELOPMENT

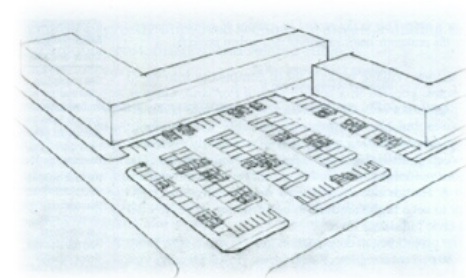
There are approximately 3,818 acres of undeveloped land remaining in the Residential Zoning District.¹ Under the 2002 Zoning Ordinance, there is the opportunity for this land to develop at up to one residential unit per acre. Given that much of the remaining undeveloped and residentially zoned land is located in areas of Pelham with significant natural resources, including steep slopes, large forest blocks, surface water resources, ground water resources, soils with high limitations for septic systems and/or significant agricultural soils, consideration should be made limiting development in these areas. A number of attempts to amend the Residential Zoning District to allow for one residential unit per two

¹ See page III-11 in Existing Land Use Chapter.

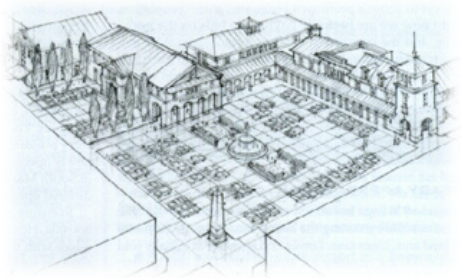
acres, and to allow for open space development, have been defeated at the polls. Therefore, consideration should be made to reducing the allowable density in areas with the presence of significant natural resources while increasing the allowable density in areas with fewer development constraints. This goal may be implemented through an amendment to the Residential District of the Zoning Ordinance to re-zone significant pieces of the remaining undeveloped residential land. Another option is to implement system of transfer of development rights whereby one landowner can purchase the development rights from another and transfer the allowable density to land with fewer development constraints. This system, however, involves considerable planning and administration and is unlikely to be successful without a full commitment to implementation.

V. COMMERCIAL DEVELOPMENT

There are approximately 97 acres of undeveloped land remaining in the Commercial Zoning Districts located in a strip along NH 38 from the Massachusetts border to just north of Bridge Street¹. The majority of the Commercial Zoning Districts were developed in the 1970's through 1990's with retail and restaurant uses typical of late 20th century strip development. This type of development is characterized by multiple curb cuts, large areas of on-site parking generally located in front of the principal structure, and insignificant architectural treatment.



Before Redevelopment



After Redevelopment?



However, given the limited availability of undeveloped land and the relatively short design life of existing commercial buildings, there is tremendous opportunity for redevelopment along NH 38 in the next 20 years.² Specifically, an access management plan, which may be in the form of an update to the 1991 Route 38 Corridor Study, may assist with maintaining the capacity of the roadway and improving access for all modes of transportation. The update to the study should include best practices in vehicle, bicycle and pedestrian circulation, urban design and stormwater management.

