

Town of Lyndeborough, NH



Master Plan Update 2002



Approved by the
Lyndeborough Planning Board
May 16, 2002

Prepared by the



Nashua Regional Planning Commission

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CHAPTER I INTRODUCTION, GOALS AND OBJECTIVES

A. INTRODUCTION

Preparing a community master plan is the primary responsibility of a Planning Board and should be the basis for implementing policies and programs that guide the development of a town. New Hampshire Revised Statutes Annotated 674:1-4 authorizes the Planning Board to prepare a Master Plan and describes the sections, adapted to the needs of a community, that such a plan must contain. This Master Plan contains: Chapter II, Population and Housing; Chapter III, Existing Land Use; Chapter IV, Natural Resources; Chapter V, Community Facilities; Chapter VI, Transportation; and Chapter VII, Future Land Use and Recommendations. The plan is intended to be an evolving document that reflects the changing conditions and priorities in the community and the region, and should be updated as necessary.

This 2002 Master Plan is an update of the 1988 Master Plan. The Planning Board outlined a one-year process for completing the update with the assistance of a citizen Master Plan Committee and the Nashua Regional Planning Commission. The Master Plan Committee was composed of citizens selected to represent major interest groups from all geographic areas of Town and met once a month from July 2000 to February 2002. This update was guided by community attitudes and opinions as determined by a "Community Profile," Master Plan Committee discussions, and plans, reports and studies submitted by various Town departments and the Wilton-Lyndeborough Cooperative School Board. The Plan also relies heavily on available Census 2000 figures.



The Lyndeborough Community Profile was held on September 14 and 15, 2001. It was facilitated by the University of New Hampshire Cooperative Extension and was organized by the Lyndeborough Master Plan Committee. 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. The goals and objectives of this 2002 Master Plan update, below, reflect the results of the Community Profile as well as the goals and objectives from the 1988 Plan. A copy of the results of the Community profile is available in the Lyndeborough Citizens Hall.

B. GOALS AND OBJECTIVES

After analyzing the natural and physical conditions within the Town, documenting the community's problems and potentials, and considering the results of the Community Profile, the Master Plan Committee developed a list of goals and objectives to guide future growth. The goals and objectives are reflected in the discussion and recommendations found in each master plan chapter.

- 1. Goal: Preserve the Town's rural character and heritage.**
 - a. Objective: Retain fields and woodlands.
 - b. Objective: Retain tree-lined, unpaved rural roads.
 - c. Objective: Retain commercial and family farms, orchards and woodlots.

- d. Objective: Ensure that land use regulations result in developments that reflect Lyndeborough's existing rural character and not conventional suburban development.
 - e. Objective: Retain small town government and a minimal reliance on new public services.
 - f. Objective: Preserve the Town Center, historic homes, mills and stone bridges.
- 2. Goal: Preserve the Town's scenic and natural beauty.**
- a. Objective: Protect the mountainous terrain and views and vistas it offers.
 - b. Objective: Preserve and enhance the rural and historic character of South Lyndeborough and Lyndeborough Center areas.
 - c. Objective: Preserve cemeteries, stone walls and historic sites and structures.
 - d. Objective: Preserve and protect streams, ponds, wetlands and wilderness areas vital to the preservation of wildlife.
 - e. Objective: Promote the use of energy efficient and non-polluting practices in homes and other buildings.
- 3. Goal: Protect the health, safety and welfare and property of Town residents.**
- a. Objective: Ensure that new development and re-development is in keeping with the capability of the land and the provision of existing public services.
 - b. Objective: Preserve open space.
- 4. Goal: Provide for a wide variety of lifestyles and housing options.**
- a. Objective: Allow for the provision of affordable and elderly housing.
- 5. Goal: Provide for economic health and enhanced tax base.**
- a. Objective: Retain or expand agricultural and sustainable forestry activities.
 - b. Objective: Allow for the provision of small, non-polluting industry and businesses not requiring excessive community facilities.
 - c. Objective: Allow for small home occupations customary to a small rural community.
- 6. Goal: Ensure that the rate, type, location and density of growth does not place an unreasonable burden on the Town's financial ability to expand its public services.**
- a. Objective: Plan for a rate of growth that does not exceed the Town's "fair share" of the region's growth.
- 7. Goal: Encourage good government and active citizen participation within.**
- a. Objective: Continue to plan for adequate public facilities and consider developing a new community center.
 - b. Objective: Preserve rural values of independence, cooperation, privacy and neighborliness.

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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 U.S. 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 an overview of: 1) Population trends, projections, migration, density and composition; 2) Housing units, types and affordability; and concludes with a series of recommendations.

B. POPULATION

1. Historic Population Trends

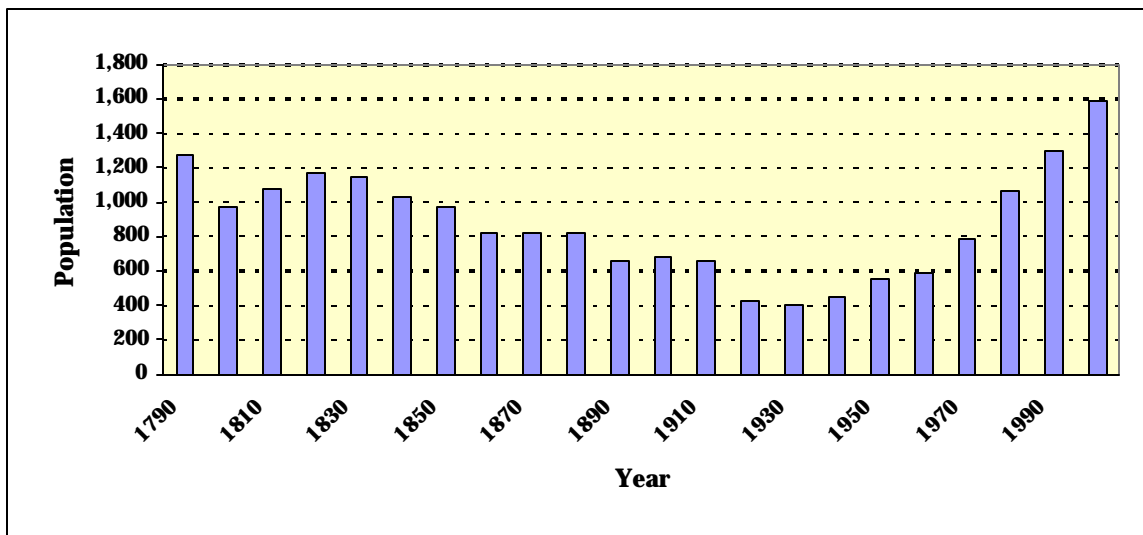
Lyndeborough, unlike many of its neighbors, has remained a small, rural town throughout history. The population of the Town has fluctuated between 1,280 people during the first US Census count in 1790 to a peak of 1,585 people in 2000. From 1790 to 1800 the population dropped considerably due to Lyndeborough losing land to Greenfield and Frankestown in 1791 and to Temple in 1796. During the mid-19th Century, Lyndeborough, 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 well into the 20th Century. By 1930, the population had dropped to 399 people, similar to the State Census figure of 272 recorded in 1767. The Town did not surpass its 1790 peak population level of 1,280 people until 1990. 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 escalated population growth spurred on by the growth of high-technology industries in the Nashua and Manchester area made possible by major improvements to the state and federal highway system. Between 1970 and 1980, Lyndeborough grew by 36%, the fastest period of growth in the Town's history. In the decades following, the Town grew more moderately at a rate of just over 20%. Historical growth trends are depicted in Table II-1 and Figure II-1.

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

Year	Lyndeborough	% Change	NRPC Region	% Change	State of NH	% Change
1767	272*	-	-	-	-	-
1775	713*	-	-	-	-	-
1783	832*	-	-	-	-	-
1790	1,280	-	10,196	-	141,885	-
1800	976	-24%	11,431	12%	183,858	30%
1810	1,074	10%	12,444	9%	214,460	17%
1820	1,168	9%	13,003	4%	244,161	14%
1830	1,147	-2%	14,461	11%	269,328	10%
1840	1,032	-10%	17,589	22%	284,574	6%
1850	968	-6%	21,656	23%	317,976	12%
1860	823	-15%	22,423	4%	326,073	3%
1870	820	0%	23,055	3%	318,300	-2%
1880	818	0%	25,103	9%	347,000	9%
1890	657	-20%	30,998	23%	376,500	9%
1900	686	4%	36,731	18%	411,600	9%
1910	660	-4%	38,467	5%	430,600	5%
1920	428	-35%	40,796	6%	443,100	3%
1930	399	-7%	45,347	11%	465,300	5%
1940	452	13%	48,214	6%	491,500	6%
1950	552	22%	52,010	8%	533,200	9%
1960	594	8%	63,216	22%	606,900	14%
1970	789	33%	100,862	60%	737,579	22%
1980	1,070	36%	138,089	37%	920,475	25%
1990	1,294	21%	171,478	24%	1,109,252	21%
2000	1,585	22%	195,788	14%	1,235,786	11%

Source: US Census; compiled by NRPC, except *State Census.

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



In order to determine if initiatives to limit growth are necessary, the growth of the Town should be compared to “first tier” and “second tier” communities to determine if the Town is absorbing more than its fair share of regional growth. First tier communities are those directly abutting Lyndeborough and second tier communities are those that about the first tier communities. Table II-2 compares the growth by decade for first and second tier communities, the NRPC Region and the State.

Table II-2: Population Growth by Decade, 1970-2000

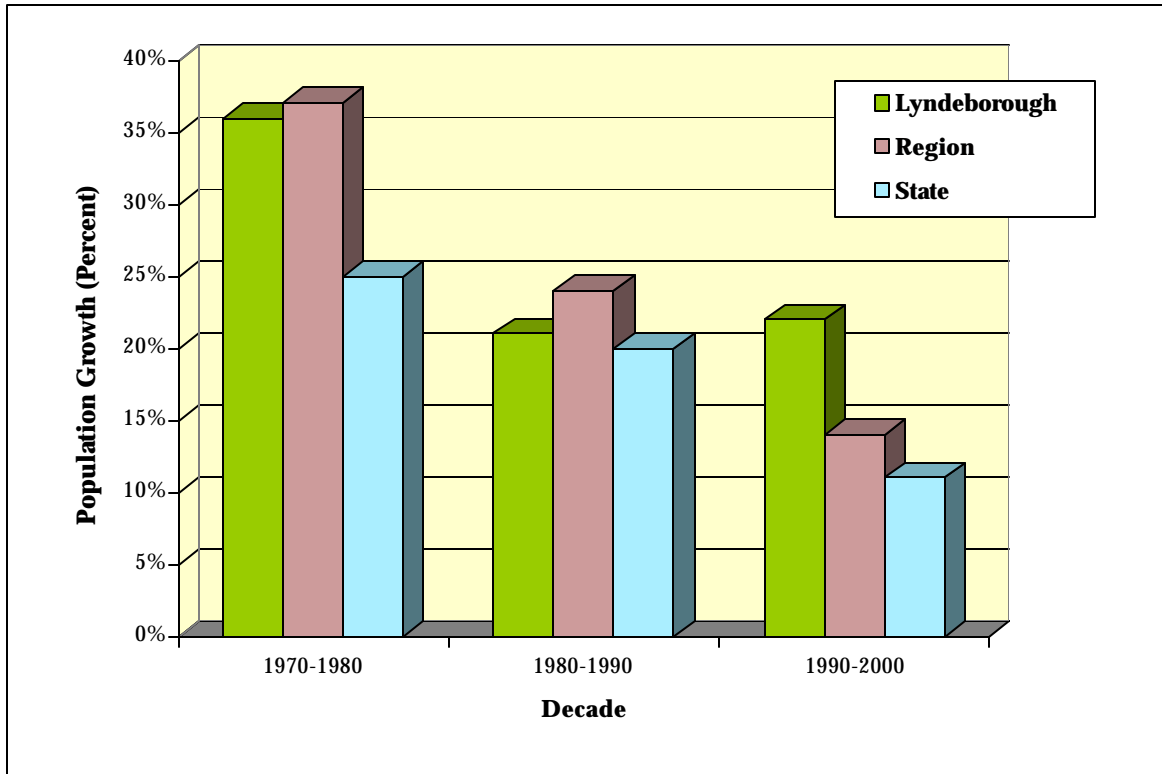
Community	1970	Percentage Increase 1970-1980	1980	Percentage Increase 1980-1990	1990	Percentage Increase 1990-2000	2000
Lyndeborough	789	36%	1,070	21%	1,294	23%	1,585
First Tier Communities							
Francistown	525	58%	830	47%	1,217	22%	1,480
Greenfield	1,058	-8%	972	56%	1,519	9%	1,657
Mont Vernon	906	59%	1,444	25%	1,812	12%	2,034
New Boston	1,390	39%	1,928	67%	3,214	29%	4,138
Temple	441	57%	692	73%	1,194	9%	1,297
Wilton	2,276	17%	2,669	17%	3,122	20%	3,743
<i>1st Tier Average</i>	-	29%	-	42%	-	19%	-
Second Tier Communities							
Amherst	4,605	79%	8,243	10%	9,068	19%	10,769
Bedford	5,859	62%	9,481	33%	12,563	45%	18,274
Bennington	639	39%	890	39%	1,236	13%	1,401
Goffstown	9,284	22%	11,315	29%	14,621	16%	16,929
Greenville	1,587	25%	1,988	12%	2,231	0%	2,224
Hancock	909	31%	1,193	34%	1,604	8%	1,739
Mason	518	53%	792	53%	1,212	-5%	1,147
Milford	6,622	31%	8,685	36%	11,795	15%	13,535
New Ipswich	1,803	35%	2,433	65%	4,014	7%	4,289
Peterborough	3,807	29%	4,895	7%	5,239	12%	5,883
Sharon	136	35%	184	63%	299	20%	360
Weare	1,851	75%	3,232	92%	6,193	26%	7,776
<i>2nd Tier Average</i>	-	42%	-	31%	-	20%	-
NRPC Region	100,862	36.9%	138,089	24.2%	171,478	14.2%	195,788
State	737,681	24.8%	920,610	20.5%	1,109,117	11.4%	1,235,786

Source: US Census; derived by NRPC.

In the 1970's, Lyndeborough grew faster than the 1st Tier communities, but slower than the 2nd Tier communities. This trend is likely due to the influence of larger and rapidly growing 2nd Tier communities such as Amherst and Bedford. In the 1980's Lyndeborough grew at a significantly lower rate than both 1st and 2nd Tier communities. However, this changed in the 1990's when Lyndeborough grew faster than both 1st and 2nd Tier communities. On March 8, 1988, the Town adopted a Growth Management Ordinance in order to limit growth to its “fair share” of its regional growth. This ordinance is reviewed by the Planning Board each year to determine the growth rate which is appropriate to the Town and was most recently reviewed on July 17, 2001.

Figure II-2 illustrates Lyndeborough's growth by decade compared to the NRPC Region and the State.

Figure II-2: Comparative Population Growth by Decade



With the exception of the 1990s, Lyndeborough has historically grown at a slower rate than the NRPC Region, but faster than the State. This trend is likely due to Lyndeborough's location near the larger economic centers of Nashua and Manchester, but its relative isolation from major transportation corridors. In the 1990's, however, Lyndeborough has been growing at a faster rate than both the NRPC Region and the State and, with the exception of New Boston, is the fastest growing of 1st Tier communities (see Table II-2). The increases in population in the past three decades have had an impact on the land and people of Lyndeborough. However, Lyndeborough continues to remain a rural town.

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-3. 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.

Table II-3: Population Projections, 2000-2020

Community	2000	2020* Projected	Projected Percentage Increase 2000-2020
Lyndeborough	1,585	2,427	53.1%
Amherst	10,769	14,686	36.4%
Brookline	4,181	8,279	98.0%
Francistown	1,480	1,999	35.1%
Greenfield	1,657	2,169	30.9%
Hollis	7,015	11,940	70.2%
Litchfield	7,360	11,785	60.1%
Milford	13,535	17,006	25.6%
Mont Vernon	2,034	2,978	46.4%
Nashua	86,605	91,145	5.2%
New Boston	4,138	5,558	34.3%
Temple	1,297	2,125	63.8%
Wilton	3,743	4,363	16.6%
NRPC Region	195,788	246,436	25.9%
State of NH	1,235,786	1,527,873	23.6%

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

Lyndeborough's population is projected to continue to increase by 1.02% per year over the next twenty years. If these projections hold true, then an additional 842 persons will be added to Lyndeborough's population by 2020. With an estimated population of 2,427 in 2020, Lyndeborough would continue to be a rural small town, but may exhibit some suburban elements unless the design of new development is in keeping with the Town's existing rural character.

3. Natural Increase vs. Migration

Changes in population can be attributed to either natural increase (births and deaths) or in-migration of residents from some other location. The Annual Town Reports track the number of births and deaths. By subtracting the number of deaths from births, the population increase attributable to natural increase can be determined. The remainder of the total population increase can be attributable to in-migration. Table II-4 indicates the population increase attributable to natural increase and in-migration by decade.

Table II-4: Natural and In-Migration Population Growth, 1970 - 2000

Decade	Population Increase	# Births	# Deaths	Natural Increase	Percent Natural Increase	In-migration	Percent In-migration
1970 – 1980	281	112	107	15	5%	266	95%
1980 – 1990	224	184	66	118	53%	106	47%
1990 - 2000	291	138	65	73	25%	218	75%
Total	796	434	238	206	26%	590	74%

Source: US Census and Town of Lyndeborough Annual Reports 1970 – 2000; compiled by NRPC.

As Table II-4 indicates, 74% of the population increase in Lyndeborough over the past three decades has been through in-migration.

4. 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, the abutting Towns, the 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 contain a high concentration of population within a relatively small portion of the Town.

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

Community	Area (sq. mile)	Pop. 1990	Density /sq. mile 1990	Pop. 2000	Density /sq. mile 2000	Projected Pop. 2020*	Density /sq. mile 2020
Lyndeborough	30.6	1,294	42	1,585	52	2,427	79
Amherst	34.5	9,068	263	10,769	312	14,686	426
Brookline	20.1	2,410	120	4,181	208	8,279	412
Francistown	30.4	1,217	40	1,480	49	1,999	66
Greenfield	27.0	1,519	56	1,657	61	2,169	80
Hollis	32.6	5,709	175	7,015	215	11,940	366
Litchfield	15.1	5,516	365	7,360	487	11,785	780
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
New Boston	44.1	3,214	73	4,138	94	5,558	126
Temple	22.5	1,194	53	1,297	58	2,125	94
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, 2000; compiled by NRPC.

In 2000, Lyndeborough had the second lowest population density amongst its neighboring communities, at 52 people per square mile. The next highest density is found in Greenfield. With 62 people per square mile, Greenfield has a slightly higher population density than Lyndeborough. The only abutting Town with a lower population density is Francestown, at 49 people per square mile. Based on OSP population projections, Lyndeborough's population density will increase by the year 2020 to 79 people per square mile, and the Town will remain the second most rural amongst all of neighboring towns. The only abutting Town projected to have a lower population density continues to be Francestown.

5. Population Composition

According the U.S. Census 2000, 98.2% of Lyndeborough'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 Lyndeborough 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
Lyndeborough	1,556	3	5	2	6	13	26	1.8%
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.

Population by age is indicated in Table II-7. 38% of Lyndeborough's population were between 35 to 54 years of age in 2000, forming the Town's largest age group. Comprising 23% of the population, school age children (5 to 19 years of age) were the Town's second largest age group. Age distribution in Lyndeborough is similar to the NRPC Region and the State, although the Town does have slightly higher percentage of 35 to 54 age group and slightly lower 20 to 34 age group.

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	
	Pop.	%	Pop.	%	Pop.	%	Pop.	%	Pop.	%	Pop.	%
Lyndeborough	97	6%	359	23%	259	16%	596	38%	164	10%	110	7%
NRPC Region	13,510	7%	44,227	23%	36,516	19%	66,563	34%	16,836	9%	18,136	9%
State of NH	75,685	6%	268,480	22%	228,827	19%	405,165	33%	109,659	9%	147,970	12%

Source: US Census, 2000.

C. HOUSING

1. 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. While the data directly correlates with the changes in population over time, household sizes have been decreasing significantly since the 1950s. In 1960 the average household size in Lyndeborough was 3.02 persons per household whereas in 2000 the average household size was 2.70 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, Lyndeborough experienced an increase in the total number of housing units. Lyndeborough's housing unit growth (198%) during this timeframe was significantly lower than the regional (354%) and state growth (244%). However, in the past decade, housing unit growth in Lyndeborough (20.3%) has been faster than both the regional (12%) and state (8.9%) growth. Housing unit growth by decade is indicated in Table III-8.

Table II-8: Housing Unit Growth, 1960-2000

Community	1960	1970	% Increase 1960-1970	1980	% Increase 1970-1980	1990	% Increase 1980-1990	2000	% Increase 1990-2000
Lyndeborough	197	303	53.8%	390	28.7%	488	25.1%	587	20.3%
NRPC Region	21,002	31,260	48.8%	47,944	53.4%	66,375	38.4%	74,341	12.0%
State of NH	224,440	280,962	25.2%	386,381	37.5%	502,247	30.0%	547,024	8.9%

Source: U.S. Census, 1960 – 2000.

2. Housing Type

While the NRPC region's proportion of single family homes (60.4%) is similar to the state's (61.0%), the Town of Lyndeborough exhibits a high percentage of single family housing units (87.8%) with the remainder in multi-family and manufactured units. However, this is in keeping with the rural character of the Town. Housing stock by type is indicated in Table II-9.

Table II-9: Housing Stock by Type, 1999

Community	Percent Single Family Units	Percent Multi-Family Units	Percent Manufactured Units
Lyndeborough	87.8%	5.4%	6.8%
NRPC Region	60.4%	36.0%	3.5%
State of NH	61.0%	30.6%	8.5%

Source: NH Office of State Planning, 1999.

3. Affordable Housing

As the NRPC region has continued to grow, the availability of housing affordable to individuals of all income levels has become one of the region's most critical issues. According to data from the National Low Income Housing Coalition (see Table II-10), the hourly wage needed to afford any type of rental housing in the Nashua PMSA (Primary Metropolitan Statistical Area, which includes Lyndeborough) 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 Nashua PMSA as opposed to the state average.