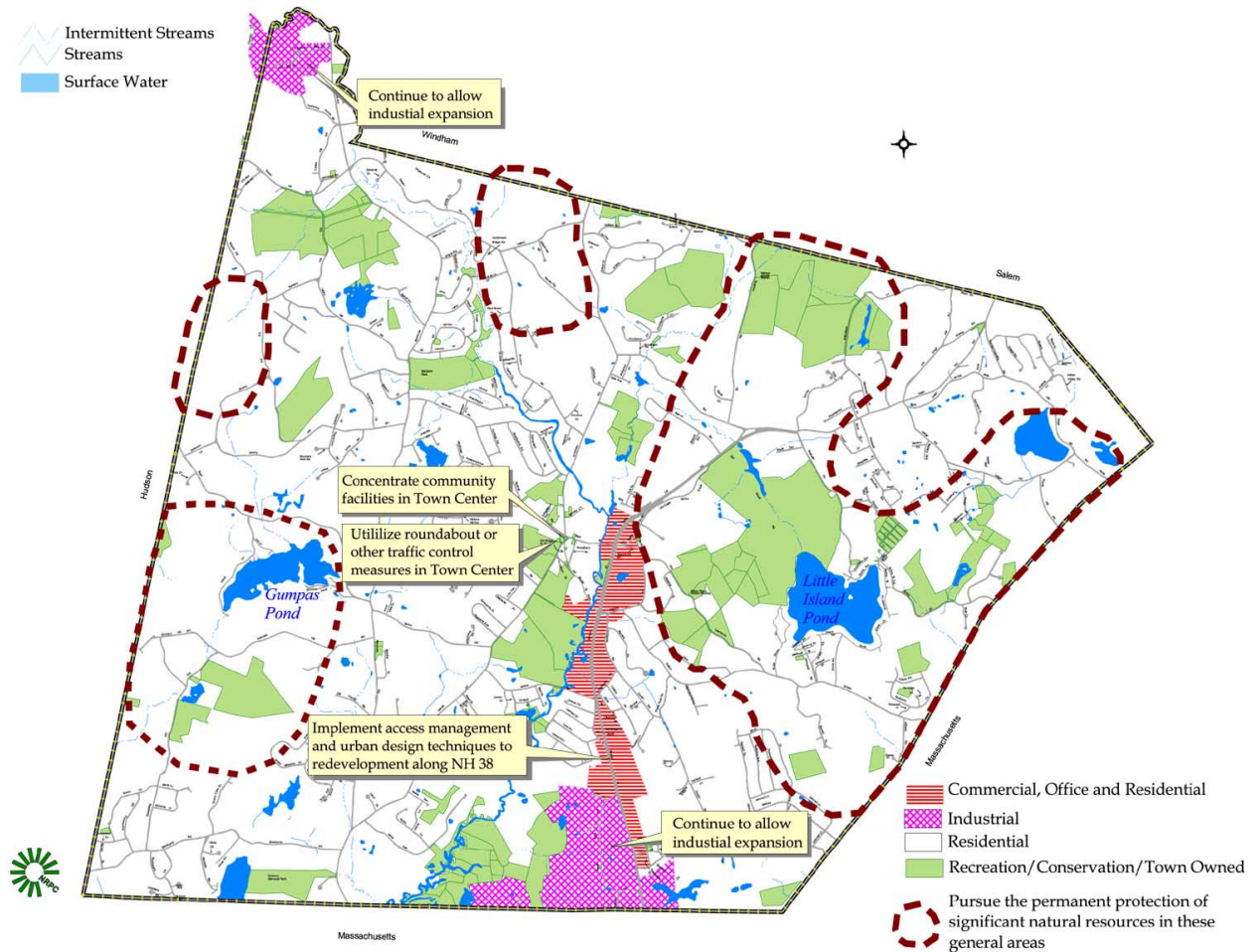
In addition, further implementation of the *Compatibility Guidelines for the Town of Pelham*³

and amendments to the sign ordinance may assist in dramatically improving the aesthetics and function of the corridor. The uses permitted in the Commercial Zoning District appear to be adequate as a mix of residential and commercial uses are permitted. However, site development along this corridor should not be considered in isolation. There will likely be multiple opportunities for shared parking, shared access, façade improvements and mixed residential/retail/office uses as applications for redevelopment are received.

² Graphics courtesy of Congress for the New Urbanism, 2001. Photo courtesy of Mashpee Commons, MA website.

³ NRPC, *Compatibility Guidelines for the Town of Pelham, NH*, June 15, 1999.

Map VIII-1. Future Land Use



- Consider amending the sign ordinance to improve the aesthetics of commercial development. Consider a requirement that signs must be compatible with architectural treatments and prohibit the use of moving, flashing or electronic changing signs.
- Consider amending the Zoning Ordinance to allow for shared parking and shared access where appropriate.

E. Industrial Development

- Continue to implement the provisions of the Industrial Zoning Districts.