Table II-10: Housing Wage and Work Hours at Minimum Wage Needed to Afford Fair Market Rent, Nashua 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
Nashua, NH PMSA	\$12.94	\$16.06	\$21.85	101	125	170
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, no assisted housing is located in Lyndeborough. Assisted housing is defined by the NH Housing Finance Authority (NHHFA) as housing units that are “provided subsidies for the purpose of creating affordable units for low and very low income households.” In 2000, Lyndeborough had a deficiency in the amount of assisted housing provided relative to the region and the state. As indicated in Table II-11, the regional and state averages for percentage of assisted housing units in 2000 were both 3.1%. Lyndeborough, at 0%, fell below these averages, and would need to provide 18 assisted housing units to meet the average. However, it should be noted that 6.8% of housing units in the Town are manufactured housing units compared to 3.5% for the Nashua region. Manufactured housing units are generally more affordable than single family housing units.

Table II-11: Assisted Housing Units, 2000

Community	Elderly Assisted	Family Assisted	Other Assisted or Combined Types	Total Assisted	Percent Assisted Units	(Shortfall)/ Excess
Lyndeborough	0	0	0	0	0%	(18)
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.

D. 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 according to the current land use regulations. These land use regulations should then be modified, if necessary, to meet the goals and objectives of the Master Plan.
- Develop regulatory measures that will facilitate the provision of affordable housing, such as: 1) Housing for Older Persons Ordinance; or 2) a refinement of the provisions allowing for accessory dwelling units so that such units can be constructed to a maximum of 800 square feet and contribute towards the provision of assisted housing under Federal or State programs.
- Continue to monitor Lyndeborough’s rate of growth relative to first and second tier communities and review the Lyndeborough Growth Management Ordinance each year to assure that the Town maintains its fair share of growth while not overburdening the provision of public services.

#230B-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 first provides a history of the Town and then discusses: the general land use pattern; residential, commercial, industrial and institutional land uses; current use land; agricultural land; excavations; Lyndeborough's current zoning districts; and an analysis of vacant land.

B. HISTORY OF LYNDEBOROUGH

Any discussion of the existing land use is incomplete without a historical overview to place the land uses in context. The following is a history as written by Helen van Ham, Lyndeborough resident.

Throughout the seventeenth and early eighteenth centuries Massachusetts was unable to pay its military for the campaigns against the Indians and the French. By the 1730s settlers were moving away from the coast and the legislature realized it could pay the soldiers with land grants. The sixty men or their heirs who had been sent from Salem in 1690 on the unsuccessful campaign to capture Quebec from the French were given a six-square-mile tract called Salem-Canada. They were required to have the land surveyed, along with sixty-three home lots of sixty acres, laid out one for each soldier, one for a minister, one for the ministry and one for the school. Within three years after their surveyed plan was approved the proprietors were to have one settled family with a house at least "eighteen square feet and seven feet stud" with six acres of plowed land. The home lots were in the southeast section of the grant in what is now Perham Corner, Johnson Corner and the northeast corner of Wilton. The proprietors divided between them one hundred twenty-six lots of one hundred thirty acres adjoining the home lots. Then they made arrangements for a sawmill and a road from the nearest settlement, Amherst, to the town center that they assumed would be at the top of Putnam Hill. The building of a meeting house that had been a condition of the grant was started but with the time involved in clearing land, building a house and planting crops, as well as a threat of an Indian attack, the building was never completed.



Historic Bridge, Old Temple Road

In 1741 Salem-Canada found itself in New Hampshire, not Massachusetts. The proprietors then had to obtain a charter from New Hampshire. As a result, they had to give a large tract of land in the southwest corner of the Town to help form a new town that became Wilton. This section contained the first saw mill and many of the early settlers. To compensate for the lost property, land was added on the west and north. This added land divided the Town into a section south of the mountains and land north of the mountains. The division caused problems for many years. Since Putnam Hill was now almost on the Town's border, the center was moved to the present location. Those from the southeast section of Town felt it was too far from them and those north of the mountain complained about crossing the mountain to get to meetings.

In 1753, after negotiating with the Masonian proprietors without success, the Salem-Canada proprietors received a charter for the grant now called Lyndes Borough. At this time, Benjamin Lynde was the largest landowner in Town. It took ten more years for the proprietors to settle the ownership of the common land and to fill the requirements to obtain incorporation of the Town under Royal Charter. The first Town Meeting was held in 1764, where the business consisted of electing officers.

The location of a meetinghouse was a concern from the beginning. In 1791, Parsons Corner, now Perham Corner, objected to the site chosen and petitioned unsuccessfully to leave Lyndeborough and to join Milford. The settlers north of the mountain had received permission from the State to leave Lyndeborough to form Greenfield or to join Francestown. Meanwhile, shortly after obtaining the first charter from the Masonian proprietors, a large tract of land went to New Boston because of a mistake made by the surveyor, thereby shortchanging Salem-Canada. In 1796 Temple received six hundred acres from the southwest corner of the Town. The Town had been against all these moves which cut the tax base. In 1780 the first of three petitions was made to separate from Lyndeborough a half-mile strip of land bordering on what is now Mont Vernon. In 1852 the legislature finally agreed to let this land join Mont Vernon. The Town lost fourteen families with this move. With the exception of a small area annexed to Milford, the Town was now the shape it is today, showing no resemblance to the shape of Salem-Canada.

The first road into Salem-Canada came from Amherst near the Souhegan River, and probably followed it to Purgatory Brook, then up the hill to Bullard Road, which it followed to where Curtis Brook joins Purgatory Brook. From there it headed to Johnson Corner, then through the woods to the brick house on Center Road and again through the woods to Putnam Hill. The second road joined a road north of the mountains, coming over Pinnacle Road and Emery Holt Road to Putnam Hill. In 1800 the Second New Hampshire Turnpike was built from Nashua to Claremont, passing through Lyndeborough. This brought stagecoaches and farmers taking live stock to market. Until the Forest Road was built in the 1830s, the principal road through town to Greenfield and towns west was the County Road. This road followed Center Road from the Milford line to Herrick Road, then Herrick Road to Pinnacle Road, then over the mountain on Pinnacle Road to Greenfield. The building of Forest Road through Town was only approved after Greenfield volunteered to help. This road made a big difference to South Lyndeborough, which before this time had few houses. Now traffic from the west traveled through the area. The Holt house became an inn and many houses were built on the section toward Wilton. In 1835 a Post Office was established at South Lyndeborough. Mail was then taken to the Post Office at the Center, which before had received the mail through Mont Vernon.

In 1775 Lyndeborough sent a delegate to Exeter, the State's Capitol, to choose delegates to the Continental Congress in Philadelphia. Four days after the battles of Lexington and Concord, twenty-seven Lyndeborough men marched to join the forces. The Town voted to stockpile necessary supplies, salt, molasses and rum. Lyndeborough sent men to Portsmouth to guard the fort and harbor during the War of 1812. During the Civil War, the Town voted to raise money to aid the families of volunteers. Fourteen Lyndeborough men died in the war and are honored with a monument at the South Cemetery.

Although the Town voted against having a school in 1770, they voted the next year to sell the school lot to raise money for a school. 1772 saw a favorable vote for schools, and by 1777 the Town was divided into school districts. In 1790 a law was passed requiring every town to expend a certain percentage of their money for the support of schools. Lyndeborough voters agreed to spend more than the required amount. In 1804, \$1500 was raised to build schoolhouses in all the districts except the "out corners." The next year a singing master was hired. In 1808 the boundaries of ten districts were settled. Two of these districts were joined with neighboring towns. These districts remained up into the twentieth century. With the passing of a law in 1919, the Supervisory Union No. 63 was formed, with a superintendent overseeing the schools. With the declining population, school districts were joined until there were only two schools, with the North Lyndeborough children going to Francestown.

In 1948 the voters agreed to build a central school. It opened in February 1949 in South Lyndeborough with two classrooms and fifty-three pupils. There have been two additions since, and in time those in North Lyndeborough were brought to the school. High school students went to their choice of neighboring schools. In the nineteenth century some went to the Francestown Academy. Later it was Milford, Wilton or New Boston that were most often chosen. The Wilton-Lyndeborough Cooperative School District was formed to build a junior and senior high school which opened in 1971. An addition to this school was opened in 2001, making it possible to separate the junior high from the high school.



Old Town Hall

During the eighteenth century Town business had to do with the necessities of living here. That is, the building and upkeep of roads, the Town Pound to impound farm animals in lieu of taxes, building a meetinghouse and looking after soldiers' families. The nineteenth century saw a need for schools, continuing the upkeep of roads, building and maintaining water troughs for the use of travelers, making sure the school children were being taught, looking after the Town poor, and paying bounties on wild animals that were destroying crops or live stock. During the twentieth century we see regulations being passed down by the State. There now was State aid for highways, laws regarding schools and, as the century advanced, laws for the formation of budget committees, planning boards and conservation commissions. Lyndeborough has had a budget committee since 1939, a planning board since 1955, building regulations with a board of adjustment since 1956 and a conservation committee since 1970.

In 1929 the Town voted to buy fire equipment. Before this time everyone who could went to the site of a fire when the church bells rang. Usually they helped in removing as much as possible from the house or barn. There was not much hope of saving the building. A fire department was organized in 1930. The firehouse was dedicated in 1948. Before this, the fire truck was stored in a local barn. One addition has been made to the firehouse and several trucks are now in use. With the training that is now required of the firemen, building losses are frequently avoided.



Remains of the old crushing mill, later to become the cider mill

The first telephone line entered Town through Perham Corner in 1905. The Public Service Commission was petitioned in 1928 to extend electric lines to Lyndeborough. By 1940 most of Town was covered. In 1929 The Village Improvement Society paid for electric street lights to be installed in South Lyndeborough to replace the kerosene lamps.

In the mid-1800s there was the Lyndeborough Glass Factory which employed many and caused the growth of the south village. There have been other small companies in Town but none that employed many. In 1900 the Town was a farming community with some men working in the Wilton mills. Now most residents work out of town, which means all our services with few exceptions are paid by homeowners with property taxes.

C. GENERAL LAND USE PATTERN

As the history indicates, Lyndeborough remains a rural community. As such, most of the Town's total area of 19,371 acres is mostly forested land and the remaining developed land is almost all for residential uses. The Nashua Regional Planning Commission (NRPC) maintains a Geographic Information System (GIS) database for generalized land use in Lyndeborough. This GIS database is a general representation of how land is being used and is broken down into nine land use categories including: residential; commercial; industrial, institutional, agricultural, recreational/open space, vacant land, roads and water bodies. 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 nine generalized land-use classes as currently found in this database. Figure III-1 illustrates the location of each land use.

Table III-1: General Land Use Types in Lyndeborough

Land Use (parcel-based)	Total Acres	Percent Total Land Area
Commercial	1	0.0%
Institution	20	0.1%
Manufactured Housing	103	0.5%
Recreation/Conservation	726	3.7%
Residential	7,552	39.0%
Town Owned	450	2.3%
Vacant	10,046	51.9%
Road	420	2.2%
Water	53	0.3%
Total:	19,371	100.0%

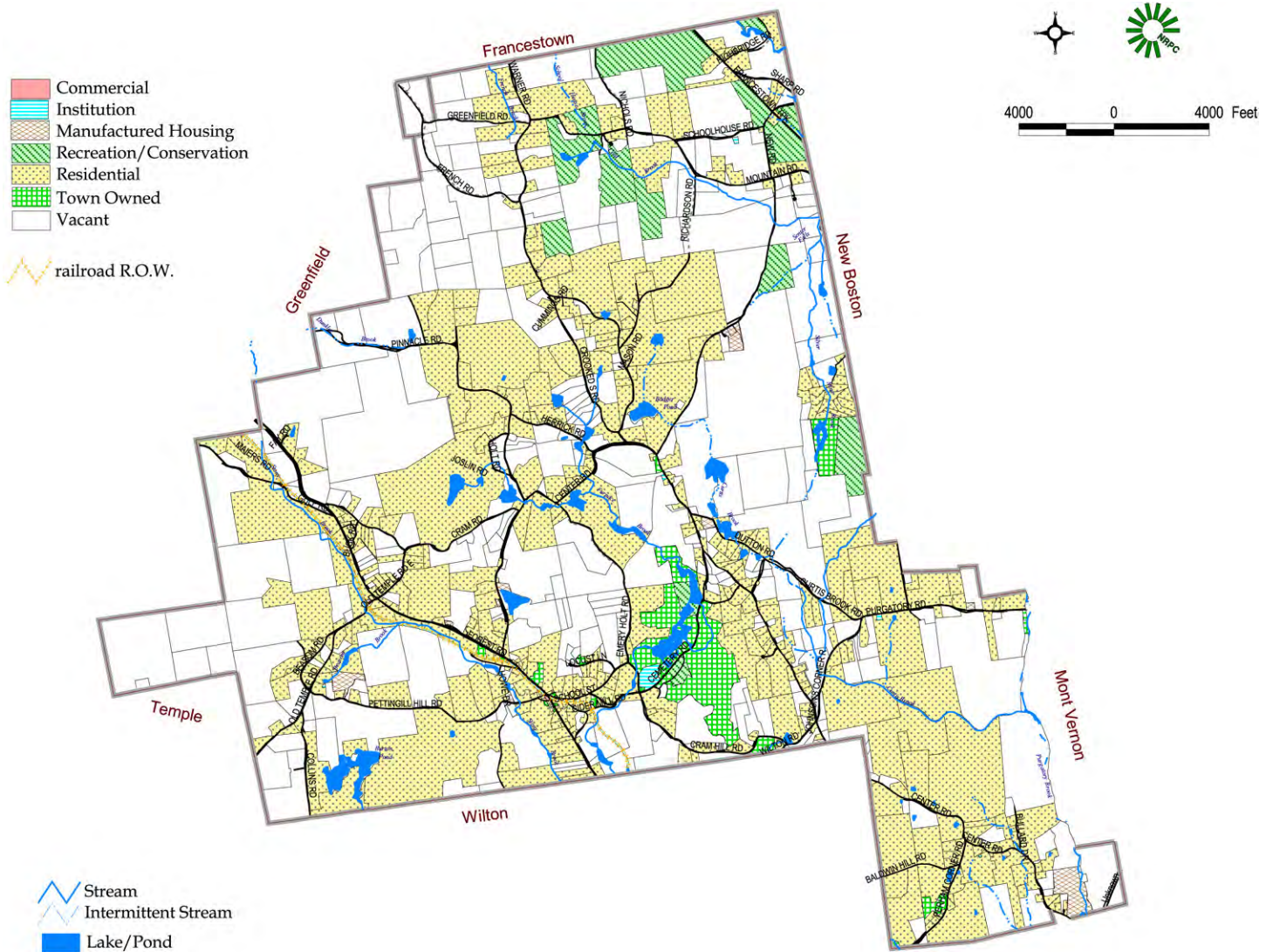
Source: NRPC GIS Database for Landuse, 2002.

Lyndeborough's existing land use exhibits a traditional rural village growth pattern. That is, much of the existing development has occurred in clusters near Town and State road intersections, especially in South Lyndeborough. Most residential lots have direct access from an existing rural road. The various land uses are discussed below.

1. Residential Land Use

A vast majority of Lyndeborough's residential development is single family residences. Most of the single-family development is located in South Lyndeborough, with descending levels of development density having taken place in the Lyndeborough Center and Johnson Corner areas and, more recently, along Center Road. The major limiting factor to residential development appears to be the existence of Town and State road access, which explains the historic rural village growth pattern near Town and State road intersections. Other limiting factors appear to be elevation, slope and soils.

Figure III-1: Land Use Classes in Lyndeborough, 2002



2. Commercial Land Use

The location of Lyndeborough's commercial land uses has been partially pre-determined based on the availability of Town and State road access. Other factors include the amount of traffic associated with the road to support the business and the proximity to areas of greater residential development. Given Lyndeborough's relatively small population, only a tiny percentage of the Town is developed with commercial uses.

Commercial land uses have historically located on NH Route 31, on Center Road near the Milford Town Line and the Francestown Turnpike in the northeast corner of Town. The only remaining commercial use is the Village Store located at NH Route 31 and Citizens Hall Road in South Lyndeborough. Home businesses are permitted in the zoning ordinance and a number of home businesses exist throughout the Town.

3. Light Industrial Use

There is currently no industrial development in Lyndeborough. Neither of the two areas zoned for Light Industrial have been developed for their intended use. As these areas are a potential source of increased tax revenue, it is important to ensure that they are not put to another use that would preclude their use for future light industrial or office development which could enhance the tax base.

4. Agriculture

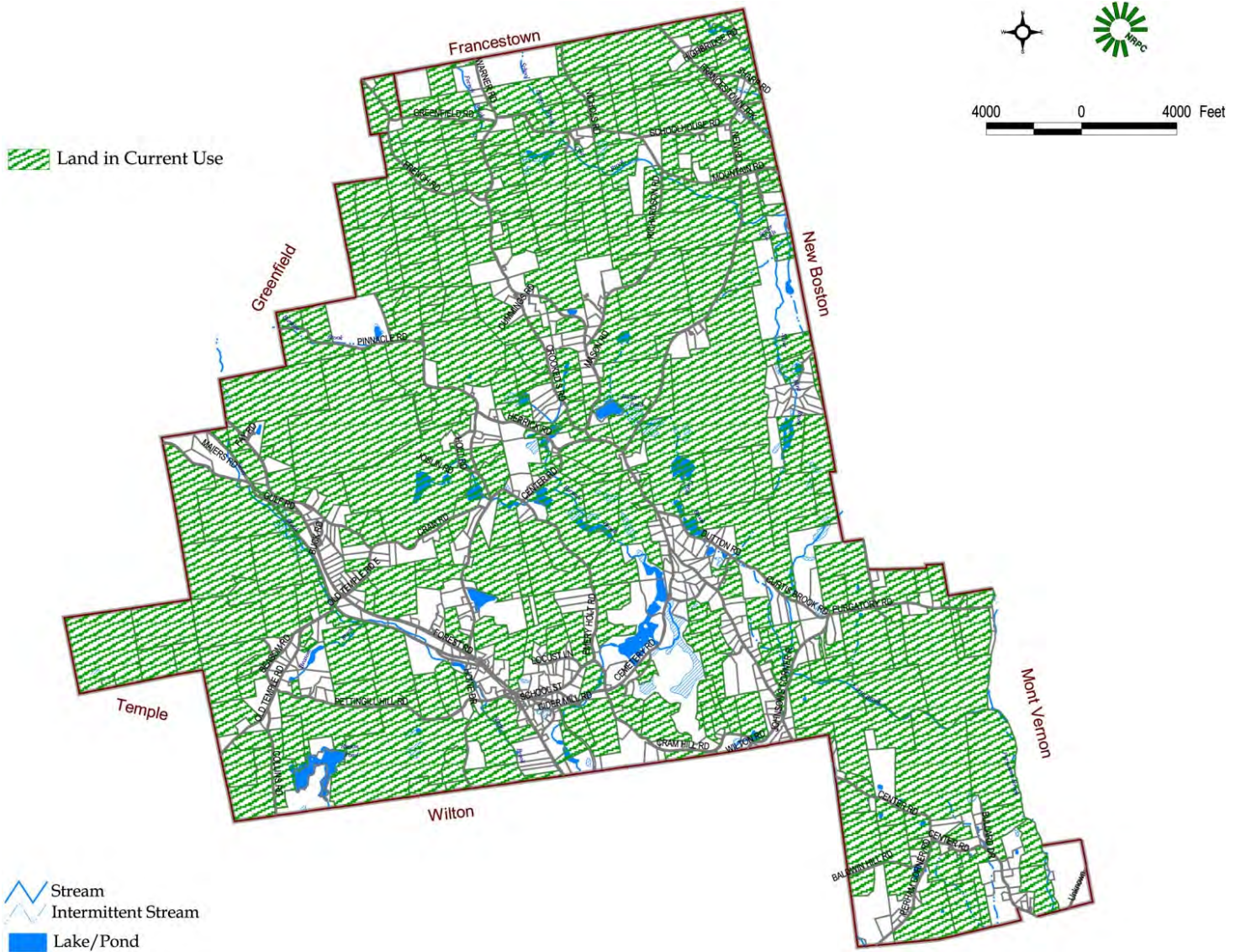
Agricultural uses in Lyndeborough have developed where the natural soils, slopes and access have encouraged them. Areas of higher intensity agricultural uses exist within the South Lyndeborough, Johnson Corner and Lyndeborough Center areas. However, with the exception of some horse and tree farms, few agricultural operations remain. Little agricultural development has taken place in western, northern and portions of eastern Lyndeborough due to elevation, slope and soil constraints (see Chapter IV, Natural Resources for a discussion of agricultural soils). As Lyndeborough has very little agricultural land, it will be important 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 1972 and 2001 were being coded into the NRPC GIS system. This data is estimated to be available in July, 2002.

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. According to the NRPC GIS database, approximately 14,507 acres or 75% of the Town's land area were enrolled in the current use assessment program in 2001.¹ These parcels can be seen in Figure III-2.

¹ Source: NRPC GIS. Acres based on area of GIS parcels coded as current use, 2001.

Figure III-2: Current Use Land



6. Excavations

Table III-2 identifies existing excavation sites in Lyndeborough. The four sites have been granted permits by the Planning Board under NH RSA 155-E. Excavations are regulated under the Lyndeborough Site Plan Review Regulations regarding Excavations as well as by State regulations.

Table III-2: Excavations In Lyndeborough

Site	Location	Status
Christenson	Beason Road	Existing
Fitches	Center Road	Existing
Granite State	Francetown Turpike	Expansion permit pending
JFM	Broman Way	Existing

Source: Town of Lyndeborough Planning Board.

D. LYNDEBOROUGH ZONING DISTRICTS

For the most part, zoning districts in Lyndeborough correspond with existing land use patterns. Zoning Districts are: 1) Village District; 2) Light Industrial District; 3) Rural Lands 1; 4) Rural Lands 2; 5) Rural Lands 3; and 6) Wetlands District (overlay). These zoning district boundaries are illustrated on the Official Town Zoning Map, as amended, available at Town Hall. The district boundaries as of April 2001 are illustrated on Figure III-3. Non-residential uses, with the exception of home businesses, are only permitted in the Village District and Light Industrial District. The three Rural Lands districts are based upon elevation, with higher density residential development permitted at lower elevations.

1. Village District (V)

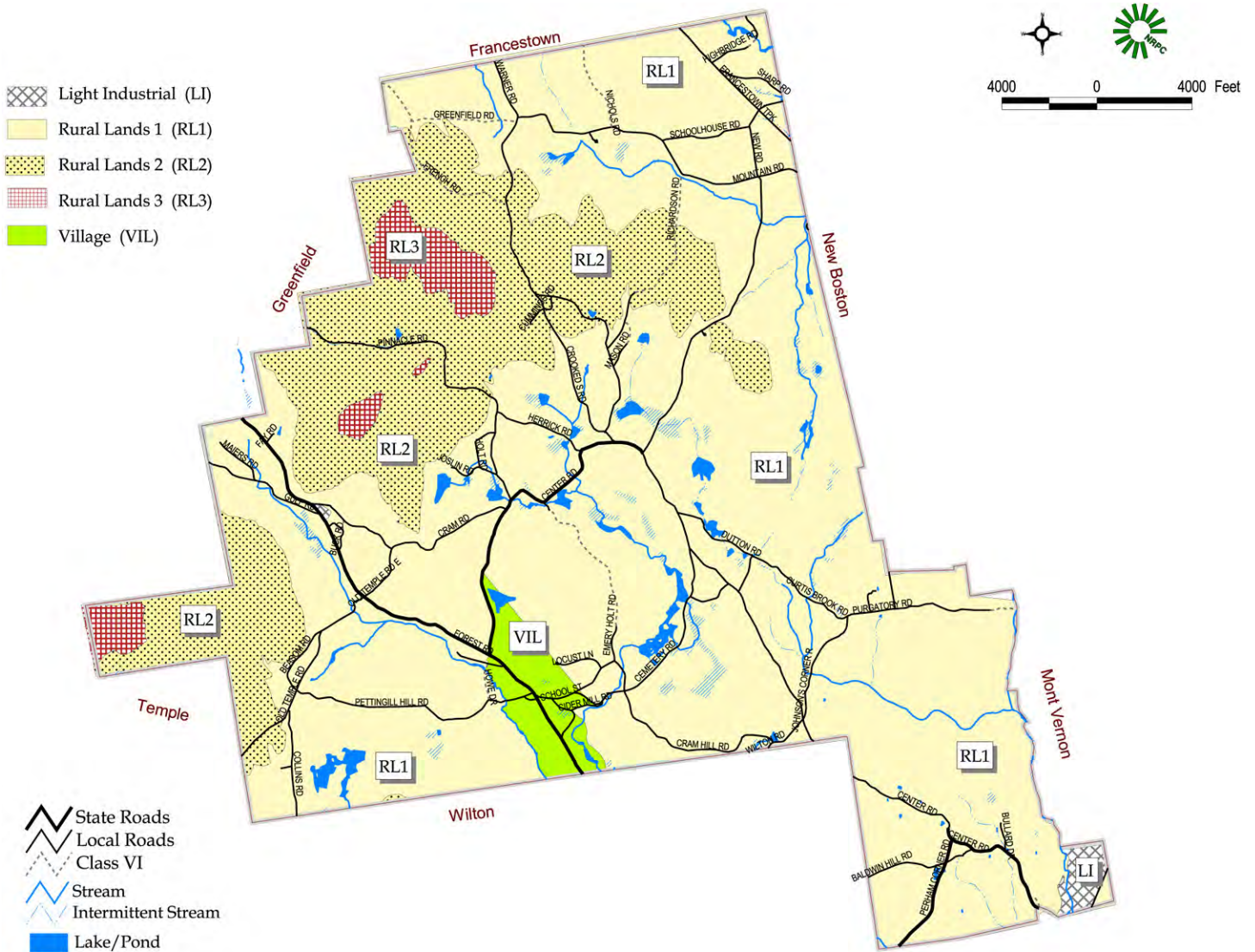
The Village District encompasses the area of Town considered South Lyndeborough. The District follows along both sides of NH Route 31 from Lyndeborough's southern town boundary north to Center Road. The District is bounded on the west by Stony Brook and on the east by the B&M Railroad, the western portion of Cemetery Road and a straight line connecting the intersection of Cemetery and Putnam Hill Roads with a point 1000 feet north from NH Route 31 along Center Road.

The objective of the Village District is to provide opportunities for mixed uses commonly associated with a village center. The area already functions as the village center and contains the Village Store and a variety of institutional uses. By designating the area as a village, these historic land use patterns are encouraged to continue and expand. At the time this Master Plan was adopted, the permitted land uses include: single family residential, retail, office, banking, institutional, agricultural, home business, worship and restaurant uses. Two family dwellings, schools, daycares, automotive service stations, accessory apartments and bed and breakfasts are allowed by special exception of the Zoning Board of Adjustment under certain circumstances. All new uses with the exception of single family residential and agricultural uses are subject to site plan review and approval by the Planning Board.

2. Light Industrial District (LI)

The Light Industrial District is located in two areas. The first is located in an area bounded by the Purgatory Brook, the Mont Vernon and Milford boundaries and Purgatory Brook Road in the far southeast corner of Town. The second is located in an area bounded by NH Route 31 and Cram Road in the western part of Town.

Figure III-3: Town of Lyndeborough Zoning Map (April 2001)



The objective of the Light Industrial District is to provide employment opportunities and broaden the tax base by establishing a location for light industrial development in an area that does not conflict with surrounding land uses and that provides good access to transportation facilities. At the time this Master Plan was adopted, the permitted land uses include: light manufacturing, research/testing facilities; offices; newspaper and printing facilities; warehouses; retail; banks; and personal services. Vehicle sales, service and repair, contractor yards and public assembly halls and places of worship are allowed by special exception of the Zoning Board of Adjustment. All new uses are subject to site plan review and approval by the Planning Board.

3. Rural Lands 1 District (RL1)

The Rural Lands 1 District encompasses all areas of the Town not subject to any other designated district. The objective of the Rural Lands 1 District is to provide for residential development at higher densities than other areas while conserving the rural character of the Town, maintaining natural resources and protecting the health and safety of residents. Since public water and sewer will not be available, the lands developed in this District should not have severe limitations for on-site sewage disposal. Lots in this District should be of sufficient size and configuration to provide adequate space for septic systems, individual water supplies and any dwelling or accessory structures.

At the time this Master Plan was adopted, the permitted land uses include: single family dwellings, seasonal dwellings, agriculture, forestry, home businesses, manufactured housing; and outdoor recreation areas not including campgrounds. Two family dwellings, accessory apartments and bed and breakfasts are allowed by special exception of the Zoning Board of Adjustment under certain circumstances. The minimum lot size is 2 contiguous acres of dry land undivided by wetland, pond or drainage way. The minimum frontage is 250 feet and the minimum setback is 50 feet from all lot lines (35 feet side setback if the lot is less than 5 acres). Approximately 1,104 acres of land in the RL1 District are protected from development via ownership by public or private conservation-based organizations.

4. Rural Lands 2 District (RL2)

The Rural Lands 2 District encompasses all land in the Town above 1000 feet in elevation and below 1500 feet in elevation. The objective of the Rural Lands 2 District is to provide for low density, rural residential development given the distances from the Town Center, steep slopes, poor road conditions, difficulty of travel during certain seasons and septic system restrictions. The Rural Lands 2 District encompasses some of the largest remaining wilderness areas in the Nashua Region.

At the time this Master Plan was adopted, the permitted land uses include: single family dwellings; seasonal dwellings; agriculture; forestry; home businesses; and outdoor recreation areas not including campgrounds. Two family dwellings, accessory apartments and bed and breakfasts are allowed by special exception of the Zoning Board of Adjustment under certain circumstances. The minimum lot size is 5 acres with a minimum of 2 acres of contiguous acres of dry land undivided by wetland, pond or drainage way. The minimum frontage is 500 feet and the minimum setback is 50 feet from all lot lines (35 feet side setback if the lot is less than 5 acres).

5. Rural Lands 3 District (RL3)

The Rural Lands 3 District encompasses all land in the Town at or above 1500 feet in elevation. The objective of the Rural Lands 3 District is to protect the most sensitive and remote land from development. Poor road conditions, steep slopes, shallow depths to bedrock and generally severe limitations for septic systems characterized the undevelopable nature of land within this District.

At the time this Master Plan was adopted, the permitted land uses include: single family dwellings; seasonal dwellings; agriculture; forestry; home businesses; and outdoor recreation areas not including campgrounds. Two family dwellings, accessory apartments and bed and breakfasts are allowed by special exception of the Zoning Board of Adjustment under certain circumstances. The minimum lot size is 10 acres with a minimum of 2 contiguous acres of dry land undivided by wetland, pond or drainage way. The minimum frontage is 500 feet and the minimum setback is 50 feet from all lot lines (35 feet side setback if the lot is less than 5 acres).

6. Wetlands District

The Wetlands District, also considered an environmental overlay district, was developed in the interest of public health, safety and welfare. The objective of the Wetlands District is to guide the use of land areas designated as having poorly and very poorly drained soils (see Chapter IV, Natural Resources for further discussion). The provisions of the Wetlands District are designed to: prevent the development of structures and land uses on wetlands which would contribute to the pollution of surface water and groundwater by sewage; prevent the destruction of natural wetlands that provide flood protection; prevent unnecessary or excessive Town expenditure to provide and maintain essential services and utilities which may arise from the improper use of wetlands; and encourage those uses that can be appropriately and safely located in wetland areas.

Uses allowed by right include any use that does not result in the erection of any structure or alter the surface configuration by the addition of fill or by dredging land that is otherwise permitted by the underlying zoning district. Examples include: forestry; agriculture; water impoundments and wells; drainage ways; wildlife refuges; parks and recreation uses consistent with the purpose and intent of this ordinance; conservation areas; nature trails; and open space. Streets and other access ways, utility right of way easements and other uses not in conflict with the intent of the Wetland District are allowed by special exception of the Zoning Board of Adjustment under certain circumstances.

The Lyndeborough Wetland District does not include provisions for a buffer zone or setback. Under the existing Wetland District provisions, a structure can be erected up to the edge of the wetland which has potential implications for erosion, sedimentation and flooding. In addition, Lyndeborough does not currently employ a Floodplain Protection District, with negative implications for repetitive loss and on flood insurance rates.

7. Home Businesses

Lyndeborough has adopted a Home Business Ordinance that permits the operation of a business within a residence or accessory structure within the Village and Rural Lands 1, 2 and 3 Districts. Permitted home businesses under this ordinance include those whose type and nature do not change the character of the principal use of the premises as a residence. Objectionable noise, vibration, smoke, dust, electrical disturbance, odors, heat, glare or waste produced in excess of a normal residential use is prohibited. No traffic is to be generated by a home business in a greater volume than would normally be expected in the neighborhood.

8. Optional Method of Developing Large Tracts of Land

In order to preserve the rural character of Lyndeborough, the Lyndeborough Zoning Ordinance was amended in 2000 to allow for an optional method of developing large tracts of land that do not otherwise meet the Class V road frontage requirements. This method provides opportunities to develop large pieces of backland with access via a private road.

E. ANALYSIS OF VACANT LAND

The amount of developable land remaining in the Village District, Light Industrial District and three Rural Lands Districts in 2001 is shown in Table III-3. The amount of remaining developable land is calculated by subtracting the acres of wetlands and protected lands from the acres of vacant land in each zoning district.

Table III-3: Vacant and Developable Land by Zoning District, 2002

Zoning District	Total (acres)	Vacant Land (acres)	Protected Land (acres)	Wetlands² (acres)	Potentially Developable Land (acres)
Village	450	142	12	0	130
Light Industrial	111	75	0	0	75
Rural Lands 1	14,568	6,756	1,104	18	5,634
Rural Lands 2	3,967	2,397	60	0	2,337
Rural Lands 3	482	425	0	0	425
Total:	19,578	9,765	1,176	18	8,601

Source: NRPC GIS Databases for Landuse and Soils, 2002.

Note: Figures do not exactly match those in Figure III-1 as the GIS zoning coverage and the GIS parcel-based land use coverage are from different sources.

Today, approximately 9,765 acres or 50% of the total land area in Lyndeborough remains completely vacant (ie. there is no development on the land whatsoever). Of the 9,765 acres of vacant land, 18 acres are wetlands and 1,176 acres are protected lands, leaving approximately 8,601 acres throughout Lyndeborough to be developed according to the development conditions in place as of April 2001. However, it should be noted that much of the “developed” land in Lyndeborough consists of a single housing unit on a large piece of property. That is, these properties may be further subdivided if they meet the requirements of the Town’s zoning and regulations. A detailed Buildout Analysis could assist in determining the full potential of the Town’s land to accommodate future housing units or commercial space.

#230B-3

² Source: NWI. There may be additional wetlands that may be identified on a site specific basis.

CHAPTER IV NATURAL RESOURCES

A. INTRODUCTION

Natural resources and wild areas define the character of Lyndeborough to a greater degree than perhaps any other town in the Nashua region. Lyndeborough's extensive forested hillsides, wetlands, and agricultural areas form the ever-present background for the community's quality of life. Lyndeborough contains the highest elevation in the Nashua region (1,820 feet on the slope of North Pack Monadnock) and the greatest number of peaks over 1,000 feet (Winn Mountain, Pinnacle, and Rose Mountain). A greater percentage of Lyndeborough (87%) is forested than any other town in the region. Nearly 73% of this forested area is found in blocks greater than 500 acres. All of these natural characteristics are significant for wildlife habitat and biological diversity.

The Town of Lyndeborough lies on the western reaches of the Lower Merrimack River Basin in south central New Hampshire. The Town's rugged terrain and glacial till soils are indicative of the glacial activity which crept southeasterly across the area over ten thousand years ago. The northwestern portion of Lyndeborough contains the highest elevations in the Nashua Region. The rough terrain of this area includes steep slopes and shallow-to-bedrock soils, which make development difficult and costly. The southeastern section of the community is lower in elevation with a rolling terrain and shallower slopes. This area also contains the remaining agricultural land in Town.

In analyzing the Town's natural resources, it is important to understand that a unique set of natural resource constraints to development may exist on each individual parcel of land. This chapter is a guide to these natural resource constraints and considers: 1) topography; 2) slope; 3) soils; 3) water resources; 4) forests; 5) wildlife and plants; 6) existing conservation lands; 7) visual resources; 8) priorities for future conservation efforts; and concludes with a series of recommendations.

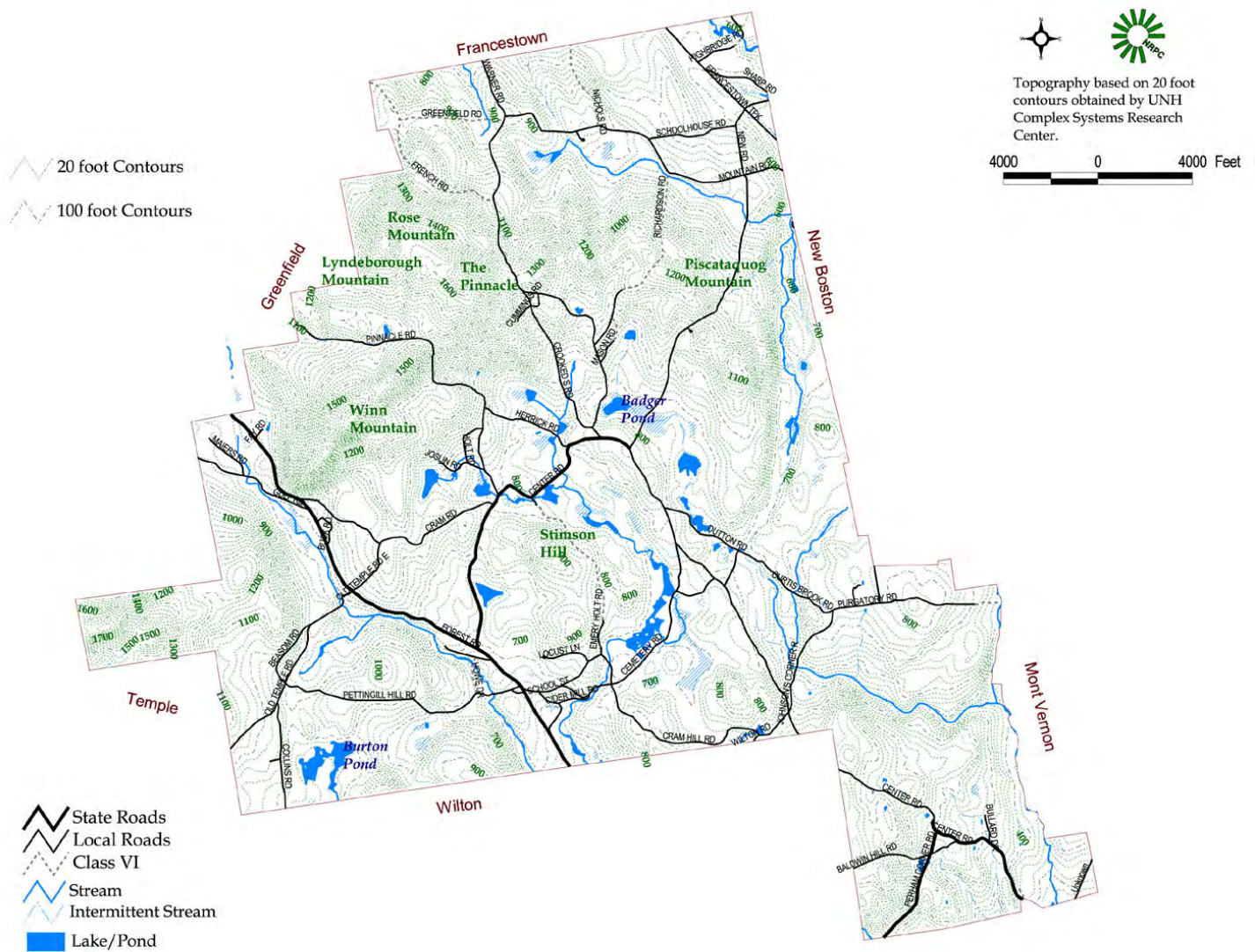
B. TOPOGRAPHY

By far, the most visible and interesting of Lyndeborough's natural resources is its topography. The high elevations and rugged terrain are unique in the Nashua Region. 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.

1. 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 Lyndeborough vary from 280 ft. AMSL in the southeasternmost corner of Town, to 1,820 ft. AMSL in the extreme west of Town, (a range of 1,500 feet). More than one-quarter of the land area in Town sits at elevations above 1000 feet. Among the highest points in Town are Winn Mountain (1,676 ft. AMSL), the Pinnacle (1,686 ft. AMSL) and Rose Mountain (1,725 ft. AMSL). The highest elevations in Town are portions of the North Pack Monadnock, whose peak lies just west of the Town's boundary. Overall, the higher elevations are located in the west and north-central sections of Town. As such, they present a significant barrier to free access and movement between the northern and southern portions of Town.

Map IV-1: Topography





Lyndeborough's high elevations (above 1000 ft.) are a unique local and regional resource and contain large wilderness and undeveloped areas. For example, the high elevations in west Lyndeborough are part of the largest undeveloped wilderness area located totally in Hillsborough County. This area includes the Wapack National Wildlife Refuge, Miller State Park and adjacent areas. They offer area residents the opportunity to

witness the rolling terrain of the western portion of the Nashua Region. The areas in the west of Town with elevations above 1,500 ft. are on the eastern reaches of the Monadnock range and offer a vantage point from which to view Pack Monadnock and North Pack Monadnock to the west, the sprawling Merrimack River Valley to the east, and Boston to the southeast. The wonderful views and vistas offered from these sites merit their conservation. The natural conditions of these areas may preclude their development for certain uses. It is recommended that the Town make an active effort to retain areas above 1,500 feet elevation as open space to provide access for the community to these areas and to establish sound forest management to maximize their open space/recreational value. In addition, development above 1,000 feet elevation should continue to be limited.

Lyndeborough currently implements elevation-based Zoning. Development located above 1500 feet is limited to one residential unit per a minimum 10 acres. Currently there are no subdivisions located above 1500 feet. Another way of increasing protection of these higher elevation areas would be to purchase conservation easements or the development rights to the lands involved. The method that offers the most protection assurance would be the outright fee simple purchase or acquisition of the land. Neither option is inexpensive, unless the owner happens to offer the easements, development rights or a "bargain sale." However, these are the options that offer the greatest level of protection and public use of this unique resource. Not only would conservation easements or fee simple purchases ensure that these mountaintops are preserved, but they could also allow the public to view the distant vistas described above. The higher elevations in Lyndeborough may not be considered of statewide importance but they have regional and local significance. For this reason, assistance and funds should be actively sought to protect and preserve these important resource areas.

2. 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., $\text{change in elevation} / \text{distance} = \% \text{ slope}$). 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 slope of a piece of land affects its capability to support various land uses. The mapping of slopes can be 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 Lyndeborough. Where slopes 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 (1987, as amended), that has been prepared by the Hillsborough County Conservation District.

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 Lyndeborough's roads. These areas 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 required, or approached with extreme caution and subjected to a thorough review by the Conservation Commission, Town Engineer 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 development.

15-25% Slope – Land areas in this slope category present substantial constraints to 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 on these slopes should be avoided or approached with extreme caution.

Areas with slopes greater than fifteen to twenty-five percent are generally found in areas with elevations above 1000 feet 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.

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, of course, 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. The Town's Wetlands Conservation District ordinance will be a valuable aid in protecting these areas. 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-1, Topography, 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 Planning Board, Conservation Commission, Town Engineer 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 and water resource data in determining the overall natural ability of the land to support development.

C. 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 Lyndeborough, where the soil material is the sole medium for the purification of all wastewater generated by residents.

The Natural Resources Conservation Service, 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 (for the duration of this chapter, we will refer to SCS since all of the documents cited refer to this former agency). 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 Lyndeborough is the SCS 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.

3. SCS Soil Limitation Rating System

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). 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 results of the research were summarized into an overall rating of the soils for the particular use. The rating indicates which soils have slight, moderate, or severe limitations for use with septic systems. The ratings are illustrated on Map IV-2, Soil Type Limitations for Septic Tank Absorption.

Slight Limitation

Soils in the slight limitation class are considered to have the best potential for active uses. They have properties generally favorable for uses 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 should be capable of 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.