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CHAPTER IX SUMMARY OF RECOMMENDATIONS

I. Population and Housing

- Conduct a Town buildout analysis using parcel-based Geographic Information System (GIS) technology. The buildout analysis can provide a more accurate estimate of the amount of developable land remaining in the Town. The results of the buildout analysis can be used to predict the level of public services required when the Town is fully developed.
- Using the results of the buildout analysis and the Natural Resources Inventory, conduct a study of the potential need for public water and/or sewer in certain sections of the Town.
- Develop regulatory measures that will facilitate the provision of affordable housing, such as: 1) review and consider revising the Housing for Older Persons Ordinance to further encourage the provision of such housing; 2) review and consider revising the requirements for Accessory Dwelling Units to allow for one-bedroom market rate rental housing; and 3) review and consider revising the zoning ordinance to further encourage the provision of mixed residential/commercial units in the Business Districts.

2. Natural Resources

a. Topography

- Consider an amendment to the Zoning Ordinance, subdivision and site plan regulations to adopt a Slope Conservation Overlay District to protect the most severe slopes in Town from unsuitable development. Development of land with slopes greater than fifteen percent should be approached with extreme caution, giving consideration to the problems presented by these slopes. Active use or development of slopes greater than twenty-five percent should be avoided. As these areas are best suited for open space, reserving them for that purpose will minimize the potential for erosion and allow for maximum absorption of surface water run-off thus protecting down-slope residents.

b. Soils

- The Planning Board should continue to consider soil potentials and limitations when reviewing the intensity of development.
- The Town's agricultural lands are recognized as an important and endangered resource with few State or local incentives for keeping viable agricultural lands in production. To protect this valuable resource, the Town should take steps to protect active and idle agricultural lands from development for other uses and create incentives which encourage agricultural lands to be kept in, or returned to, productive farm use. The Trust for New Hampshire Lands Program or the Land and Community Heritage Investment Program may assist the Town in this endeavor.
- New development should be focused in large areas with slopes of less than fifteen percent, giving consideration to the other factors which affect the development suitability of these areas.
- Site Specific Soil Mapping Standards and enforcement actions should continue to be required in the subdivision regulations as a means of verifying actual site conditions, to determine the extent to which development is feasible and to ensure that approved development is constructed according to the approved site and subdivision plans. The non-residential site plan regulations should be reviewed and revised as necessary to require the use of SSSMS.

c. Water Resources

- Land adjacent to surface water resources is restricted from development or strictly monitored in its active use. As these areas are a vital interface between surface and groundwater supplies, they are best suited for open space and have the potential for forming the basis of an open space system serving all developable areas of the community.
- Enforce the Shoreland Protection Act around all great ponds.
- Consideration is given to the protection of surface water and groundwater supplies within the Town's boundaries as they are the life-blood of the community. Groundwater supplies exist which are capable of supporting higher intensities of development. However, these must be protected from contamination in the absence of a municipal waste treatment system.
- Protect existing wetlands and surface waters by amending the Wetlands Ordinance to increase the 50' buffer from the edge of the wetland or surface water. This buffer will protect the natural habitat surrounding wetlands and surface waters that is crucial to the proper functioning of these water resources.
- Continue to implement the Floodplain Overlay Zoning District to reduce losses due to flooding.
- Water supply wells located on till deposits are shallow in depth and very susceptible to land use related contamination (septic systems, fuel storage, fertilizers, road salt, etc.). The Town should consider increasing the setback of future land-uses to these water supply wells.
- Take advantage of the University of New Hampshire's Community Environmental Outreach Program (CEOP)¹ and Natural Resources Senior Projects to continue prime wetland evaluations and designations.
- It is recommended that development of wetland areas continue to be restricted in the future through the Town's Wetland Conservation ordinance. This, combined with active enforcement of State regulations governing the location of septic system and along with the possibility of the Town adopting greater setback distances than the State's minimum, will ensure that these areas may continue to perform the natural functions for which they are best suited.
- Improve the licensing checklist to include the review of the National Pollution Discharge Elimination System permit, especially the facility's Stormwater Pollution Prevention Plan.
- Enforce licensing requirements of all junkyard facilities.
- Prepare a stormwater management plan that addresses the 6 minimum controls outlined under the EPA's Phase II Stormwater Regulations.
- Pursue further protection measures through the Department of Environmental Services.