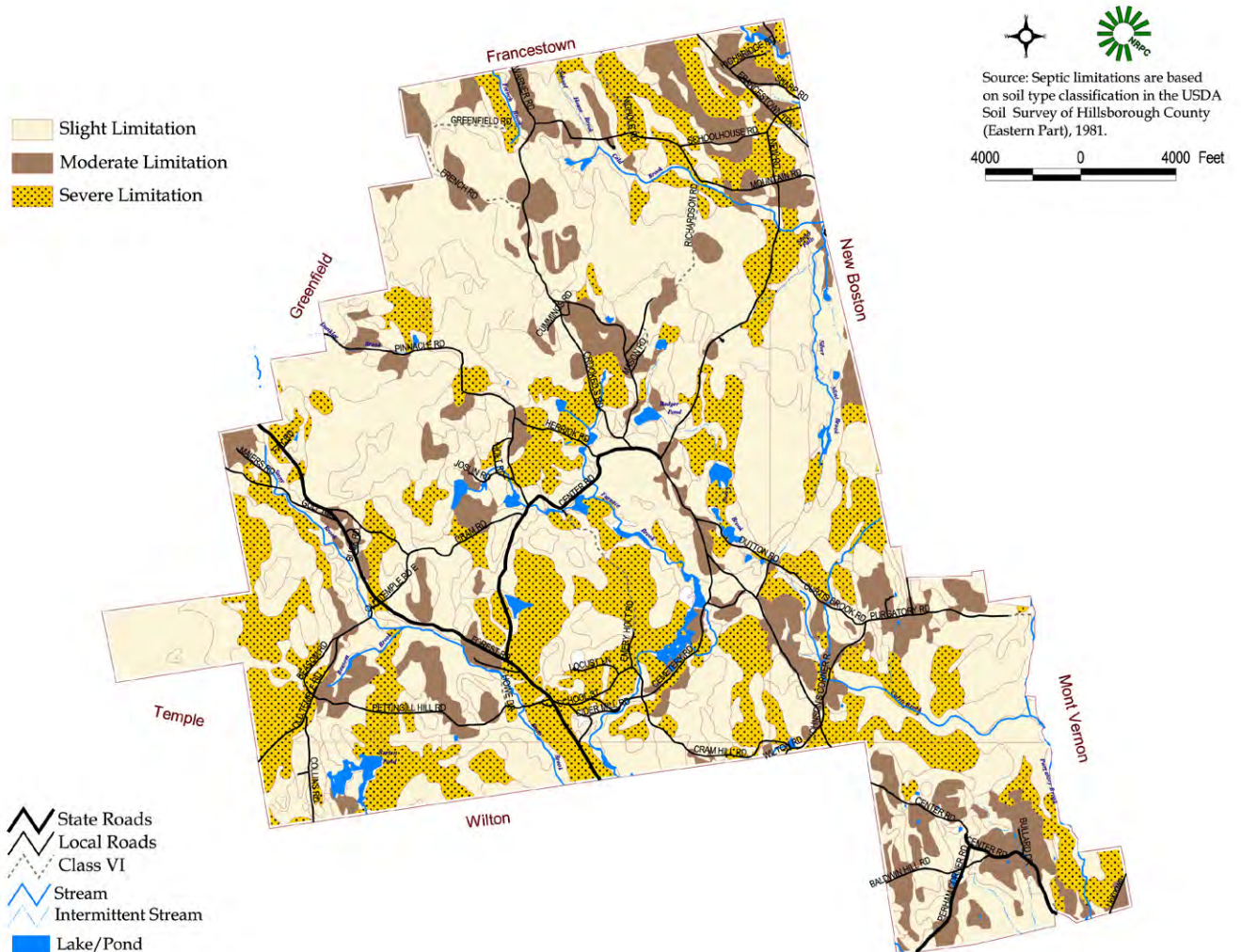
Moderate Limitations

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.

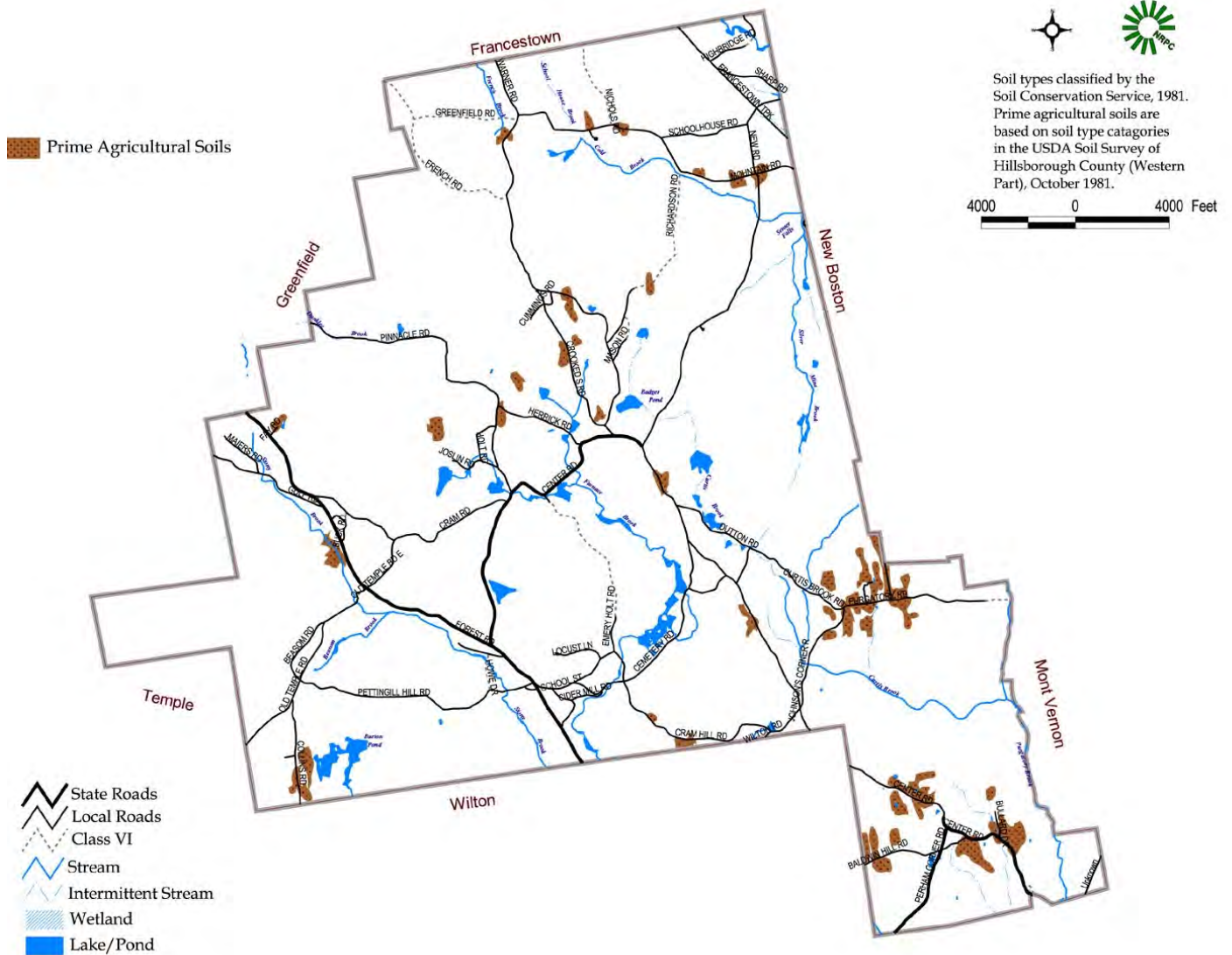
Severe Limitations

The soils in the severe limitation class have the poorest potential for supporting septic tank absorption fields. They 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 Conservation Commission, Town Engineer, or designated representative.

Map IV-2: Soil Type Limitations for Septic Tank Absorption



Map IV-3: Agricultural Soils



4. Agricultural Soils

The importance of agricultural lands as a valuable, rapidly diminishing resource has increased at national, state and local levels. Nationally, the U.S. 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.

By the middle of the nineteenth century, agriculture reached its peak in southern New Hampshire. Approximately 55-65% of Hillsborough County was considered improved farmland at that time; most located in upland areas. In Hillsborough County, some thirty-three percent of agricultural land was taken out of agricultural use over the period from 1952 to 1974. Thirty-two percent of Lyndeborough's agricultural lands fell out of production, either becoming idle or developed for other uses, over the same period.

Active agricultural practices such as horse properties and properties that are not actively managed as farms but are passive open spaces comprise only a small percentage of the total acres in Town. Agricultural uses in Lyndeborough have diminished over the years, and old stone walls in the forests are the only clues to the formerly cultivated lands. The rural picturesque quality attracts new residents to Town. Yet residential development pressure is the very thing that threatens the existence of Lyndeborough's remaining farmlands.

Based on the Community Profile, maintaining the remaining agricultural land is a high priority for the citizens of Lyndeborough. For agriculture to remain in Lyndeborough, the Town must develop innovative regulations, programs and policies beneficial to everyone. One method would be to acquire easements or purchase development rights to preserve agricultural uses. The Town should also seek additional funding sources both inside and outside its own budget to support agriculture. The Land and Community Heritage Investment Program is a good example of such funding. Monies may also become available through the Conservation and Reinvestment Act (C.A.R.A. 701) for farmland preservation. In addition, there is a "Barn Again" Program, which aids rehabilitation and preservation of income producing barns.

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 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 productive 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. Agricultural uses can also be productive uses for flood plains and seasonally wet soils, which are generally unsuitable for development.

The Town's important agricultural soils are illustrated on Map IV-3 and are divided into three groups of important farmlands based on the soil character suitability for crop production.

Prime Farmland - These lands are best suited for producing food, feed, forage, and 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 included the following soil types as constituting Prime Farmland: Groveton (27B); Madawaska (28B); Becket (56B); Marlow (76B); Peru (78B); Ondawa (101); Podunk (104); Monadnock (142B); and, Skerry (558B).

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 included the following soil types as constituting farmlands of Statewide importance: Becket (56C); Marlow (76C); and, Monadnock (142C).

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. The SCS has included the following soil types as farmlands of local importance: Adams (36A, 36B); Becket (57B, 57C); Marlow (77B, 77C); Peru (79B); Rumney (105); Monadnock (143B, 143C); Skerry (559B); and, Croghan (613A, 613B).

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. LCHIP and CARA, described later in the chapter, could be used to protect important agricultural lands through the acquisition of development rights.

A listing of the soils situated within the Town of Lyndeborough grouped according to their potential for, or limitation to, active use and development is included in Appendix VI-B. The list is intended for use as a reference in reading and understanding the implications of the soils mapping. The list of soil limitation ratings is taken from the previous Master Plan. The list is an aid and may 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 effects.

D. 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 Lyndeborough 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. The first step toward ensuring the protection of the Town's water quality is to inventory the water resources and identify their importance to the community.

1. Surface Water Resources



Surface water resources provide storm drainage, storage, groundwater recharge, wildlife habitat, water supplies, and active or passive recreation. The Town's streams, including Stony Brook, Furnace Brook, Curtis Brook, Purgatory Brook, and South Branch Piscataquog River flow into different drainage basins. The two main basins are the West Branch of the Piscataquog (in the northern portion) and Stony Brook (generally in the southern portion of Town).

Lyndeborough's ponds are also a very important surface water resource, providing wildlife habitat, water supply, flood control, and outdoor recreational opportunities. An inventory of Lyndeborough's ponds is presented in Table IV-1 and illustrated on Map IV-4. It was noted in the Town's draft Groundwater Protection Policy Plan that Badger Pond and water bodies located along portions of Cemetery Road contain excessive aquatic plant species. This is generally due to nutrient loading (phosphorous) from agricultural operations or landscaping.

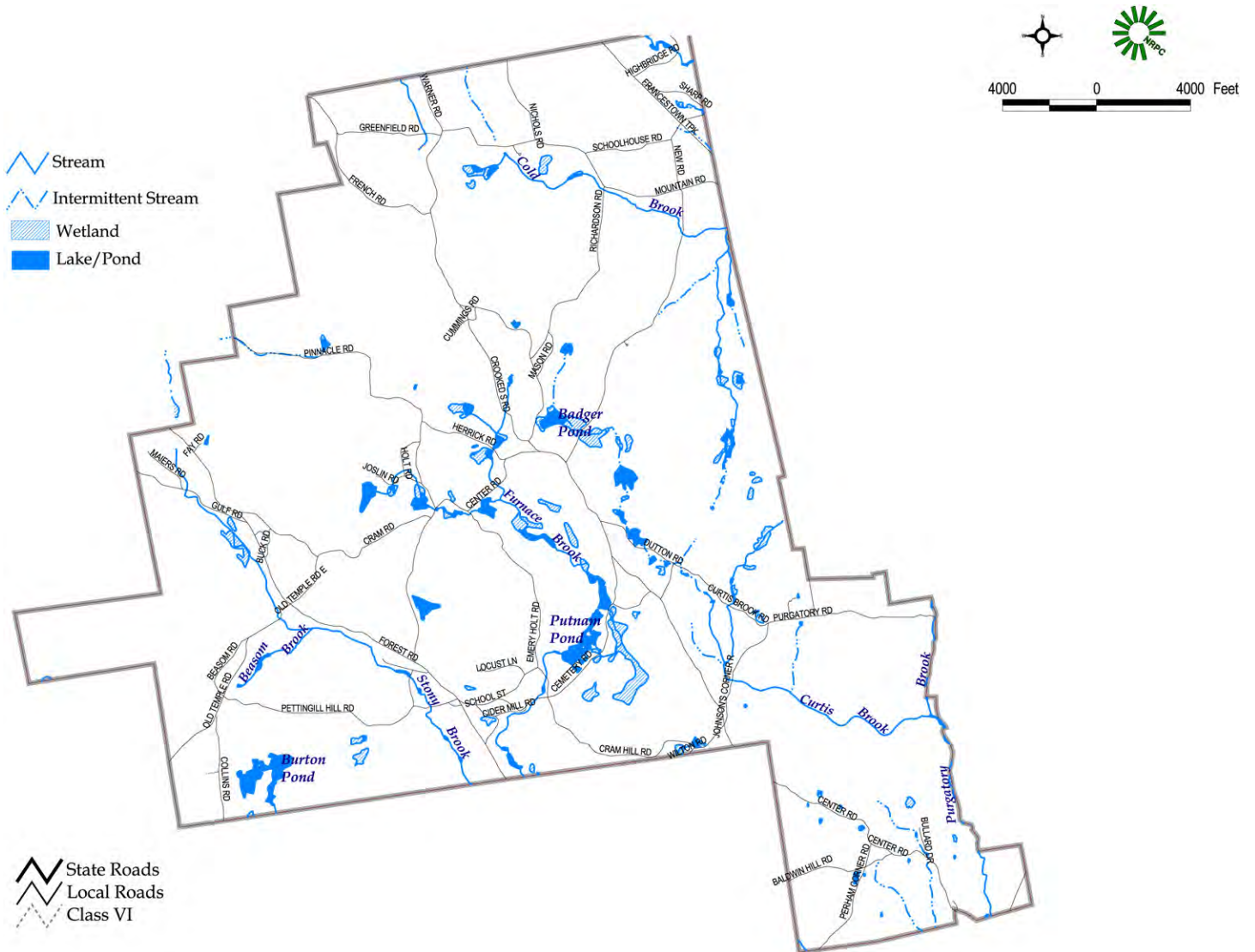
All surface waters are important due to their length, current or potential uses, and the interconnection between surface water and groundwater. Although they may represent a small portion of the Town's land area, they are an important resource to consider relative to the Town's future growth because of the extensive network they form.

Table IV-1: Ponds in Lyndeborough

Name of Water	Size	Description
Badger Pond (private)	Area: 12 acres	Color: colorless
	Elevation: 860 feet	Bottom: 95% muck, 5% rock
	Max. Depth Sounded: 6.8 feet	Emergent Vegetation: common
		Submerged Vegetation: scant
Burton Pond (private)		Shore: 60% wooded, 30% swampy, 5% meadow, 5% cultivated
	Area: 26 acres	Color: brown
	Length: 2.0 miles	
Putnam Pond (public)	Elevation: 870 feet	
	Area: est. 50 acres	Color: dark brown
	Max. Depth Sounded: 6 feet	Bottom: 100% muck
		Emergent Vegetation: scant
Swartz Pond #1 (private)		Submerged Vegetation: scant
	Area: 12 acres	
	Elevation: 935 feet	
	Average Depth: 7 feet	

Source: *Survey Lake Data Summary*, New Hampshire Department of Environmental Services, Water Division, November 2000.

Map IV-4: Water Resources





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 areas adjacent to surface water resources be protected by restricting their development from active use. These areas can be safely developed, however, to meet the community's needs for passive recreation and open space. They will also provide protective greenways that buffer or minimize any land use impacts that may be created by allowed 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. In Lyndeborough, this would provide open space areas for most of the developable land in Town.

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. Groundwater Resources

A substantial portion of water in Lyndeborough 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, 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.

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. According to the draft Groundwater Protection Plan, primary stratified drift aquifers are not extensive. There are three principle areas in Town capable

of being a primary source of groundwater. These aquifers are located in the northeast portion of Town in the vicinity of the Francestown Turnpike, the Bracketts Cross Road and Putnam Pond Conservation Area, and the residential portion of NH Route 31 to the west.

Water usage will vary depending on the type of development. Single family residential and light commercial development use a relatively small amount of water in relation to higher density residential and heavy commercial and industrial uses. Thus, 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 in limiting 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 aquifer. 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.

The aquifers delineated on the water resources map in the previous master plan were taken from a 1977 study, which identified underground water supply potential according to soil types. Three categories of groundwater sources were identified:

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.

Since the previous master plan was prepared, another more detailed study of the glacial stratified drift aquifers within the Nashua Region was published by the U.S. Geological Survey in 1987. The Aquifer Delineation Study for the Nashua area is an expansion of the USGS Groundwater Availability mapping. Based on the hydrogeologic information supplied by this earlier study, 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 performed 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. The one well tested in Lyndeborough was found to have levels of Sodium (Na) slightly higher than the USEPA recommended Toxic Contaminant Level. The domestic well was shallow, and likely contaminated by either road salt or septic leachate which are both a possible source of Sodium.

The following excerpt is the USGS aquifer study description of Lyndeborough's stratified drift aquifers:

"Only 2.4 ml² or 8 percent of the Town is underlain by permeable stratified drift. In a few places, the saturated thickness of stratified drift exceeds 10 ft.; therefore, most deposits seem to be incapable of yielding more water than may be required for residential use."

The small, thin aquifers in Lyndeborough are widely scattered and discontinuous. In the Piscataquog River, Curtis Brook, and Stony Brook valleys, the stratified drift in kame terraces and eskers is thick, but the saturated thickness is too small to support large well yields; possible exceptions are stratified-drift deposits along the Piscataquog River east of Piscataquog Mountain and those northeast of Piscataquog Mountain near Wilton Road in New Boston, where the saturated thickness, is less than 20 ft. and the transmissivity is less than 4,000 ft.-/d. However,

exploration to determine if sites for large yielding wells are possible would be desirable. The limited extent and saturated thickness of the stratified-drift aquifers in Lyndeborough indicates that a large-capacity municipal water-supply system is not likely to be located in the Town. Use of the small, isolated stratified-drift aquifers, which generally have transmissivities less than 2,000 ft./d, is suited for individual household water supplies.

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 easily 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 Lyndeborough 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 Dept. 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. These soil series and their corresponding soil symbols are showing in Table IV-2.

Table IV-2: Glacial Till Soils

Soil Series	Soil Symbols
Becket	56B, 56C, 57B, 57C, 57D
Lyme	246B, 247B
Marlow	76B, 76C, 76D, 77B, 77C, 77D
Monadnock	142B, 142C, 143B, 143C, 143D, 145C, 145D
Peacham	549
Peru	78B, 79B, 79C, 79D
Pillsbury	646B, 647B
Skerry	558B, 559B, 559C
Tunbridge-Lyman-Monadnock Complex	160B, 160C, 160D
Lyman-Tunbridge Rock Outcrop Complex	161C, 161D

Source: *Soil Survey of Hillsborough County New Hampshire, Western Part*, United States Department of Agriculture, Soil Conservation Service, October 1981.

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 individual water supplies.

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 carry 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 you are drilling in a high fracture area, then there is a good chance your 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. According to the Town of Lyndeborough Groundwater Protection Policy Plan, the area along the Pinnacle Fault has the potential to produce high yielding bedrock wells due to its distinct and geologic site specific conditions. The fault is located in the eastern portion of Town and runs in a more or less north/south direction.

Since Lyndeborough has little stratified drift or till aquifers available, bedrock aquifers are a viable and already highly used option for providing individual water supplies. Again, due to the complex nature of bedrock aquifers, the Town should be cautious about allowing existing and future land uses to dispose of waste products that may find their way into surface water and groundwater supplies.

3. Water Supply

There are five known public drinking sources: Lyndeborough Central School, Citizens Hall, the Town Library, Babes in School Land Preschool and the United Church, and the Old Town Hall on Center Road. The Nashua Regional Planning Commission indicates that, overall, water quality and current supply are adequate with few reported incidents of well failure or contamination. Two homes along NH Route 31 complained of road salt contamination of their water supplies. Subsequent testing of the wells verified the complaints. The contamination was attributed to the close proximity of the wells to the roadway.

All water supplied to Town residents comes from groundwater sources. These private systems are usually bedrock water supply wells, dug wells and some springs. In general, bedrock systems are capable of yielding sufficient potable water for individual household consumption.

Several groundwater supplies within the Town's boundaries are suspected to be of sufficient size to yield substantial amounts of water. Normally, supplies of this nature are targeted for potential use for small municipal water supply systems. In Lyndeborough however, such consideration seems unfeasible, as the development costs for such a system would be prohibitive due to the difficult terrain throughout

much of the Town. Also, in an era of declining state and federal assistance for such a project it is impractical to assume that a Town of Lyndeborough's size could bear the financial burden of developing a community water supply. And finally, it appears unlikely that future development in Town will occur in the intensity which would require a public water supply to be developed. However, consideration should be made to the potential for future light industry in the currently designated and undeveloped Light Industrial Zoning districts.

The presence and location of these major groundwater supplies however, deserves consideration in the Town's planning efforts. Map IV-4, Water Resources, 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 then 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. A recent study conducted by the Nashua Regional Planning Commission, on behalf of the NH Office of State Planning, was concerned with inventorying existing "non-point sources" of pollution. 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.

The study inventoried local salt storage locations, active and inactive landfill sites, road salting routes, and areas of intensive development not serviced by a public sewer system. Information from the study indicates that currently, every major groundwater source in Lyndeborough lies below roadways that are salted on a regular basis during winter months. While it is evident that the Town's terrain can make roads covered with ice or snow hazardous, it should be recognized that current road salting practices represent a potential threat to the Town's groundwater 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; 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 large agricultural uses which entail pesticide/fertilizer operations and concentrations of organic pollutants such as manure.

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 preserving the public welfare.

4. Sewage Disposal

In Lyndeborough, it is impossible to study the future of the Town's water supply without simultaneously considering the impacts of current sewage disposal methods. As in most rural communities, the sole means of disposal in Lyndeborough is through subsurface sewage disposal systems on each individual home site. The Soils map, which accompanies this report and indicates the

Soil Conservation Service's determination of the suitability of soil types for use as septic tank absorption fields, shows that only a small percentage of the Town's area is comprised of soils which have a high or moderate suitability 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 Lyndeborough where water supply and sewage disposal both relies on the natural capabilities of the soil.

It seems unlikely that Lyndeborough will ever undertake the development of a municipal sewage treatment facility. In areas where there are multiple wells and aging/failing septic systems, community septic systems should be investigated. Excessive costs and the lack of financial resources locally are the primary reasons for this determination, however, it does not appear that the demand or need for such a facility will be present at the level and type of growth anticipated. The above determination emphasizes the need for the Town to closely monitor sewage disposal practices in order to protect local water quality.

The New Hampshire Water Supply and Pollution Control Commission (WS&PCC) has developed minimum standards for the design and construction of subsurface sewage disposal systems. The WS&PCC is, in fact, the permitting authority, statewide, 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 WS&PCC, 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.

RSA 36 and RSA 147 empower communities to develop Health Codes that they feel are applicable to its own particular circumstances. Thus, if deemed beneficial, Lyndeborough 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 Lyndeborough and what level of resources are needed to be committed to ensure that local regulation is effective in protecting water quality.

5. 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. Areas of potential flooding in Lyndeborough are identified as Zone A Special Flood Hazard Areas on the US Dept. of Housing and Urban Development, Flood Hazard Boundary Maps. Special Flood Hazard Areas in Lyndeborough are minimal and are located along the edges of Purgatory Brook, Curtis Brook, South Branch Piscataquog River, Burton Pond and Stoney Brook where it parallels Boston and Maine RR.

Due to the small amount of land in Town which is susceptible to flooding, the Federal Emergency Management Administration (FEMA), Federal Insurance Administration has not prepared a flood insurance study of the community. The areas delineated as Zone A on the existing map were identified

by soil information. The Town is not currently enrolled in the National Flood Insurance Program. The New Hampshire Office of State Planning (OSP) administers the program for FEMA and is in the process of visiting all towns in the State that are not enrolled in the Program.

6. Riparian Buffers/Streamside Forests

The riparian buffer traps pollutants and helps filter out sediment and debris from surface runoff. The vegetated buffer also slows the velocity of water and promotes groundwater recharge. The groundwater then returns to the stream or river at a much slower rate and over a longer period of time. This helps control flooding and helps maintain stream flow during the driest time of the year. The buffer helps to stabilize streambanks and reduce erosion and sedimentation. Buffers are essential for cold water fisheries (trout/salmon) to increase shading to moderate water temperatures.

7. Wetlands



Existing wetlands include those areas where the soils are particularly sensitive to development. Wetlands perform many 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; and 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. In Lyndeborough all poorly or very poorly drained soils and field indicators for identifying hydric soils are contained in the Wetlands District.

Nothing can replace the field survey when it comes to identifying wetlands. Trained botanists, ecologists, wetland scientists, soil scientists, and hydrologists, when working in the field, can provide the highest level of information needed. If available, this information should be incorporated into any land use decision-making process. However, the reality of most local Planning Boards is that the costs involved greatly outweigh the applicability of using this approach in developing an information base.

There are two 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 include:

Table IV-3: Poor to Very Poor Drainage Soil Types

Very Poorly Drained Soils	Poorly Drained Soils
Borohemists (197)	Lyme (246B, 247B)
Chocorua (395)	Naumburg (214A, 214B)
Greenwood (29S)	Pillsbury (646B, 647B)
Peacham (549)	
Searsport (15)	

Source: *Soil Survey of Hillsborough County New Hampshire, Western Part*, United States 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, slopes, 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-4, Water Resources, illustrates the 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. The Town has already adopted a wetland protection ordinance which designates permitted uses within the District, however, the ordinance does not provide for a buffer to ensure that natural vegetation critical to the health of the wetlands is protected. Buffers serve as a pollution filter helping to maintain water quality within the wetland, which is important for all wildlife, both aquatic and terrestrial. Many species are dependent on aquatic habitat or the vegetation bordering the water for nesting or feeding. Information on the type and size of buffers can be found in various national and state publications¹. 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.

Currently, little or no development has taken place in wetland areas in Lyndeborough. It is recommended that development of these areas continues to be restricted in the future through the Town Wetland Conservation ordinance and that the ordinance be amended to include a 100 foot buffer from the edge of the wetland. This, combined with active enforcement of Town's regulations governing the location of septic systems (100 feet), will ensure that these areas may continue to perform the natural functions for which they are best suited.

¹ See: US Department of Agriculture, Forest Service, *Riparian Forest Buffers*, 1992, publication #NA-PR-07-91 and NH Office of State Planning, *Buffers for Surface Waters and Wetlands*, 1997.

Prime Wetlands

State law (RSA 482-A:15) authorizes a community to designate wetland areas meeting established standards as prime wetlands. The criteria and the submission requirements are explicitly set forth in the administrative rules governing the Department of Environmental Services Wetlands Bureau. The benefits of prime wetland designation include:

- Identifying and recognizing wetlands as locally significant based on their size, unspoiled character, diversity of flora and fauna, water storage capacity in combination with other characteristics.
- Notifying landowners, developers and the New Hampshire Wetlands Board of the municipality's strong belief that certain wetlands should remain undisturbed.
- Assuring that the Wetlands Bureau will give additional consideration to proposals for activities within a designated prime wetland.

A few points about prime wetlands should be noted. First, prime wetland designation can only apply to very poorly drained soils. Second, the Conservation Commission must notify the Wetlands Board when a proposal would involve a designated prime wetland. The Town should undertake a Prime Wetland inventory to give these wetlands additional consideration by the Wetlands Bureau when development proposals are presented to the Town.

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 State of New Hampshire, Department of Environmental Services, in its publication "New Hampshire NonPoint Source Management Plan", lists the various forms of non-point source pollution in order of priority for abatement efforts. The list is based on the following factors:

- Danger to public health
- Magnitude and pervasiveness of the potential threat
- Potential impacts to receiving waters
- Professional judgement
- Ability of existing regulatory programs to control pollution
- Adequacy of existing education programs to promote pollution control
- Public perception
- 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.

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. Map VI-5 shows the location of actual and potential point and non-point pollution sources in Lyndeborough.

Some of the major sources of surface and groundwater contamination in Lyndeborough include: 1) stormwater runoff; 2) subsurface sanitary waste disposal; 3) underground storage tanks; 4) waste sites; and 5) road salt.

Stormwater Runoff

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 groundwater.

The United States Environmental Protection Agency (EPA), through a program called the *National Pollutant Discharge Elimination System* (NPDES), 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). As Lyndeborough is a small rural town, these rules do not apply. However, they should be considered for any future industrial development that may occur in the Light Industrial Zoning district. Approximately 105 acres of this district is located adjacent to the Purgatory Brook.

Similar to Phase I, the Phase II rules do not currently apply to the Town but should be used as guidance for site development review. Phase II, 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. In addition, the Phase II rules will also impact construction activities between 1 and 5 acres, whereas Phase I 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
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 New Hampshire Department of Transportation will be responsible for all State roads regardless of the size of the community.

The stormwater management plan must be designed to reduce the discharge of pollutants to the maximum extent practicable (MEP), to protect water quality, and to satisfy the water quality requirements of the Clean Water Act. Though stormwater management plans must be submitted by March, 2003, full implementation is required by 2008, giving communities 5 years in which to carry through with their plans.

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.

All of Lyndeborough is served by on-site sanitary waste disposal systems.

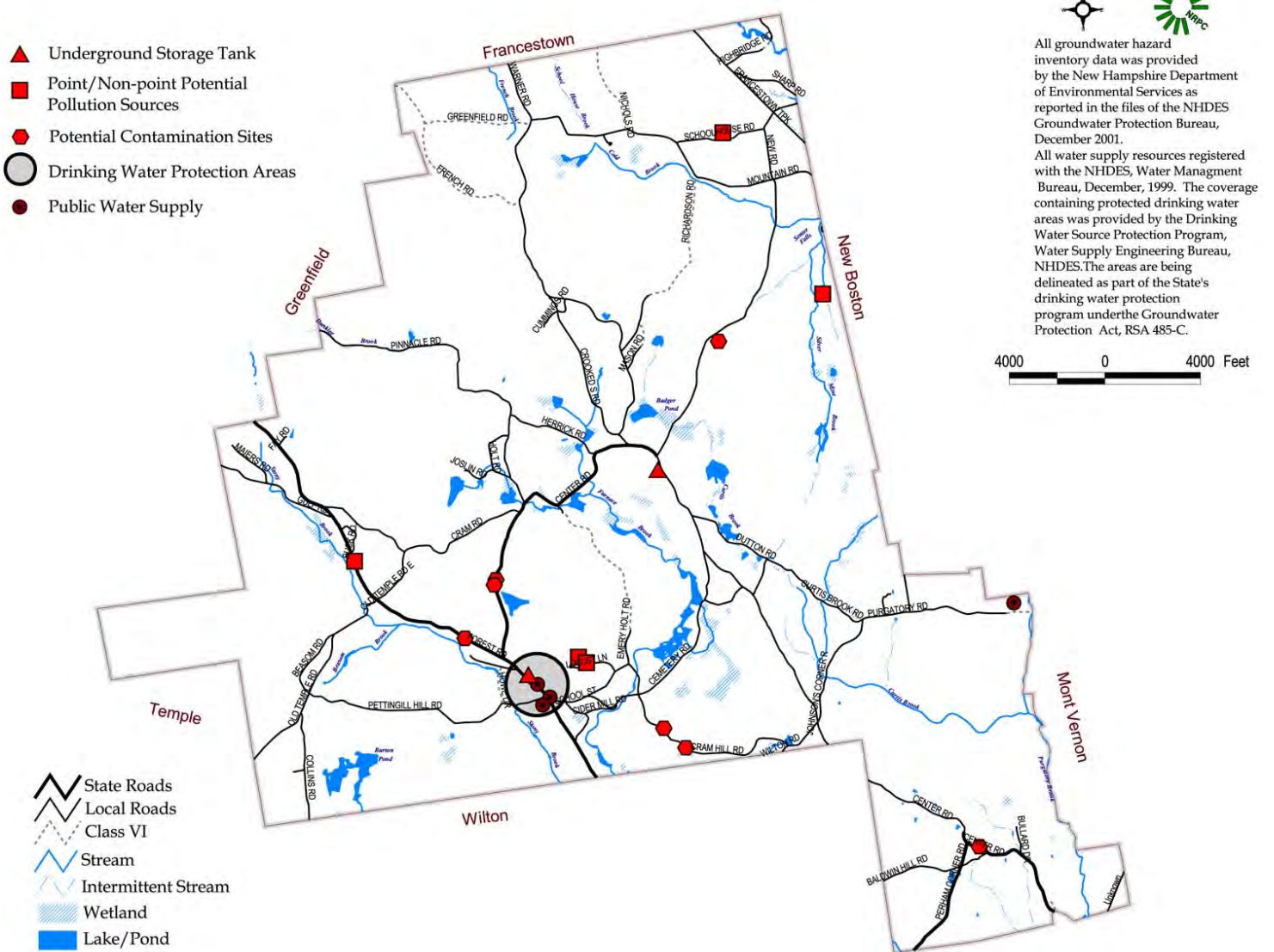
Underground Storage Tanks

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 2001, two USTs in Lyndeborough were registered with the NH Department of Environmental Services, Water Supply and Pollution Control Division.

Waste Sites

Contaminants from waste disposal sites and sites contaminated by industrial activities can leach into surface and ground waters. The NHDES 1987 *Waste Site Inventory* identified the municipal landfill as the only waste site in Lyndeborough.

Map IV-5: Point and Non-Point Pollution Sources



Road Salt

Road salt storage and application create the potential for sodium, calcium, and chloride contamination of surface and ground waters. Elevated sodium and chloride levels in drinking water supplies can pose serious health threats for certain population groups as well as animals and plants. In addition, high levels of chloride in surface waters can inhibit water mixing, cause stratification and salination of the bottom layers. At the time the Master Plan was adopted, the Town stored salt in an uncovered facility located on Locust Lane and an enclosed salt bay is needed to meet EPA requirements. The Town does not have an established sand/salt mixture policy; however, the percentage does vary depending on the type of storm. A number of towns in the region have adopted reduced and/or no-salt programs in sensitive areas such as near public water supply wells, concentrations of individual wells and surface waters.

E. 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 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) 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 1997 Integrated Natural Resources Management Plan for the New Boston Air Station, remnants of stands of chestnut trees have been discovered on the installation. The proximity of "Chestnut Hill" also suggests that chestnuts were prevalent throughout the entire area.

According to the Society for the Protection of New Hampshire's document entitled "New Hampshire's Changing Lands", 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 analyses indicate that the forest cover was approximately 83% in 1993 and 76% in 2001. 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 Lyndeborough'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 Lyndeborough, comprising approximately 87% of total land cover in Town.

Silviculture activities in Lyndeborough consist predominately of hardwood and pine harvesting and firewood sales. Firewood is still widely used as an additional heat source in the winter. Small woodlots continue to be selectively cut as supplemental income. The most current timber harvest was the former Lorden property, which harvested the most valuable timber on approximately 300 acres in the southeastern section of Town.

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. There is no set policy on clearcutting in Lyndeborough, but the Conservation Commission continues to verbally negotiate buffer widths with loggers on a case by case basis.

A greater percentage of Lyndeborough (87%) is forested than any other town in the Nashua region. Nearly 73% of this area is found in blocks greater than 500 acres, which is critical for wildlife habitat and the preservation of biological diversity. 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. See Map IV-6 for location of forest blocks greater than 10 contiguous acres in size.

Table IV-4 provides a summary of Lyndeborough's forest facts derived from the study, "New Hampshire's Changing Landscape", produced by the Society for the Protection of New Hampshire Forests in 1999. 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.

Table IV-4: Lyndeborough Forest Facts

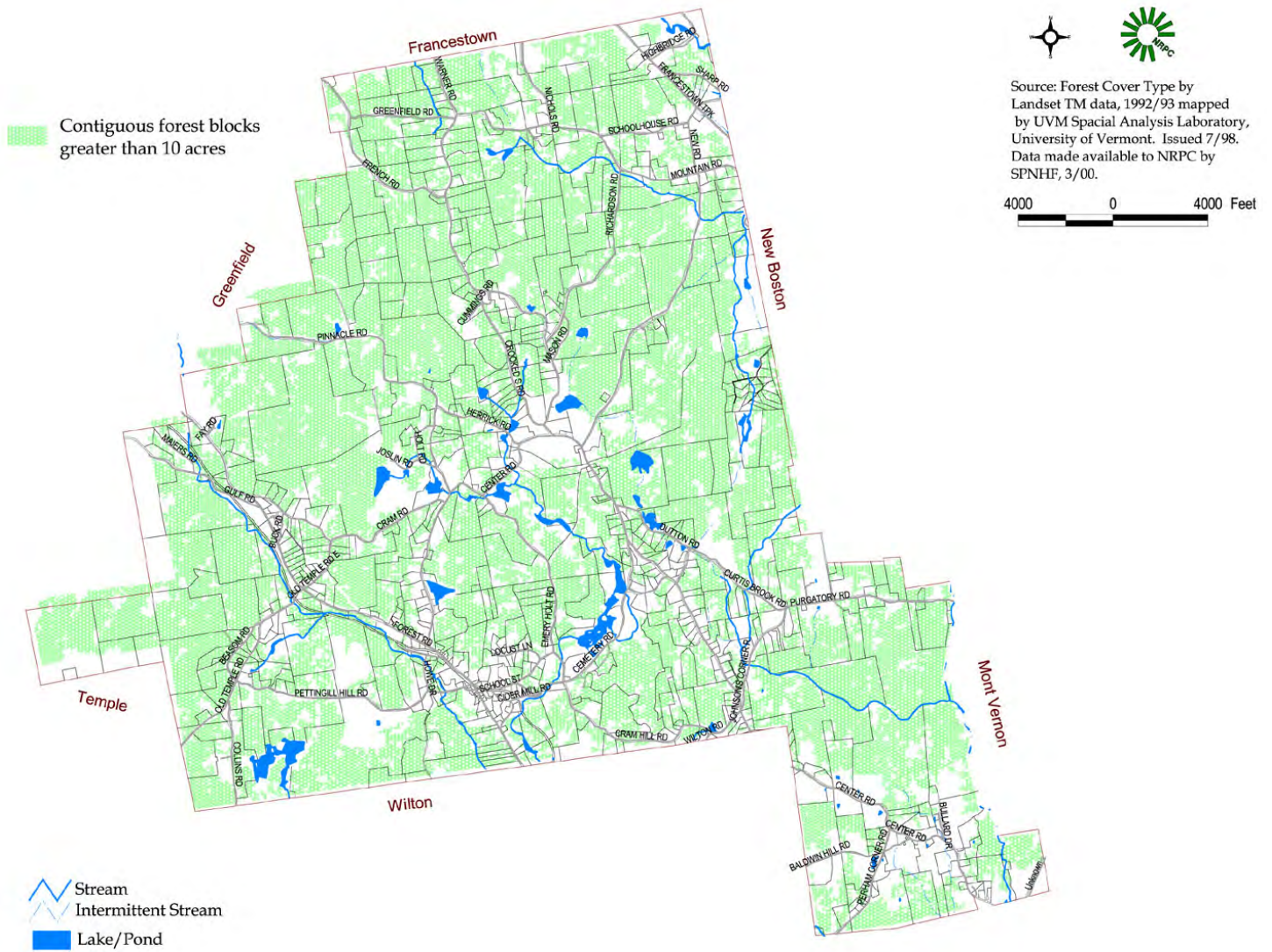
Total Area of Lyndeborough in Acres	19,297.49
Total area in Forest Blocks > 500 acres	12,274.39
Number of Forest Blocks > 500 acres	10
Average and Median Size of all Forest Blocks	322.3
Percentage of Forest Blocks > 10 acres that are protected	6.2%
Predicted Decline in Forest Area by 2020	861.6
Predicted % Decline in Forest Block Size by 2020	29.0%

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

Forestland Evaluation and Site Assessment (FLESA) Process

The FLESA process is a planning tool to aid towns as they plan for future development and natural resource needs, with careful consideration for what currently and could potentially exist. The FLESA process has two basic components and is based on a point system.

Map IV-6: Forest Blocks Greater Than 10 Acres



The first is referred to as land evaluation. This is a technical evaluation of a parcel or site's ability to grow desirable species based on soil information. The land evaluation considers the productivity potential of the soil as well as the probability that the tree species growing on site will produce quality trees. The key tool is using GIS to identify where Important Forest Soil Groups (IA, IB, IC, IIA, IIB) and Forest Type Cover is located

The second phase is site assessment. Specifically, FLESA will help inventory forest based resources, and assess commercial timberland, wildlife habitat, recreation use, and scenic resources. Timber resource assessment would include examining accessibility to the site, environmental limitations, parcel size, and contiguous acreage. The ranking for wildlife would use the same criteria as timber resource but also includes known threatened and endangered species, unique or critical habitat, and different wildlife attractors such as streams, orchards, etc. Recreation resources would include accessibility, trail type present, remoteness, and recreational activity present. Scenic resources consider the type of view, topographic features, special or unusual features, and vegetation.

F. WILDLIFE AND PLANTS

Lyndeborough'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 identify one "historical" Southern New England Dry Rich Forest on Acidic/Circumneutral Bedrock or Till natural community in Lyndeborough. Natural communities are basically different types of forests, wetlands, grasslands, etc. The NHI formally defined as assemblages of plants and animals that recur in predictable patterns across the landscape under similar physical conditions.

However, the 1997 Argonne National Lab (ANL) Biodiversity Survey identified 9 natural communities on the New Boston Air Station (NBAS), which has similar terrain and elevation. These areas, identified by the dominant plants, vegetative structure and minor features of the physical environment, represent intact examples of New Hampshire's native flora and fauna.

1. Animals

Animal species commonly found in Lyndeborough 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, and fishers have increased in Lyndeborough 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 are occasionally sighted in the Town. It is recommended that the Conservation Commission and interested citizens participate 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.

2. 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, ruffed 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. The only species found that is listed in the NH Heritage Inventory as endangered is the Pied-Billed Grebe.

The “Watch List” is a program developed by the National Audubon Society to call attention to birds at risk before they require federal listing, stressing preventative action today over last ditch rescue attempts in the future. Many agency scientists (USFWS, DOD, Audubon) are involved in the Partners in Flight Program. The Partners in Flight Program is a similar program to the Watch List but on an international scale. The Audubon Watch List annually targets bird species with declining populations; species with limited ranges; and species facing threats such as habitat loss on their breeding grounds, wintering grounds, and migratory routes. The Watch List species listed in Table IV-5 were identified during the biodiversity study at New Boston Air Station. Since many of the same habitats can be found throughout the region, it is likely that the same species can be found in Lyndeborough.

Table IV-5: National Audubon Society’s Watch List

American Bittern	Grey Catbird
Black-billed Cuckoo	Field Sparrow
Yellow-billed Cuckoo	Prairie Warbler
Chimney Swift	Palm Warbler
Eastern Pewee	Bobolink
Veery	Wood Thrush

Source: Argonne National Lab 1997 Biodiversity survey
of New Boston Air Station; Audubon Society’s Watch List.

3. Vernal Pools

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. Vernal 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 off the nutrients from fallen leaves.

Most vernal pool animals do not live their entire lives in the pool but migrate in response to seasonal ponding and drying. 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.

4. Plants

Plants commonly found in southern New Hampshire dominate the species in Lyndeborough. The NHI records indicate there are no threatened or endangered plant species in Town. However, the New Hampshire Native Plant Protection Act identifies 11 plants as “special concern.” These species are not rare in New Hampshire, but their showy nature makes them vulnerable to over collection. Table IV-6 identifies the species of special concern, many of which are found in Lyndeborough.

Table IV-6: Plant Species of Special Concern

Grass Pink	White Fringe Orchids
Flowering Dogwood	Large Purple Fringed Orchid
Pink Lady’s Slipper	Rose Pogonia
Dutchman’s Breeches	Lapland Rosebay
Trailing Arbutus	Pitcher Plant
Mountain Laurel	

Source: NHI.

A comprehensive biodiversity survey has never been performed for Lyndeborough, however, the New Boston Air Station (NBAS) survey is the closest intensive survey that has been completed in the region. A total of 454 species of plants were identified in the 1997 Argonne National Lab (ANL) biodiversity survey conducted over a three year period. No federally listed threatened or endangered plants were found on the station. However, the fern-leafed false foxglove is listed by the State of New Hampshire as endangered.

5. Native Fauna

A total of 147 species of birds have been recorded at NBAS during the ANL biodiversity survey; 109 were neo-tropical migrants. The only federally listed (threatened) species was the bald eagle. The eagle was spotted during the fall migration and is known not to use the habitat on the base. Several state listed species were observed and included: pied-billed grebe (endangered), osprey (threatened), Cooper’s hawk (threatened), and northern harrier (threatened). The harrier was observed during fall migration.

G. EXISTING CONSERVATION AND PUBLICLY OWNED OPEN SPACE AREAS

The Town of Lyndeborough contains a variety of conservation and recreation lands under both public and private ownership. These areas account for over 726 acres of the total land area in Lyndeborough. Once a popular resort area, Purgatory Falls is now only accessible by hiking. Purgatory Brook flows through heavily wooded, pristine forest. The water surges through a deep flume before cascading into the pool below. Ted Bonner from Greenfield and volunteers have created a trail along most of the brook.