d. Forests and Wildlife

- Utilize the Forestland Evaluation and Site Assessment (FLESA)² for future forest planning and components of the program on all Town owned lands.
- Maintain 50 foot undisturbed, shady buffer around vernal pools and 100 foot buffer on property lines abutting forests and all surface waters.
- Consider legal easements on all Town Forests to preserve the land for recreation and permanent protection.

¹ <http://ceinfo.unh.edu/Water/Documents/WRcomcon.htm>

² North Country and Southern New Hampshire Resource Conservation and Development Area Councils, *Planning for the Future of Local Forests*, 2001.

- Inventory all existing trails using Geographic Positioning System (GPS) and create a trail system map signage for all Town forests.
- Initiate a long-term insect monitoring plan for Hemlock Woolly Adelgid, weevils, and others.
- Take advantage of the University of New Hampshire's Community Environmental Outreach Program (CEOP) and Natural Resources Senior Projects for a plant biodiversity survey. These are inexpensive programs and the range of possible projects is limited only by the needs of the community and the availability of students to match those needs.

e. Conservation

- Pursue the fee purchase, purchase of development rights or other conservation measures to protect the remaining open space properties. Legal easements should be placed on all conservation properties.
- Allocate 100% of the Land Use Change tax to the Conservation Fund to help contribute towards increasing the number of protected open space parcels and provide matching funds for potential funding sources.
- Farm protection should be pursued for existing or undeveloped lands with Prime or State designated soils.
- Establish a Capital Reserve Fund to raise funds for land protection.
- The Conservation Commission and interested citizens should consider participating in the "Keeping Track" Program. This program uses animal tracks to identify habitats and feeding grounds in a systematic manner for a variety of animals. The information gained can be the start of an inventory and a monitoring system of prime habitats for future conservation.
- Take advantage of the University of New Hampshire's Community Environmental Outreach Program (CEOP) and Natural Resources Senior Projects. These are inexpensive programs and the range of possible projects is limited only by the needs of the community and the availability of students to match those needs.
- The Pelham Fish and Game land, the golf course, Camp Runnels and the watershed of the pond, Little Island Pond Prime Wetland and the surrounding uplands along with the Peabody Town Forest and the surrounding lands with powerline easements should be recognized as a greenway corridor and expanded so that movement of wildlife can continue to the Dracut.

3. Transportation

- The Town should conduct a townwide traffic study immediately to look at future transportation and traffic issues in the community in detail. Specific recommendations should be developed that could be implemented over the course of time to address the anticipated conditions. The Town should then budget for these improvements in its Capital Improvement Program and undertake a systematic transportation system improvement program
- The Town should develop a town-wide hiking and walking trail system utilizing Class VI roads and Town Center sidewalks.
- New roads in the Town should be local roads in function and classification, limited to providing access to adjacent parcels in subdivisions.
- The Town should employ access management techniques for the purpose of preserving roadway capacity and ensuring safe movement for vehicles entering and exiting curb cuts and side roads. Access management techniques that should be pursued include implementing

minimum driveway separation distances based on roadway speed and entering into a Memorandum of Understanding with the NH DOT.