The Town has acquired a number of conservation easements over significant properties and adjacent to sensitive areas such as wetlands. These easements protect important natural and community areas while providing interconnections between the larger public parcels. In addition to the conservation lands under the more permanent forms of protection, approximately 14,507 acres or 75% of the Town’s land area were enrolled in the current use assessment program in 2001.² The New Hampshire legislature has recognized the importance of open space and has found that its preservation is in the public interest:

² **Source:** NRPC GIS. Acres based on area of GIS parcels coded as current use, 2002.

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 with a minimum \$2,500 gross value of product on properties less than ten acres. The current use program provides limited short-term protection because enrolled, open land can easily be converted to other uses. Land in current use remains so until the land no longer meets the current use criteria. 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.

Map IV-7 illustrates the location of the significant conservation properties in Lyndeborough. The preservation and conservation of these sites and areas is of tremendous importance to the preservation of the visual quality, water quality, farms and forests, wildlife habitats, greenways, trails and rural character of the Town.

H. VISUAL RESOURCES



The visual resources of a community are a major component of its image and sense of place, and have an impact on the quality of life for residents and the perceptions of visitors. The Town of Lyndeborough is well aware of the value of its natural resources: ponds, streams, wetlands, and forests, its orchards and active agricultural lands, and its built environment – the Town center, historic homes, mills, and stone bridges. Center Road and NH Route 31 in particular have outstanding views that should be protected.

Reasonable protection of outstanding views and vistas has withstood the test of the courts on numerous occasions throughout the country. Typical view protection regulations involve height limitations for buildings, chimneys, antennas and/or setbacks. Height limitations have been used to preserve views of natural features such as mountain peaks, park areas and river views, and for protecting the stature of historic structures and landmarks. Special design criteria can also be used to minimize the visual impact of hillside/ridgeline development. Building materials such as rock, stone, brick and wood are compatible with the environment and tend to blend in better than other materials. The use of earth tone colors for paint or stain help to soften the building. Design that minimizes the disturbance or existing natural landforms and retention of existing vegetation should also be taken into consideration.³

I. PRIORITIES FOR FUTURE CONSERVATION EFFORTS

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.

³ See: Thomas Kokx Associates, Best Management Practices for Hillside/Ridgeline Development, Town of Meredith, NH, February 2001.

The Regional Environmental Planning Program (REPP) has been a response to these statewide conservation efforts. 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. Lyndeborough identified the Temple Road Bridge as the top cultural/historic top priority but, at the time the Master Plan was adopted, had not yet selected any natural resources priorities.

The results of the Community Profile indicates that preservation of orchards, ground water supply, wetlands, forests, conservation land, trails, wildlife habitat and scenic roads are a high priority. The results also show that residents recommend that a complete Natural Resources Inventory (NRI) be completed. An NRI lists and describes important naturally occurring resources within a given locality. At its simplest, an NRI is the compilation and description of existing natural resources data. At its most complex, it includes detailed analysis of specific natural resources. An NRI could be useful in identifying natural resource priorities for Lyndeborough.

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.

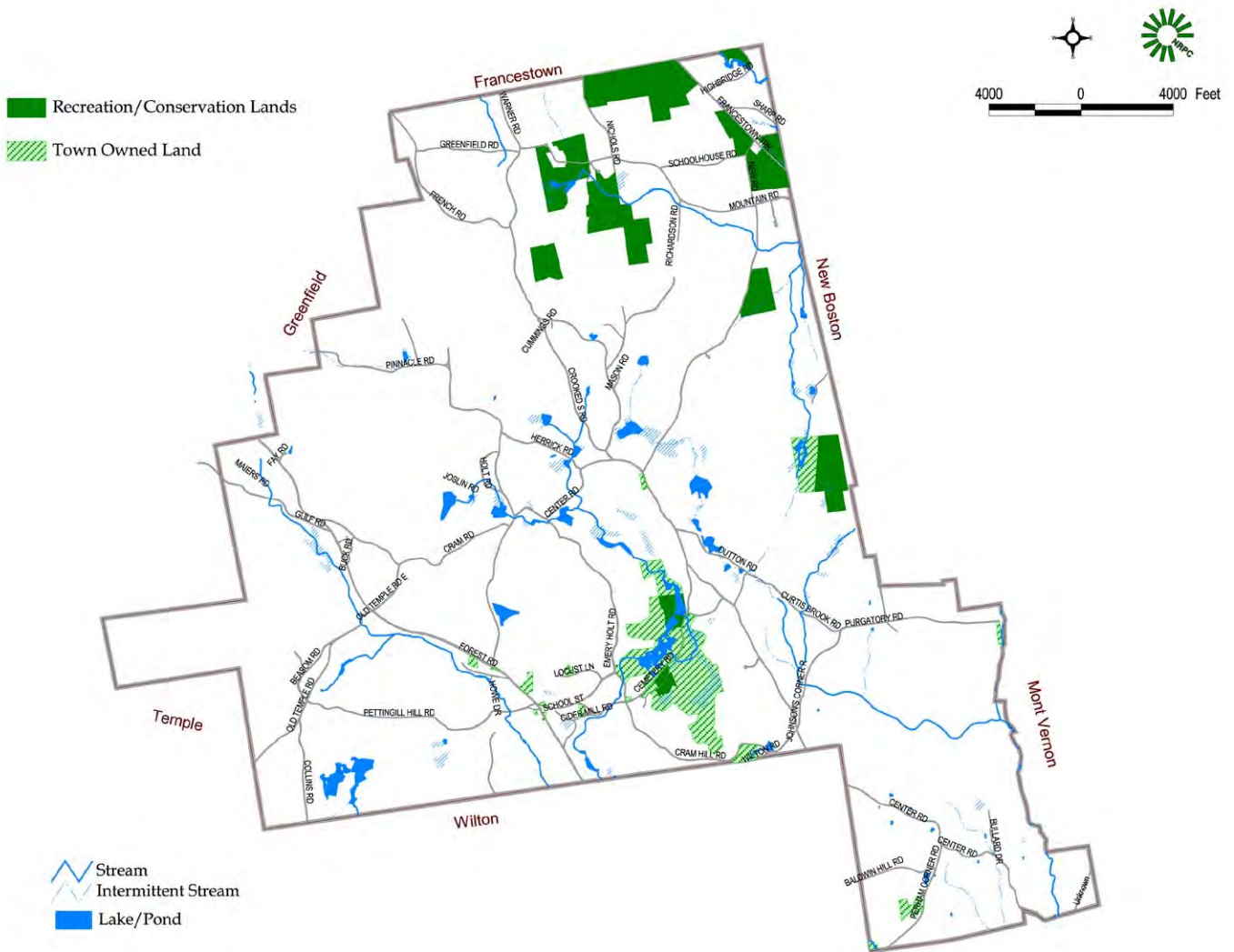
A program called the Land and Community Heritage Investment Program (LCHIP) will carry out the goals of Senate Bill 401 and the LCHC. The New Hampshire General Court created LCHIP in order to:

"...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."

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.

The 2001 Community Profile revealed that preservation of orchards, ground water supply, wetlands, forests, conservation land, trails, wildlife habitat, and scenic roads were a high priority. However, to date, no specific parcels have been identified. A Natural Resource Inventory could assist in this endeavor.

Map IV-7: Existing Conservation Lands



J. RECOMMENDATIONS

1. Topography

- Continue to protect steep slopes and high elevations from inappropriate development through the soil and elevation based Zoning.
- Consider developing special design criteria to minimize the visual impact of hillside development including the use of building materials compatible with the environment (rock, stone, brick and wood) and to preserve existing vegetation and natural land forms.

2. Soils

- When reviewing the intensity of development, the Planning Board should continue to consider soil potentials, limitations and slopes. Soils with steep slopes and/or low potential for supporting septic tank absorption fields should be limited to open space.
- The Town's few remaining 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 Land and Community Heritage Investment Program, the American Farmland Trust, the Wapak Land Trust and the Farmland Protection Program may assist the Town in this endeavor.
- Continue to require the use of Site Specific Soil Mapping Standards (SSSMS) in the subdivision regulations and consider amending the site plan regulations to require the use of SSSMS. The SSSMS are the most current standards available that can be used for a variety of land use activities.

3. Water Resources

- Consider researching the creation of a municipal waste water treatment system in South Lyndeborough since there is a heavy concentration of community and residential wells in this area.
- Protect existing wetlands and surface waters by amending the Wetlands Ordinance to include an adequate buffer from the edge of the wetland or surface water. A minimum of 100 feet is suggested for all surface waters. This buffer will protect the natural habitat surrounding wetlands and surface waters that is crucial to the proper functioning of these water resources.
- Consider increasing the setbacks from wells located in glacial till soils. These wells are close to the surface and are very susceptible to contamination.
- Undertake a Prime Wetland Inventory to give these wetlands additional consideration by the Wetlands Bureau when development proposals are presented to the Town.
- Require herbicide, pesticide and arsenic testing in all new wells in former orchards in the southeast part of Town since the orchards overlay till or stratified drift aquifers and are highly susceptible to contamination.

4. Forests, Wildlife and Plants

- Consider using the Forestland Evaluation and Site Assessment (FLESA) for future forest planning and components of the FLESA Program on all Town owned lands.

- Maintain a 50 foot undisturbed, shady buffer around vernal pools and a 100 foot buffer from 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.
- Consider 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.

5. Conservation

- Conduct a Natural Resources Inventory of Lyndeborough to assist with future conservation efforts.
- The unique local and regional resource of Lyndeborough's high elevations should be preserved and encouraged to be made accessible to the public through donated recreational easements. The Town should actively seek conservation easements for such land.
- Pursue the fee purchase, purchase of development rights, or other conservation measures to protect significant properties identified by the Conservation Commission or in a Natural Resources Inventory.
- Consider raising the Land Change Use Tax to help contribute towards increasing the number of protected open space parcels and provide matching funds for potential LCHIP applications.
- 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.

APPENDIX VI-A

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

APPENDIX VI-B

Important Agricultural Soils in Lyndeborough

Prime Farmlands

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%
HsD	Hinckley loamy sand	15-35%
NnB	Ninigret very fine sandy loam	3-8%
Oc	Occum fine sandy loam	
Om	Occum fine sandy loam	high bottom
PbB	Paxton fine sandy loam	3-8%
Pu	Pootatuck fine sandy loam	
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%
SsA	Scituate fine sandy loam	0-3%
SsB	Scituate fine sandy loam	3-8%

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

Soil Limitations for 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: Soil Survey of Hillsborough County, New Hampshire, Western Part, USDA, SCS, 1980.

#230B-4

CHAPTER V COMMUNITY FACILITIES

A. INTRODUCTION

The ability of a community's public facilities and services to meet the needs of that community is an indicator of the quality of life shared by its residents. The Town assumes responsibilities for the emergency services, administration, roads, education and other facilities. The demand for these public services will increase with population growth and the capability of the Town to prepare for future growth depends on the ability of local officials to plan for the population expansion and improvements of community facilities and services.

In 2001, a Space Needs Committee was formed to assess the current and future space needs of several departments in Lyndeborough including the Library, the Police Department and the Elementary School. This plan is a source of projections for growth in the Town and can be used to assist the Space Needs Committee.

This chapter of the Master Plan examines Lyndeborough's existing facilities as shown on Map V-1 and identifies current and future needs based on population projections and acceptable facility standards. Recommendations are based on results of the Community Profile and the Master Plan Committee discussions. This chapter considers the following community facilities, and concludes with a series of recommendations:

- | | | |
|---------------------|----------------------|---------------|
| • Fire Department | • Town Offices | • Library |
| • Communications | • Highway Department | • Recreation |
| • Police Department | • Cemeteries | • Solid Waste |
| • Ambulance | • Public Schools | |

B. FIRE DEPARTMENT



1. Existing Facilities

The Lyndeborough all-volunteer Fire Department facility is located just north of the Wilton-Lyndeborough Town Line on NH Route 31. The facility was originally built in 1948 and consisted of a 1,120 square foot, two-bay building. A 1,280 square foot, two-bay addition was added in 1972. Except for a new roof and the addition of a hose-drying tower, the facility has not changed significantly since the 1972 addition.

The Fire Department is struggling to meet demands for its services. The current station is not adequate for several reasons. There is only one exit from the second floor of the fire station and there should be a second exit constructed for safety reasons.¹ Also, parking for the Fire Station consists of a small 600 square foot dirt lot which can only accommodate three vehicles.

¹ Conversation with Rick McQuade, Lyndeborough Fire Chief, 2001.



The station is insufficient to house any more equipment, including a much-needed replacement of a 1976 custom pumper. While the existing pumper fulfills the water supply role for the Town's current needs, its 1,000-gallon per minute pump is far below the prevailing standard for the area. A new fire truck, which is scheduled to be replaced in 2004, will not fit into the space the current pumper occupies. Discussions are under way as to whether the existing fire stations should be expanded or whether a new substation should be located in a more central area of Town.

The southwest corner of Lyndeborough around the current station contains the greatest concentration of the Town's residents and businesses. However, as development projects reach into the northern parts of Town, there is expressed concern about adequate fire protection for this and other outlying areas. The average distance for calls responded to is four to five miles and the distance between the Fire Station and the farthest point in Town is over eight miles.

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 southern portion of the Town is covered by the response radius of the single existing fire facility. In addition, there are two main factors affecting adequate response times: 1) rural, winding roads, rough terrain, deteriorating bridges and traffic conditions make moving the fire equipment to the scene difficult and sometimes dangerous; and 2) more time is required for an all-volunteer team of firefighters to go to the station, prepare the equipment and arrive at the scene. Both of these factors reduce the effective service radius of the fire station. For the above-mentioned reasons alone, a fire station in a more central location is necessary to reduce the response times and adequately serve the more distant parts of Town.

There are, however, factors that help to offset the limitations of the effective service area. The Town is a member of the Souhegan Mutual Aid Association, which includes Lyndeborough, Mont Vernon, Greenville, Wilton and Amherst. Through the Association, the Town is able to call for assistance from neighboring communities. The Town also has two mutual aid contracts with the Town of Mont Vernon to provide fire protection assistance to the Tarn Road area off Salisbury Road and with the Town of Wilton to provide service to the Perham Corner area in southeast Lyndeborough. The existing Fire Station and the mutual aid agreements with Mont Vernon and Wilton provide adequate service coverage to most of Lyndeborough.

The Lyndeborough Fire Department operates on a volunteer basis with no full-time personnel employed by the Town. Compensation to department members consists of an annual reimbursement for mileage and gas. The Lyndeborough Fire Department is dependent on these volunteer members to come from within the community to fill its ranks. At present, the Department is made up of 20 members. Personnel composition is shown in Table V-1.

Table V-1: Fire Department Personnel Composition

Position	Quantity
Chief	1
Assistant Chief	2
Lieutenant	2
Fire Fighters	15

Source: Lyndeborough Fire Department, 2001.

The services provided by the Department include public education and fire inspections, as well as fire and rescue calls. The volunteers donate a great deal of time to their fire protection activities with training sessions being conducted twice monthly on a year-round basis. This insures efficiency of operation and knowledge of new fire fighting techniques. The volunteers also donate time and money to finance equipment purchases for the Department and other community events. The members also donate their time to what the department calls “off-nights.” Because there may be weeks at a time between emergency calls, members come into the station once a week to run a check on all of the equipment to detect any problems.

2. Existing and Future Needs

As with many municipal departments, standards are used to determine whether adequate staff is employed to address the needs of the community. The National Fire Protection Association (NFPA) report, *U.S. Fire Department Profile Through 1991*, compared various population sizes with the number of full time, part time and volunteer fire department staff. For communities with populations under 2,500, the report found that 96% of the fire departments were staffed solely by volunteers. Given the Town’s existing population of 1,585 people and projected 2020 population of 2,427, it is likely that an all-volunteer fire department will be sufficient to serve fire protection needs for the next 20 years. The provision of a more centrally located station should reduce response times and provide a facility to house the new pumper.

Fire fighting ability is also greatly enhanced with on-site sources of water, either through a cistern fire pond or residential sprinkler systems. Applications for new subdivisions located far from an adequate year-round water source should be reviewed to ensure that adequate fire protection is provided.

C. COMMUNICATIONS

Lyndeborough is a member of the Milford Area Communications Center (MACC Base), which is a local dispatching service for police, rescue, fire and public works departments. A staff of 12 dispatchers provides coverage to six towns (Mont Vernon, Amherst, Greenville, Lyndeborough, Milford and Wilton) 24 hours a day, 7 days a week.

The MACC Base is located in the Milford Town Hall and was established in 1984 in response to the need for a central regional dispatching facility to service smaller communities with mainly volunteer emergency teams. Member towns support the MACC Base by tax assessment and dues are based on the population in each town.

The use of a central dispatch facility is advantageous for Lyndeborough. MACC Base provides comprehensive 24-hour coverage for fire, police and emergency calls and does not require increased investment from the Town. MACC also provides for a regional fire protection system by combining central dispatching facilities with existing mutual aid agreements.

In 1992-1993, the State of New Hampshire established the E911 system. E911 is a statewide system, centrally located in Concord, that answers all 911 calls placed throughout the state. When a call is received by E911, an automated caller identification system locates the call and immediately contacts the appropriate town. The E911 system is beneficial in that it offers emergency services to all communities 24 hours a day, 7 days a week. It is estimated that Lyndeborough will be connected to the E911 system in the earlier part of 2002.² The E911 system will have a substantial impact on the efficiency of emergency services in Lyndeborough. It will enable a more centralized system to dispatch the most appropriate emergency team based on the location of the call. Road and weather conditions and volunteer emergency teams can greatly affect response times, but it is anticipated that the E911 system will help reduce those response times by alerting the proper team to answer the call.

One consequence of connecting to the E911 system is that the Planning Board should consider the naming of existing or proposed shared driveways and/or private roads. The E911 system requires that all driveways accessing more than two principal structures should be named and each principal structure being accessed from said driveway should be numbered using the driveway name as the address. This allows for more efficient identification of a structure in the case of an emergency call.

D. POLICE DEPARTMENT

1. Existing Facilities

The Lyndeborough Police Department is located in Citizens Hall in a recently renovated 600 square foot one-room office. The Lyndeborough Police force consists of one full-time Police Chief and one Patrolman. The Town currently budgets for two full-time and three part-time officers and three part-time staff. The part-time staff includes a Matron (to assist females in custody), a School Crossing Guard and an Administrative Assistant. The Department does not provide 24-hour service, but is assisted by the State Police when necessary. Criminal booking takes place at the Milford Police facility.

2. Existing and Future Needs

Table V-2 provides an estimate of the number of full time law enforcement officers and facilities provided in 2001 and needed for 2020. The U.S. Department of Justice, *Uniform Crime Report*, indicates that the national average is 2.4 officers per 1,000 population for all reporting agencies, and 3.1 officers per 1,000 population for agencies serving a population under 10,000. The average for New England is 2.9 officers per 1,000 population for communities under 10,000. 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.³ This Nashua regional average will be used as the standard for the purposes of this master plan.

To meet the standard, Lyndeborough needs to provide 2.5 full time law enforcement officers to support its 2000 population of 1,585. Lyndeborough currently provides 3 full time law enforcement officers (2 full-time and 2 part-time) and thereby exceeds the standard. Using the estimated 2020 population figures of 2,427, the Lyndeborough Police Department would need to provide a minimum of 3.5 full time uniformed law enforcement employees in 2020 to meet the standard.

² Conversation with Rick McQuade, Lyndeborough Fire Chief, 2001.

³ Source: Nashua Regional Planning Commission draft Regional Plan, 2001.

Table V-2: Full Time Law Enforcement Officers and Police Facilities, 2001 and 2020

Time Period	Population	# Officers Provided	# Officers Needed*	Facilities Provided	Facilities Needed**
2001	1,585	3	2.5	600	500
2020	2,427	-	3.5	-	700

Source: US Census; draft NRPC Regional Plan, 2001; and US Department of Justice, *Uniform Crime Report*, 1997.

*Based on average for Nashua region of 1.4 officers per 1,000 population.

** Based on 200 square feet of facility per officer.

The existing 600 square foot facility is considered adequate to house the two full-time and two part-time officers currently employed, provided booking continues to take place in Milford. This yields an average of 200 sq. ft. per officer. If additional officers are hired, however, then an additional 200 sq. ft. per officer may be necessary depending on how many officers are using the facility at once. Based on population projections, 700 sq. ft. of facilities would be needed for 3.5 officers in 2020. Therefore, the current facility is adequate to meet current needs but may need to be expanded by approximately 100 sq. ft. to meet the needs in 2020.

E. AMBULANCE SERVICE

The Wilton- Lyndeborough-Temple Ambulance Service, based in Wilton on Forest Road, provides emergency coverage to these three towns 24 hours a day. The service began in March of 1974 and is funded by a service fee charged to each patient, monetary gifts and contributions, and considerable volunteer support. The service is also supported by appropriations from each member town based on population. Lyndeborough currently contributes 20% of this income to the service. The income received from the member towns is used to purchase needed equipment.

The Ambulance Service staff includes a salaried Director/Paramedic, and a volunteer membership of five EMT Paramedics, nine EMT-Intermediates, 17 EMT-Basics, and one First Responders. Since 1994, the service has also been able to offer Advanced Life Support to member communities. The service has two ambulances. The primary ambulance, purchased in 2001, is housed at their facility on Forest Road in Wilton. The backup ambulance, which was purchased in 1997, is kept in the Temple Municipal Building. The backup ambulance is scheduled to be replaced in 2003. In order to replace vehicles, the service requests Capital Reserve Fund allocations from member towns.

The current headquarters on Forest Road in Wilton has been in use since 1990. It has two ambulance bays, a large training room, sleeping quarters/TV room, a kitchen and two bathrooms.

Currently, the Director/Paramedic answers calls Monday through Friday from 6am to 6pm, with the remainder of the duties shared amongst the volunteers. Call levels have risen with population increases in the three towns and it is becoming more difficult for volunteers to leave their jobs as often as is necessary. The service tries to hold one EMT course a year to train new staff, but the course is expensive (approximately \$600 per person) and instructors are hard to find. Additional full-time paramedics may be necessary to accommodate the growing population.

F. TOWN OFFICES



Lyndeborough's Town government provides a number of essential community services to its residents. These include:

- General Government
- Zoning Administration
- Public Safety
- Selectmen's Office
- Planning Board
- Welfare
- Health
- Capital Outlay
- Tax Collection
- Town Clerk

Lyndeborough's government activity is concentrated in Citizens Hall, which is located on Citizens Hall Road in South Lyndeborough off NH Route 31. Citizens Hall provides space for the Tax Collector, Selectmen's Office, Town Clerk, Police Department and various volunteer boards. The 40' x 60', 2,640 square foot wood frame building was originally built in 1889 to house the activities associated with the Lafayette Artillery Company. The parking area, which was expanded in 2000, provides 6,000 square feet of space. There is a small meeting room on the lower level with a capacity of 30 people and a large meeting room, with a full stage on the second floor where Town Meeting and other large events are held. This room has a capacity of 171 people.

The Town government has been located in Citizens Hall since the 1960s. Before this time, the Town used Old Town Hall on Center Road as the Town offices. The Old Town Hall is a 1,200 square foot wood frame building and was built in 1845 in the geographic center of Town. It now serves as a meeting place for several organizations in Town and as the main voting station on Election Day. The building is currently not up to code to hold certain events because of the lack of a sprinkler system. However it is considered adequate by the Fire Department for meetings of up to 85 people.

Table V-3 is a compilation of personnel currently employed in Citizens Hall (minus the Police Department). Lyndeborough currently employs one person in Citizens Hall on a full-time basis. However, as the Town grows, the Town Clerk position should be full-time in order to fulfill the duties required.⁴

⁴ Source: Town of Lyndeborough Board of Selectmen.

Table V-3: Compilation of Personnel in Citizens Hall

Position	Tenure
Town Clerk	PT
Selectmen Administrative Assistant	FT
Selectmen Clerk	PT
Tax Collector	PT
Deputy	PT
Treasurer	PT
Custodian	PT

Source: Scott Roper, Selectman, 2001.

In 2000, renovations and improvements to Citizens Hall were completed which included additional space for the departments and a new sprinkler system to bring the second floor up to code. The number of departments located in the building did not change, however, and space is still limited for storage. Currently, archived files and other data are being stored in a small closet in the Town Clerk's office and on the stage on the upper level of the Hall.

Although there are no specific standards regarding space requirements for "Town Hall" or municipal facilities, available survey research indicates that the average space per employee in a general office building is 208 square feet.⁵ However, municipal facilities require additional space for public access/egress, storage of Town records and meeting space. Cannon Associates⁶ recommends a standard of 312 square feet of municipal facility gross floor area (gfa) per employee in order to accommodate for this additional space. Therefore, 312 square feet gfa per employee is used as a standard for the purpose of this master plan.

Given that Citizens Hall currently houses 7 employees, applying the standard results in the need for 2,184 square feet of space. The existing facility provides 2,640 square feet, which exceeds the standard. The main priorities for Citizens Hall in the next 20 years are to consider adjustments for storage, the re-location of the Police Department and the need to evaluate staffing levels. As the Town's population grows from 1,585 people in 2000 to a projected 2,427 in 2020, it is likely that other employees will need to be full-time. However it is unlikely that additional staff will be needed. Therefore, the existing renovated Citizens Hall is adequate for the current departments for the next 20 years. The need for adequate staffing and space for the plethora of paperwork that is generated in a town hall should be analyzed to parallel any improvements to the facility and ensure an adequate level of service to Lyndeborough's citizens. Land and Community Heritage Investment Funds (LCHIP) may be available for future renovations to the historic Citizens Hall.

G. HIGHWAY DEPARTMENT

1. Existing Facilities

The Lyndeborough Highway Department is responsible for maintaining and upgrading 76 miles of Town roads. In 1991 the Department relocated from the Town Barn off Center Road to a 3.5-acre site off of Putnam Hill Road on Locust Lane. The facility consists of 5,400 square feet of vehicle storage and maintenance space and 2,050 square feet for the office and equipment storage. The Department's staff includes one Road Agent, one Foreman and a part-time Operator. From November through March, two contractors are hired to assist in maintaining the roads. The Road Agent has stated that another full-time

⁵ Source: Institute of Transportation Engineers, *Trip Generation*, Washington, D.C., 1987, page 885.

⁶ Source: Cannon Associates, *Town of Merrimack Development of Impact Fee Schedules Final Report*, Concord, NH 1988, page20.

employee and part time secretary is needed in order for the Department to be able to provide an adequate level of service, especially during the winter months.

Currently, the Highway Department is focusing its efforts on upgrading road conditions and cutting brush to increase site visibility. The Road Agent foresees allocating more resources on bridge renovations in the future, however. Several of the bridges in Town are limited to a certain vehicle weight restriction, deeming them inadequate for the Town's emergency vehicles as well as the Town plows and other maintenance equipment. While NH Department of Transportation money will be used for some of this maintenance, it is necessary for the Town to contribute a certain percentage as a match for this aid.

The Department vehicles, such as plows, dumps trucks, and graders, are included in the Town's Capital Improvements Plan (CIP) and replaced on a rotation according to need. The Budget Committee reviews the vehicle and equipment rotation schedule annually and recommends changes to the rotation schedule when appropriate.

2. Future Needs

The Department estimates that two additional enclosed bays are needed for equipment storage at the facility on Locust Lane. The existing bays are not enclosed, leaving stored vehicles vulnerable to the effects of the elements. The vehicles require more time and resources to warm up when needed and are also more susceptible to maintenance issues on a more regular basis. The Department is also in need of an enclosed salt bay. Because of the increasing water pollution issues related to salt storage and application, the U.S. Environmental Protection Agency is requiring all Highway Departments to enclose salt brine. The current bay allows the salt brine to migrate into the open where it is exposed to the elements, allowing salt to wash off the premises or percolate into the ground.

A town's highway budget is a major capital expenditure. A community needs to plan for annual increases in highway department expenditures such as materials, equipment, and personnel. The facility upgrades and additional personnel cited above could allow the Highway Department to maximize equipment performance and to maintain and upgrade the roads parallel to the needs of the Town.

H. CEMETERIES

There are a total of nine cemeteries located within the Town of Lyndeborough. The location and size of each are listed in Table V-4 and illustrated on Map V-1 (above). The Town hires a Cemetery Custodian to maintain the cemetery facilities in Town. The Highway and Cemetery Departments work together to provide equipment and labor to maintain the facilities. Equipment is stored in two utility sheds located at the South Cemetery. The combined storage area of these sheds is 120 square feet and is considered adequate for their present needs.⁷

When the Putnam Pond Recreation area was established, 10 acres adjacent to South Cemetery was deeded to the Town for future cemetery space. The addition of the 10 acres, and the remaining area left at the 4 open cemeteries, is considered adequate for future Town needs. However, residents who pass away during the winter months are currently kept at two funeral homes in the area. Establishing a holding vault in South Cemetery in the future would allow deceased residents to remain in Lyndeborough until their burial.

⁷ Source: Cemetery Department, 2001.

Table V-4: Cemeteries in Lyndeborough

Name of Cemetery	Identification on Map V-1	Location	Acres
South	C-1	Cemetery Road	4.75
Center	C-2	Center Road	0.8
Johnson Corner	C-3	Johnson Corner Road	1
North	C-4	Schoolhouse Road	1.33
Perham Corner – closed	C-5	Perham Corner	0.25
Dolliver Pettingill Hill - closed	C-6	Pettingill Hill Road	0.33
Greenfield Road – closed	C-7	NH Route 31	0.13
Doctor's Grave	C-8	Crooked S Road	0.10
Whittemore - private	C-9	off Mountain Road	0.75

Source: Town of Lyndeborough, 2001.

See Page V-2 for Map.

I. PUBLIC SCHOOLS

The municipal school system is an important element of community life. A community must dedicate resources to provide facilities, staff and materials, which will provide for and enhance the educational experience for the community's youth.

1. Lyndeborough Central School

Existing Facilities

Elementary school children attend Lyndeborough Central School located on NH Route 31 in South Lyndeborough Village. The single story brick building was built in 1948 and is located on a 7+ acre site. The 10,500 square foot building provides six classrooms and serves grades 1 through 6. The optimum capacity of the building is estimated at 150 students, or 25 students and one teacher per room.

The school offers a full elementary school curriculum as well as music, physical and special education, occupational, physical and speech therapy, and a Title 1 tutoring program for reading and math. The staff consists of one principal, a part-time secretary, a part-time librarian, six full-time teachers and approximately 7 part-time teachers for specialized curriculum. Other staff members include a full-time classroom aide, a part-time nurse, a building aide and a special education instructor.

As is shown in Table V-5, enrollment at Lyndeborough Central School has been somewhat sporadic. Enrollment has only gradually increased each year, and in some cases has seen a decrease in students (i.e. school years 2001-2002, 1998-1999, and 1992-1993). Although enrollment has been sporadic, an approximate percentage of students per 2000 population was determined in order to estimate the possible number of students in 2020. Table V-6 includes the existing and projected school enrollment figures for 2000 and 2020.

Table V-5: Lyndeborough Central School Enrollment History

Year	Readiness	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5	Grade 6	Total
2001-2002		15	14	20	22	17	16	104
2000-2001		23	23	22	20	17	21	126
1999-2000	3	18	21	20	15	23	25	125
1998-1999		23	20	14	20	27	17	121
1997-1998		20	15	17	25	18	28	123
1996-1997	6	14	17	21	16	21	16	111
1995-1996		16	19	16	22	16	20	109
1994-1995		21	17	20	15	18	17	108
1993-1994		21	18	15	20	17	8	99
1992-1993	8	20	14	23	18	11	15	109
1991-1992	7	16	16	15	12	19	25	110

Source: Lyndeborough Central School, 2001.

Table V-6: Existing and Projected School Enrollment Figures

	Enrollment 2000	Enrollment as % of 2000 Population	Projected Enrollment 2020
Grades 1-6	126	7.9%	192

Source: US Census 2000.

Future Elementary School Needs

The Department of Education has set standards for class size which use the number of students per grade per room or amount of square footage per student per room, whichever results in a smaller number of students per room. A standard sized elementary school classroom is defined as 900 square feet.⁸ Table V-7 summarizes the existing and projected classroom floor area requirements.

Table V-7: Existing and Projected Classroom Floor Area Requirements

	Enrollment 2000	Existing Floor Area (square feet)	Minimum Required Classroom Floor Area 2000 (square feet)	Projected Enrollment 2020	Minimum Required Classroom Floor Area 2020 (square feet)
Grades 1-6	126	4,500	3,780	192	5,760

Source: School Administrative Unit #63 and NH Department of Education, Ed 305.03 *Standards for Instructional Space*.

When comparing the existing enrollment with the NH Department of Education State Standards, the school is operating within capacity. Central School includes three classrooms of approximately 600 sq. ft. and three of approximately 900 sq. ft., for a total of approximately 4,500 square feet of classroom space. Students at Central School comprised about 7.9% of the Town's population in 2000. Projecting this forward, approximately 192 students may be enrolled in 2020. The facility, therefore, is estimated to need an additional 1,260 square feet of classroom space to accommodate the projected number of students in 2020.

⁸ NH Department of Education State Standards for Schools, Ed 305.03 *Standards for Instructional Space*, (last revised 1996).

Although the facility satisfies the current state capacity standards, the present school building is not adequate for maximum realization of the educational programs and goals established by the Lyndeborough School District.⁹ The State mandates that all schools have a special education, therapy and co-curricular activities (such as gym, music, etc.) component in the curriculum and that they must be taught by a specially trained teacher rather than a regular classroom teacher. The school is able to meet this requirement, but there is no space designated for these activities. Some teachers have had to hold classes in the hallways. In addition, the bathrooms and windows do not meet fire safety standards and the kitchen and storage areas need to be updated. The school is also the primary disaster shelter for the Town and must have space set aside for the storage of items such as blankets and canned goods. The School Board and the Space Needs Committee recognize the need to fulfill State standards and ensure a quality education to the students in Lyndeborough and will continue to evaluate the current and future school space and safety needs at Central School.

2. Wilton-Lyndeborough Cooperative Middle-Senior High School

Existing Facilities



The Wilton-Lyndeborough Cooperative Middle-Senior High School provides education for grades seven through twelve. The original 55,000 square foot single story facility was built in 1970. Expansion and renovations at the site increased the square footage to 85,970 sq. ft. and added a second story to the middle school. The school is located on a 54.6 acre parcel of land west of the Wilton downtown off Burns Hill Road. The site includes the administrative offices, classrooms, parking for over 100 cars, four tennis courts and ten-acres of athletic fields

for baseball, soccer, track, field hockey, and softball, and is handicapped accessible. Current staffing includes the principle and vice principle, 2 administrative assistants, 33 Teachers, 2.5 staff people, 2 Guidance Counselors, 1 Nurse, 8 Support staff, and 5 Teacher's Aids. The Cooperative also shares a psychologist with the other schools in the District.

In 2000, the Cooperative School completed a 6.5 million-dollar renovation project that added a new middle school wing with 11 classrooms, 2 science classrooms, a special education room, and a new guidance office. The new high school wing has 5 new classrooms and 2 new science rooms, with a total of 15 classrooms and 2 science rooms.

1999-2000 school year enrollment figures for Lyndeborough students at the Cooperative School are in Table V-8. The enrollment percentages are based on a 2000 population figure of 1,585 and then projected forward to a 2020 population of 2,427.

⁹ Source: Lyndeborough School District, 2001.

Table V-8: Existing and Projected School Enrollment Figures

School	Enrollment 2000	Enrollment as % of 2000 population	Projected Enrollment 2020
Middle	43	2.7%	66
High	64	4.0%	97
Total:	107	6.7%	163

Source: US Census, NH Department of Education at <http://www.measuredprogress.org/nhprofile/>.

Future School Needs

The NH Department of Education State Standards for class size in middle and high schools use the number of students per subject or an amount of square footage per student whichever results in a smaller number of students per room¹⁰. The standard secondary school classroom is defined as 30 square feet per student. Analysis based on the number of students per subject was beyond the scope of this master plan, so an analysis of square footage needed per student was conducted. Existing and projected classroom floor area requirements are included in Table V-9.

Table V-9: Existing and Projected Classroom Floor Area Requirements.

	Enrollment 2000	Minimum Required Classroom Floor Area 2000 (square feet)	Projected Enrollment 2020	Minimum Required Classroom Floor Area 2020 (square feet)
Middle	43	1,290	66	1,980
High	64	1,920	97	2,910
Total:	107	3,210	163	4,890

Source: School Administrative Unit #63 and NH Department of Education.

During the 2000 renovations to the Cooperative School, 4 of the additional classrooms in the middle school wing were constructed to accommodate the possible addition of 6th graders at the Coop. In 2002, the Wilton and Lyndeborough School Boards may propose a change to the articles of agreement between the two towns to possibly relocate 6th graders from Central Elementary School and Florence Rideout Elementary School to the new addition in the Cooperative School.

The projected enrollment figures and the required classroom floor area for 2020 in Table V-9 do not include the additional students from a possible 6th grade relocation. Due to the exclusion of the projected 6th grade enrollment figures and the recent renovations, an analysis of the adequacy of the existing square footage available solely to Lyndeborough students is difficult. It is recommended, however, that the Lyndeborough and Wilton School Boards continue to take into consideration the projected square footage necessary at the Cooperative School to accommodate Lyndeborough students up to and including 2020.

¹⁰ NH Department of Education State Standards for Schools, Ed 305.03 *Standards for Instructional Space*, (last revised 1996).

J. LIBRARY

1. Existing Facilities



The J. A. Tarbell Library, a 600 square foot building constructed in 1911, is situated on a small lot in South Lyndeborough on NH Route 31. Parking is provided on a 1,250 square foot lot adjacent to the Library. Of the space available within the building, 100 square feet is used for an office and 36 square feet for restrooms. The remaining 464 square feet of space is used for the 10,485 volumes of reading and listening materials and seating for patrons. The Library is staffed by 1 part-time Librarian and 1 assistant.

The Library is working to keep up with the changing media world. In addition to the traditional collection of adult and juvenile books, magazines and other periodicals, which totals 7,543 volumes, space has been allocated for audio materials, videos and computer software.

Materials are ordered to support the Central School curriculum as well as the needs and preferences of the non-school patrons. Books, tapes, videos and other materials are available through the Library as part of an inter-library loan program through the State Library and other libraries. In addition to reading materials, the Library serves the needs of the Babes in School Land pre-school; hosts a children's story hour and Dr. Suess Program with guest readers; sponsors kindergarten visits; and offers a summer reading program. The Library building is also available to any Town group that needs a meeting place.

2. Existing and Future Needs

Despite the increase in materials available, however, the facility has not expanded structurally for over 15 years. The American Library Association (ALA) sets standards for libraries nationwide that address floor space, volumes per capita, linear feet of shelf space and adequate staffing levels. The ALA recommends the following standards:

- floor space of 0.60 square feet per capita;
- 5 volumes per capita;
- one linear foot of shelf space per eight volumes; and
- one staff person per 2000 population

These standards are applied to Lyndeborough's projected population levels through 2020 in Table V-10.

Table V-10: Projected Lyndeborough Library Needs, 2001-2020

	Existing	Projected Need				
Year	2000	2000	2005	2010	2015	2020
Population	1,585	1,585	1,756	1,920	2,178	2,427
Facility (square feet) *	600	951	1,054	1,152	1,307	1,456
Staffing	1	0.8	0.9	0.9	1	1.2
Collection Size *	7,543	7,925	8,780	9,600	10,890	12,135
Linear Shelf Space (feet)	664	991	1,098	1,200	1,361	1,517

Source: National Center for Educational Statistics – Library Statistics Program, 1997.
NRPC draft Regional Plan 2001.

*American Library Association Guideline, 0.60 sq. ft./capita (population data, 2000 US Census)

*American Library Association Guideline, 5.0 volumes/capita (population data, 2000 US Census)

As shown in Table V-10, the part-time librarian and her assistant meet the ALA staff standard of 1 full-time staff member per 2000 population. However, the collection size, linear feet of shelf space and the total square footage of the facility are currently under the standard. According to the ALA, a public library should have five volumes per capita. Currently, the facility needs an additional 382 volumes to meet the standard, and an additional 4,592 volumes to meet the needs of the projected population in 2020. The total square footage of the facility is currently deficient by 351 square feet. In 2020, the projected population of 2,427 may require an additional 856 square feet of space. Shelf space is also currently deficient by 327 linear feet. Projecting the standard of one linear foot of shelf space per eight volumes forward to 2020, an additional 853 linear feet may be needed. The building is also not handicapped accessible.

Expansion and relocation of the Library have been an item of discussion for many years. At the 2001 Town Meeting, a poll was taken to get feedback from the citizens on the future of the Library. Over 200 people responded and the majority stated that the library should stay in the Town Village. However, expansion at the current site may be infeasible due to the small lot size, the wetland in the back of the building and the proximity to NH Route 31. The Town should consider expanding the library to 1,456 square feet to accommodate Lyndeborough's projected 2020 population.

K. RECREATION

The Lyndeborough Conservation Commission manages the Town's recreational facilities. There are no paid staff or separate department within the Town government that are charged with the responsibility of maintenance and acquisition of recreation facilities. There has not been a significant increase in the amount and type of recreational facilities in the Town since 1988. An inventory of current recreational facilities is presented in Table V-11.

As noted in Table V-11, several of the recreational facilities are not owned by the Town of Lyndeborough. One such facility that deserves mention is Goss Park. This facility is shared between Wilton and Lyndeborough's residents and is owned by the Wilton/Lyndeborough Youth Center. Public funds are provided through both of the towns' budgets to maintain the park. Given the significance of this facility to the residents of both towns, it is expected this partnership will continue into the distant future.

Table V-11: Existing Recreational Facilities

Facility	Land Area	Recreational Use	Ownership
Goss Park	16+ acres	1 Volleyball Court 1 Tennis Court 1 Baseball Field Swimming and Boating area Picnic Area	Joint Ownership - Wilton/Lyndeborough Youth Center
Lyndeborough Elementary School	7+ Acres	Playground	Town
Curtis Dogwood State Park	14 Acres	Natural area Informal Trails	State
Purgatory Falls Conservation Area	6 miles	Conservation Area Trails	Town
Putnam Pond and Town Forest	350 Acres	Boating Fishing Natural area Ice skating/hockey	Town (100 year lease)

Source: Town of Lyndeborough 2001 and Master Plan 1988.

Another noteworthy recreational facility is Putnam Pond. This 350-acre site is used in the summer time for boating, fishing and hiking and in the wintertime for ice-skating and ice hockey. The Town is maintaining the Pond as a multi-use area. The Conservation Commission is currently working on the trail rights for a trail system along the eastern edge of the property from Cram Hill Road to the Fish and Game Club on Cemetery Road.

In general, the most common method of evaluating the adequacy of the existing facilities to meet demand is to apply a set of standards that indicate the relationship between population and each type of recreational facility. New Hampshire Office of State Planning Statewide Comprehensive Outdoor Recreation Plan (SCORP) from 1994 outlines a set of standards which are recommended for use throughout the State. Some of these recommended standards are presented in Table V-12. These standards are intended to be applied to existing population figures to give an indication of what existing and future recreational facilities should include.

Table V-12: Comparison of Recreation Facility Standards and Actuals

Facility (unit of measurement)	Unit for 1000 Population	Facilities Provided	Facilities Needed 2000	Facilities Needed 2020
BallFields (number)	1.10	1	1.74	2.67
Soccer Fields (number)	0.16	1	0.25	0.39
Tennis Courts (number)	0.95	1	1.51	2.31
Playgrounds (number)	0.50	1	0.79	1.21
Playgrounds (acres)	2.00	7	3.17	4.86
Community Parks (acres)	6.00	30	9.51	14.56
Swimming (Beaches)	0.50	1	0.79	1.21
Trails – hiking (miles)	2.20	6	3.49	5.34

Sources: NH OSP, *Statewide Comprehensive Outdoor Recreation Plan* (SCORP) 1994; 2000 US Census.

However, several observations should be noted before applying the standards. Lyndeborough, because of its small population, cannot reasonably consider providing the full range of recreational facilities set by the standards. The Town does not have the population or the funds to support the larger and more costly types of facilities. Recreational facilities, such as the Cooperative High School in Wilton, provide tennis courts and baseball fields and are available to all residents of Lyndeborough. The

analysis presented in the table is therefore not an indication of a lack of certain types of facilities, because the opportunity to participate in many of these activities is available within the region.

Overall, the Town currently meets the standards for most recreation facilities. Of the facilities for which a current need is indicated, soccer fields and playgrounds are the only immediate needs. As the Town's population grows to a projected 2,427 in 2020, however, the need for space for facilities like tennis courts, ballfields, playgrounds and community parks should be examined. Although the Town meets the basic needs for the above mentioned, an additional tennis court, ballfield and playground would be needed to meet the State standard. Factors such as public preference and the availability of funding will play a considerable role in whether these are truly needs the Town is willing to invest in.