- The Town should re-assess existing site plan, subdivision and zoning requirements based on recommendations included in NRPC, *Non-Residential Development Community Character Guidelines* and *Compatibility Guidelines for the Town of Pelham*. Any revisions based on these site design guidelines could also enhance the access management goals.
- The Town should update its Road Surface Management System study as soon as possible and every five years hence in order to plan for future road maintenance and reduce the future cost of extensive repairs to deteriorated roadways.
- The Town should utilize traffic calming measures and roundabouts where appropriate based on traffic flow and right of way constraints to channelize and control traffic through neighborhoods and the Town Center.
- The Town should request that the NH DOT consider design options for the NH38/Old Gage Hill Road N. intersection in order to ensure traffic safety. In addition, the Town should monitor the accident rate at the recently redesigned NH128/Keyes Hill Road/Tallant Road intersection to ensure that improvements are successful in reducing accidents.
- The Town should conduct a Buildout Analysis by TAZ using the NRPC's parcel-based Geographic Information System technology.
- The Town should participate in the Greater Derry Greater Salem Regional Transit Council (GDGSRTC) in order to increase public transportation options those who cannot afford it or are unable to meet their own transportation needs due to physical disability or infirmity.
- The Planning Board should maintain close contact with the State of NH to ensure ample opportunity for public and Town input regarding any planned changes to state roads within Pelham or feeding traffic into Town.

4. Community Facilities

a. Town Hall

- Construct and maintain the new Town Hall facility as approved by voters in 2002 and expand into the shell space as needed to serve population growth through the planning period.

b. Library

- Construct and maintain the new library as approved by voters in 2002.
- Reserve land adjacent to the new library for possible future expansion.
- Retain and continue to utilize the former historic library building for public use in keeping with deed restrictions on the property.

c. Police Department

- Construct and maintain the new police facility as approved by voters in 2002 and expand into the shell space as needed to serve population growth.

d. Fire Department

- Continue planning for new sub-station(s) and an expansion or replacement of the existing fire station in order to limit response times and provide adequate space for additional fire fighters.
- Continue to use impact fees as a source of revenue for new Fire Department facilities.

e. Parks and Recreation

- Perform an in-depth facility study of recreation needs to serve the existing and projected population.
- Complete and implement a Parks and Recreation Department Long Range Plan.
- Continue planning for the design and construction new recreation facilities based on the results of the study.
- Consider using impact fees as a source of revenue for new recreation facilities.

f. Solid Waste

- Continue to encourage the use of recycling as a method of limiting the cost of transfer station facilities.

g. Highway Department

- Continue planning for the design and construction of a new highway department garage.
- Consider a new location for Highway Department offices.

h. Schools

- Conduct a study of the potential to provide public kindergarten.
- Continue to plan for, design and construct additional middle and high school facilities based on NH Department of Education standards to meet the needs of the current and projected enrollment.
- Implement recommendations of the high school systems study.

i. Water Supply

- Consider updating and/or expanding existing water studies to determine whether groundwater supplies remain of a quality and quantity suitable for a public water source.
- Consider conducting a survey of underground storage tanks with capacities below 1,100 gallons.

j. Sewer

- Consider further study of municipal sewer system if demand is generated.

k. Cultural/Recreation Center

- Conduct a study of the feasibility of developing a community cultural/recreation center.
- A volunteer non-profit organization, perhaps a Pelham Arts Council, could be established to foster the arts as a vital component of Pelham's community fabric. This council could also provide guidance in the design and management of a future cultural/recreation center to ensure adequate facilities for arts programs in addition to sports and entertainment facilities

l. Re-Use of Old Buildings

- Conduct a study to determine the most appropriate re-use of the former library, Town Hall and Town Hall annex buildings.

5. Historic Resources

- Conduct a comprehensive townwide historic resources survey using a Geographic Information System. Information should be updated periodically to indicate changes to buildings, including remodeling, fire, demolition or changes to surroundings.

- The Town should continue to encourage the protection, enhancement and rehabilitation of significant architectural and historic resources such as the Town Hall, Library, Butler Monument, Town Common and cemeteries. Any building changes, site improvement or other alteration (especially to town owned buildings) should respect the historical qualities of the structure.
- The Town should consider the establishment of a heritage commission to encourage the protection and appropriate use of Pelham's cultural and esthetics as well as historic resources. Attention in particular, should be focused on Town Center.
- Historical interest and pride should be promoted in a variety of ways including:
 - photographs and exhibits in public places;
 - markers and dates at historic structures;
 - brochures describing local history;
 - tours of historic structures and sites;
 - local history courses in the school curriculum;
 - oral history projects; and
 - support of the Pelham Historical Society.
- Copies of literature from the State Historic Preservation Office regarding appropriate rehabilitation techniques should be placed on file in the Town Hall and made available by the Historical Society to encourage the sensitive rehabilitation/renovation of older homes and buildings.
- Encourage National and State Register listing for eligible local structures, including appropriate private residences and the former Library building.
- Continue to locate, identify, catalogue, preserve and protect Town records, documents, manuscripts and artifacts and provide a suitable and safe repository for them. Early handwritten records should be reproduced (transcribed or microfilmed but not photocopied) and copies kept in more than one location. Make collected historical information (in a protected environment) accessible to Town residents and future generations.
- Encourage the use of innovative land use controls including cluster development and partial development to conserve open space and minimize the visual impact of new development on significant historic areas, open space and scenic views.
- Consider the creation of a local Historic District for the Town Center.
- Strengthen incentives for historic preservation in the zoning ordinance and site plan and subdivision regulations, including the adoption of an "open space development" ordinance.
- Consider the adoption of a Scenic Road ordinance, per RSA 231:157, in order to help preserve the scenic and historic qualities of Pelham's rural roads.
- Investigate protection measures for Pelham's Class VI roads, which were often the location of historic development, and which today can serve as recreational trails for Pelham's citizens. The stone walls, cellar holes, and large trees that are often located along these Class VI road should be safeguarded from destruction or removal.
- Consider the acquisition of available, significant property for conservation and preservation purposes in limited but critical cases.
- Promote the donation of easements by historic property owners to a designated authority such as the conservation commission, or established land trust such as the Society for the Protection of New Hampshire Forests.
- Encourage archaeological investigation/documentation in Pelham including historic and prehistoric sites and cemeteries.
- Promote the work of the Town cemetery trustees and the preservation and protection of the Town's historic graveyards and private burying grounds including retention of the natural

vegetation, preservation of the dry laid stonewalls and retention of the small stones used as footstones and children's headstones.

- Promote the collection, preservation and protection of oral histories and early photographs and encourage the continued recording of townspeople and structures for permanent reference.

6. Future Land Use

a. Natural Resource Protection

- Actively pursue the permanent protection those land areas in Pelham that exhibit two or more of the following resources: steep slopes, large forest blocks, surface water resources, ground water resources, soils with high limitations for septic systems and/or agricultural

b. Town Center

- Continue to permit institutional uses in the Residential Zoning District to allow for mixed uses while protecting residential amenities.
- Continue to located additional community facilities in the town center, when appropriate.
- Protect historically significant buildings within the town center through sensitive redevelopment.
- Pursue a double-lane roundabout or other traffic control measure for the NH 111A/Nashua Road/Old Bridge Street intersection to reduce traffic delay and improve traffic, pedestrian and bicycle safety.

c. Residential Development

- Consider amending the Residential District of the Zoning Ordinance to allow for lower densities in areas of undeveloped land with significant natural resources while increasing the density in areas with fewer development constraints.
- Consider committing to and implementing a system of transfer of development rights.

d. Commercial Development

- Update to the 1991 Route 38 Corridor Study to include access management techniques and best practices in vehicle, bicycle and pedestrian circulation, urban design and stormwater management.
- Further implement the Compatibility Guidelines for the Town of Pelham 3 and apply the guidelines to all new commercial development and redevelopment.
- Consider amending the sign ordinance to improve the aesthetics of commercial development. Consider a requirement that signs must be compatible with architectural treatments and prohibit the use of moving, flashing or electronic changing signs.
- Consider amending the Zoning Ordinance to allow for shared parking and shared access where appropriate.

e. Industrial Development

- Continue to implement the provisions of the Industrial Zoning Districts.

³ NRPC, *Compatibility Guidelines for the Town of Pelham, NH*, June 15, 1999.

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