In the past and most likely continuing into the future, the Town has satisfied recreational needs through facilities located in neighboring communities. As mentioned previously, this approach allows residents of each community to enjoy a wider variety of recreational opportunities. This appears to be the most advantageous method for providing access to recreational facilities in the future.

There are number of issues which deserve consideration as the Town plans for future recreation improvements:

Inter Municipal Cooperation and Joint Facilities - Goss Park and the Purgatory Falls

Conservation Area are examples of the Town's cooperation with neighboring communities to meet common needs for open space and recreation. To date, this approach appears to be effective. The Purgatory Falls Conservation Area has expanded and may expand further in the years to come through the acquisition of land, conservation easements and land donations. The Town should commit itself, and continue to seek commitments from neighboring towns, to pool resources in planning for recreational improvements which will continue to meet the needs of the combined populations.

Regional Recreation - While the Town's population is small compared to other municipalities in the Region, its recreational assets are quite substantial. The Town possesses some of the most interesting, often spectacular natural features in the entire area. The abundance of wide open spaces, and the Town's rough terrain and high elevations, present many opportunities for hikers, snowmobilers and outdoor enthusiasts regionwide. The mountainous areas in the central and western portions of the Town are well-suited for trail systems for hiking year-round, as well as cross-country skiing and snowshoeing in the wintertime. Continuing negotiations with the Town of Greenfield to open up trail systems along Winn Mountain, Rose Mountain, Pinnacle Mountain and North Pack Monadnock and connect to the Wapack Trail system would allow the Region's residents to use these areas for recreation and nature study while ensuring that minimal adverse impacts were imposed on the natural environment.

Access to Recreation Areas in Town - Access is considered to be a problem at the Elementary School and Goss Park sites, where children traveling to and from these areas must walk or ride their bikes along the shoulders of NH Route 31. This situation is especially dangerous for those children coming from South Lyndeborough going to Goss Park, as the only access is along NH Route 31. If the Town is to continue use of the cooperative facility, concerted effort should be made to provide for a safe way for children to reach the Park area. The Town should consider providing wider shoulders or a separate bike path along NH Route 31.

L. SOLID WASTE DISPOSAL

Lyndeborough's solid waste is disposed of at the Wilton Recycling Center, located off NH Route 101 in Wilton. The Center was established in 1979 and serves the five-town area of Greenville, Lyndeborough, Mason, Temple and Wilton. The Center is owned and operated by the Town of Wilton

and serves as a drop-off facility for most waste excluding hazardous waste items. There is no charge for citizens to dispose of typical household waste, but a small handling fee is charged for larger, more difficult items such as rugs, sofas, televisions, computers and other large household furniture.

The Center's budget is mainly dedicated to the 7 staff members, and facility and equipment maintenance. Annual operating costs, which totaled \$375,476 in 2000, are paid by the member towns annually based on each community's percent proportion of the population. Each town approves the Center's budget at Town Meeting. The member towns' population and percentage contributions for the year 2000 are presented in Table V-13 below.

Table V-13: Member Town Population and Cost Allocation Figures

Town	Population	Percent of Total
Greenville	2,224	22%
Lyndeborough	1,585	16%
Mason	1,147	11%
Temple	1,297	13%
Wilton	3,743	38%
Total	9,996	100%

Source: 2000 US Census Data, as compiled by NH Office of State Planning, State Data Center, 2001.

The majority of the solid waste brought to the facility is either recycled or burned in an incinerator or wood pit. The Recycling Center accepts most recyclables such as glass, paper, metals and plastics (#1 and #2) and tires. Small items that are not recyclable such as dirty paper, wax covered bottles, cups and other packaging, are burned in the incinerator. The waste that cannot be burned or recycled is stored in bail sheds until Cheshire Waste Management transports it to Rochester, NH. Recycling is also shipped off-site. Some of the recyclables are shipped locally and others as far away as Canada.

It currently costs the Center approximately \$26 per capita to operate the facility. The Center is able to keep this cost low and save the member towns money because the recycling operation generates income. Income in 2000 was \$97,296, or about 20% of the Center's budget. In addition, what is recycled or incinerated does not have to be transported to a landfill, which is becoming more expensive every year. The current cost for off-site disposal, including hauling, a fuel surcharge and the actual disposal, is \$100 per ton. Since the Center only has to landfill 15% of the waste received (which is approximately a ton per day) this amounts to a considerable savings in landfill costs.

The Recycling Center has made many improvements since 1990, including installation of storage bins, loading docks and sheds, two woodburning pits, five 40-foot trailers, two skid steer tractors, a bobcat tractor, a back hoe and baler. In 1999, the Center received a 10-year extension on its NH Department of Environmental Services air quality permit for the incinerator, which will allow it to be used at least until 2009.

Even with a small handling fee for the larger items, the Town's involvement in the Wilton Recycling Center is an asset to the community. Considering the environmental constraints of the region, regulatory issues, and the astronomical costs of starting a landfill (\$225,000 per acre), the Center is an economical and effective means of disposing waste, and should be considered a consistent component of the annual budget.

M. RECOMMENDATIONS

1. Fire Department

- Consider the published standards for fire departments, as they are guidelines for safety and can assist the Town in planning for future growth.
- Include emergency vehicle access needs in planning for future development so as to increase the accessibility of fire protection services to all residences in Town.
- Consider amending the Zoning Ordinance, Subdivision Regulations and/or Site Plan Regulations as necessary to ensure adequate fire suppression facilities for new development.
- Continue planning for fire station facility in a more central location to reduce response times and adequately serve the more distant parts of Town.

2. Police Department

- The Town should consider expanding the Police Department facility to meet the needs of the population in 2020.

3. Wilton-Lyndeborough-Temple Ambulance Service

- Continue to contribute to the Service to ensure an adequate level of ambulance facilities as the Town grows.

4. Communications

- Continue to utilize the Milford Area Communications Center dispatch services.
- The Planning Board should amend the subdivision regulations to require that all shared driveways serving more than two principal structures should be named, and that numbers be assigned to each principal structure.

5. Town Offices

- Analyze staffing levels in Citizens Hall and continue renovation to allow for more efficient storage space and accessibility.

6. Highway Department

- Include a line item in the Capital Improvements Plan for facility upgrades. Provide for a reallocation of monies in the budget for additional personnel as required.

7. Central Elementary School

- Continue to plan for future school facilities to meet state standards for classroom provision and to meet the goals for educational programs established by the School District.

8. Middle and High School

- Continue to plan for future school facilities to meet state standards for classroom and subject provision for Lyndeborough's students.

9. Town Library

- Expand the library within the Village Center to meet American Library Association recommended standards and to accommodate the needs of Lyndeborough's projected 2020 population.

10. Recreation

- Continue to seek commitments from neighboring towns to pool resources in planning for recreational improvements which will continue to meet the needs of the combined populations.
- Continue negotiations with the Town of Greenfield to open up trail systems along Winn Mountain, Rose Mountain, Pinnacle Mountain and North Pack Monadnock and connect to the Wapack Trail system.
- Consider providing wider shoulders or a separate bike path along NH Route 31.

11. Solid Waste

- Continue to utilize the Wilton Recycling Center.

#230B-5

CHAPTER VI TRANSPORTATION

A. INTRODUCTION

The patterns and aesthetics of land development are greatly influenced by the layout of the road network. The purpose of the road network in Lyndeborough is to provide motorized and non-motorized links for residences, businesses and farms. The network, which contains roads with varying degrees of hierarchical function, is a dynamic system, and control over the evolution of the road system is important in creating an orderly pattern of land development.

Traffic is one of the more visible impacts of land development and economic activity. It can be a major detriment to community character. Traffic generated by residential, commercial and industrial development not only affects the Town's local road network but also impacts the regional highway system and inter-regional travel. Therefore, the Town must determine how its growth patterns affect travel demand and to what extent the existing local and regional road system can accommodate those demands.

The intent of this Transportation chapter is to develop strategies for an efficient, safe and aesthetically pleasing road network that contributes to the preservation of Lyndeborough's rural character. This chapter provides: 1) a description of roadway classifications; 2) an overview of federal transportation funding; 3) an inventory of the existing highway conditions, including traffic counts, highway capacity, accidents, roadway conditions, travel patterns and scenic roads; 4) traffic forecasts; 5) a discussion of key highway issues; and concludes with a series of recommendations.

B. ROADWAY CLASSIFICATIONS

There are two methods of classifying roads. The first is the State Aid Classification system as defined in NH RSA 229 – 231. The second method is the Functional Classification system as developed by the NH Department of Transportation in conjunction with the Federal Highway Administration.

1. State Aid Classification

The State-aid classification system was developed by the State of New Hampshire, as defined by NH RSA 229 – 231, to determine responsibility for construction, reconstruction and maintenance as well as eligibility for use of state aid funds. The following is a description of the state-aid system:

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.

The state aid classification road mileage in Lyndeborough is summarized in Table VI-1. Scenic Roads, are special town designations of Class IV, V, and VI roads where cutting or removal of a tree, or disturbance of a stone wall, must go through the hearing process and written approval of local officials (See RSA 231).

Table VI- 1: State Aid Road Classification

State Aid Classification	Mileage	% of Total
Class II	8.953	14.2%
Class V	46.665	73.9%
Class VI	7.495	11.9%
Total	63.113	100%

Source: NH Department of Transportation

2. Functional Classification

The New Hampshire Department of Transportation (NH DOT) has defined a second tier for the classification of roads in New Hampshire in cooperation with the Federal Highway Administration (FHWA). This scheme classifies roads and highways into different categories according to their functions as well as their source of funding. The Functional Classification scheme was developed to define eligibility for funds under federal programs. The following provides a description of the functional classification system characteristics of a road and highway network:

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 discouraged.

The major source of funding for maintenance of minor collector roads and local roads comes from the Town of Lyndeborough and the New Hampshire State Aid Block Grant for roads. Table VI-2 provides a summary of the functional classification of roads in the Town of Lyndeborough based on the NH DOT assigned functional classifications. Map VI-1 illustrates the functional classification of Lyndeborough roadways.

Table VI-2: State Functional Classification

Road	Functional Classification
NH 31 (Forrest Rd.)	Rural Major Collector
Francetown Turnpike	Rural Minor Collector
Perham Corner Rd.	Rural Minor Collector
Center Rd.	Rural Minor Collector
All Other Roads	Local

Source: NH Department of Transportation.

C. FEDERAL TRANSPORTATION FUNDING

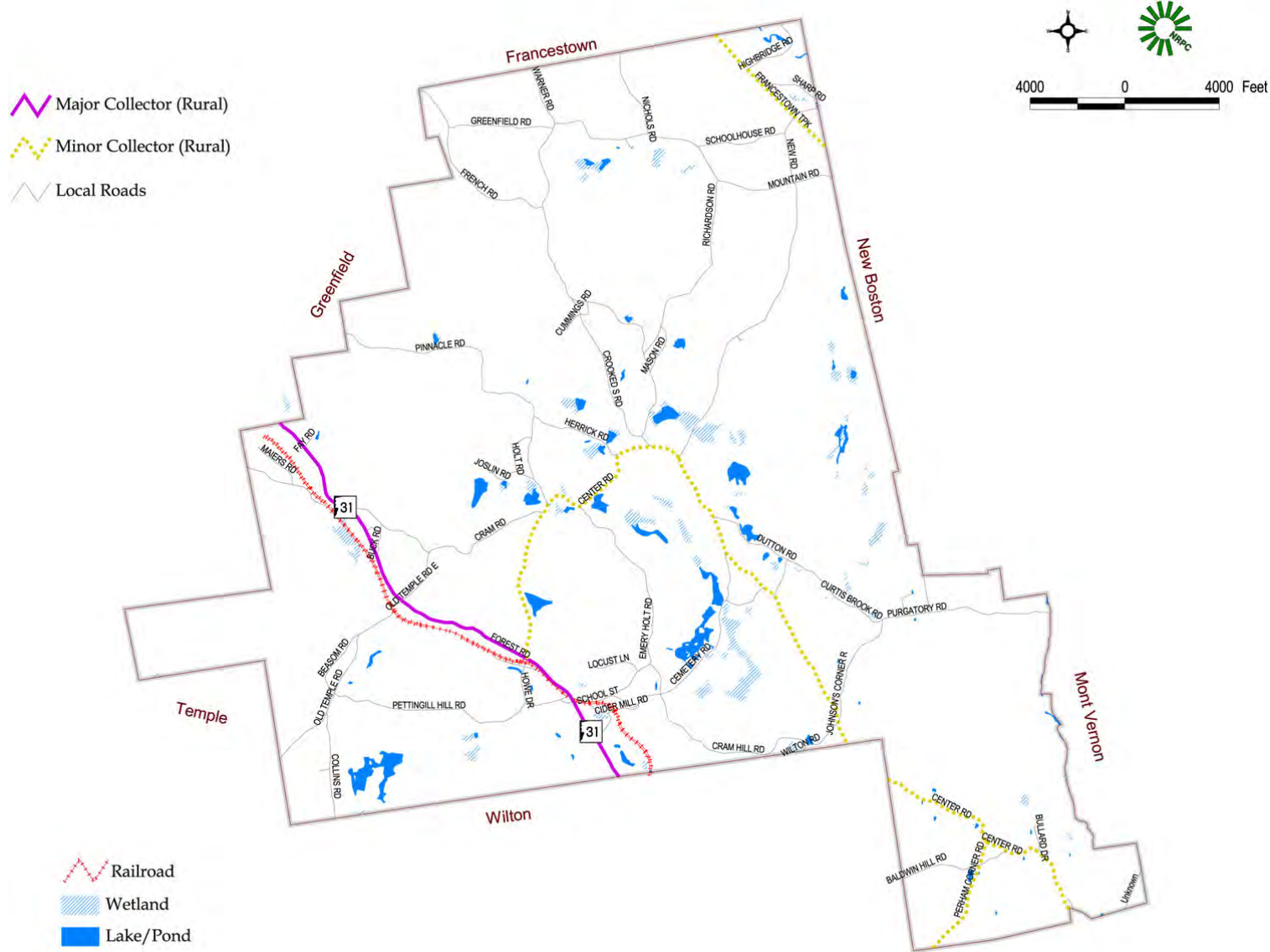
The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) significantly restructured the federal-aid transportation funding program. ISTEA was re-authorized and revised in 1998 as the Transportation Equity Act for the 21st Century, TEA-21. Descriptions of the various programs which emerged 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 Lyndeborough designated as part of the National Highway System.

Surface Transportation Program (STP), This program funds projects chosen by states and localities for any facility with a higher functional classification than rural minor collector. The only road in Lyndeborough eligible under the STP category is NH Route 31. 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:

- i. 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.
- ii. STP Any Area - This category of STP funds may be used in urban or rural areas.

Map VI-1: State Functional Classification



- iii. 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.
- iv. 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. The four bridges in Lyndeborough that span Stony Brook are in this 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. Lyndeborough is part of the Manchester/Central New Hampshire ozone marginal non-attainment area. It is therefore eligible for this category of funds.

D. EXISTING HIGHWAY CONDITIONS

1. Traffic Counts

Table VI-3 shows the weekday traffic counts performed by the Nashua Regional Planning Commission since 1987. Map VI-2 shows the location of the traffic counts.

Table VI-3: Weekday Traffic Counts and Historic Trends

Center Rd. N. of NH 31 278502				Center Rd. At Wilton Town Line 279056			Center Rd. .5 miles N. of Milford T/L 279055		
Year	Month	Total	Yearly % Change	Month	Total	Yearly % Change	Month	Total	Yearly % Change
1987	8	675							
1988									
1989				9	544				
1990				9	573	5.3%			
1991									
1992	8	546	-4.2%	6	579	0.5%			
1993				7	646	11.6%			
1994									
1995				8	800	11.3%			
1996									
1997							6	1,238	
1998				7	931	5.2%			
1999									
2000							5	1,270	0.9%
Avg Yrly %			-4.2%			6.2%			0.9%

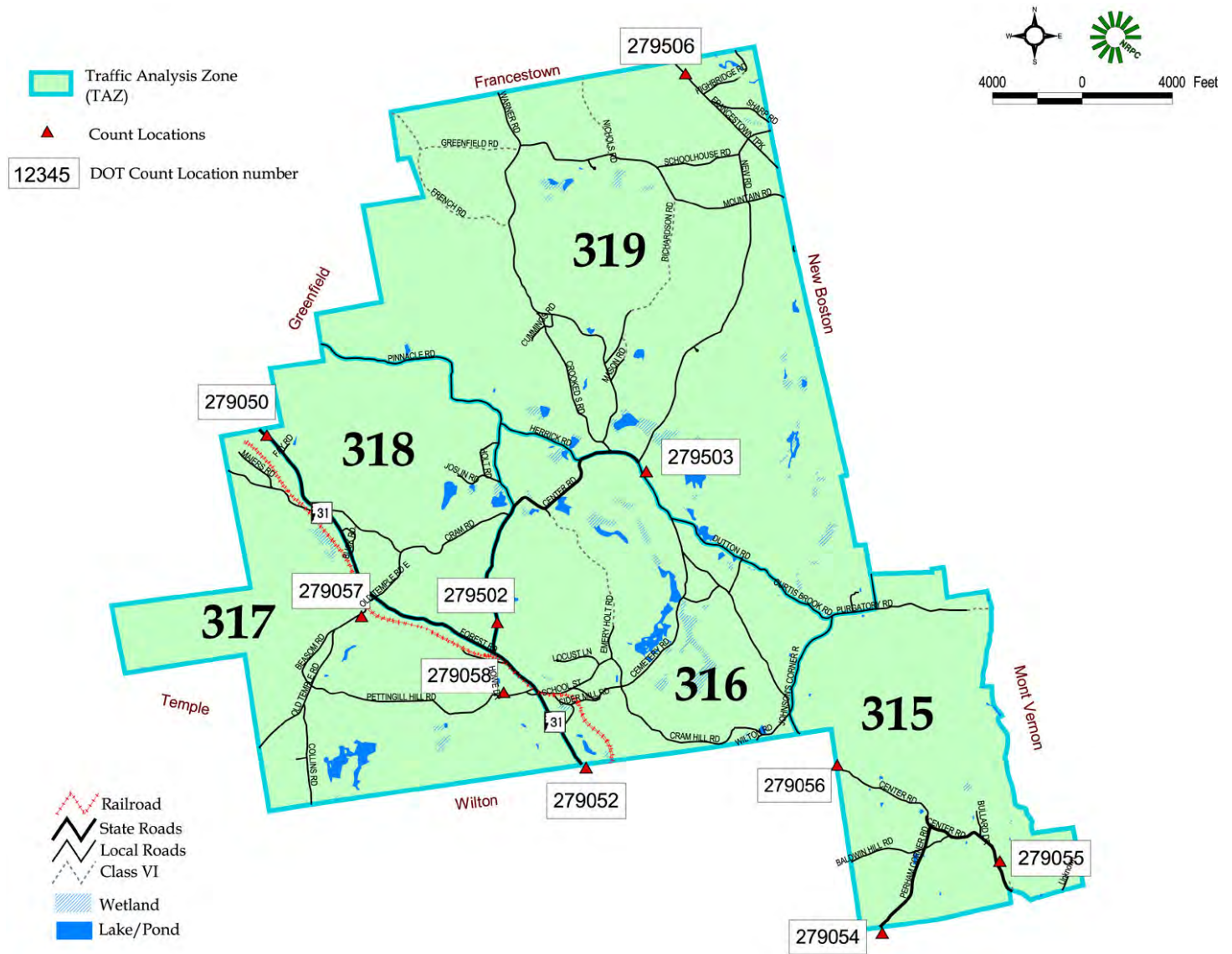
Table VI-3: Weekday Traffic Counts and Historic Trends (Continued)

Old Temple Rd. Over Stony Brook 279057				Perham Corner Rd. At Milford Town Line 279054			Pettingill Hill Rd. Over Stony Brook 279058		
Year	Month	Total	Yearly % Change	Month	Total	Yearly % Change	Month	Total	Yearly % Change
1990				9	374				
1991				5	394	5.3%			
1992	8	211					9	185	
1993									
1994				6	303	-8.4%			
1995									
1996	6	234	2.6%				6	187	0.3%
1997							6	163	-12.8%
1998				7	311	0.7%			
1999	7	175	-9.2%						
2000							10	212	9.2%
Ave Yrly%				-2.6%			1.7%		

NH 31 At Greenfield Town Line 279050				NH 31 At Wilton Town Line 279052		
Year	Month	Total	Yearly % Change	Month	Total	Yearly % Change
1985		2,903	42.5%			
1986						
1987		2,605	-5.3%		3,702	
1988						
1989				9	3,563	-1.9%
1990	10	2,033	-7.9%	9	4,270	19.8%
1991	5	2,310	13.6%	5	3,747	-12.2%
1992	6	2,491	7.8%	9	3,521	-6.0%
1993	7	2,758	10.7%	7	4,304	22.2%
1994	6	2,540	-7.9%			
1995	6	2,653	4.4%			
1996				7	5,206	6.5%
1997	6	2,971	5.8%	6	4,524	-13.1%
1998	7	2,932	-1.3%			
Avg Yrly %				0.1%		
				2.0%		

Source: Nashua Regional Planning Commission.

Map VI-2: Location of Traffic Counts and Traffic Analysis Zones



As shown in Table VI-3, NH 31 (Forest Road) carries the heaviest traffic volumes in Lyndeborough in a 24-hour period. There were 4,524 vehicles per day recorded at the location on NH 31 at the Wilton town line in 1997. There were 2,932 vehicles per day on NH 31 at the Greenfield town line in 1998. On Center Road one-half mile north of the Wilton town line, there were 1,270 vehicles per day recorded in 2000.

Table VI-3 also shows historic weekday traffic counts and the month in which the counts were taken for Lyndeborough locations. The highest growth rate was recorded on Center Road at the Wilton town line, which showed an annual increase of 6.2% over nine years between September of 1989 and July of 1998. The total number of vehicles at this location increased from 544 to 931. Traffic also increased at an annual rate of 2% over ten years between 1987 and 1997 on NH31 at the Wilton town line. Between 1985 and 1998, there was an annual increase of only 0.1% on NH 31 at the Greenfield town line. Traffic on Old Temple Road over Stony Brook decreased 2.6% between 1992 and 1999. Traffic on Perham Corner Road at the Milford town line decreased by 2.3% between 1990 and 1998.

2. Highway Capacity Analysis

Using the traffic count data, it is possible to evaluate the performance of highway facilities through the use of highway capacity analysis. The principal objective of this procedure is the estimation of the maximum amount of traffic that can be accommodated by a given facility. The capacity analysis provides tools for the analysis of existing facilities and also for planning and designing future facilities and improvements.

"Level of Service" (LOS) is a term which denotes the type of operating conditions that occur along a roadway or at a particular intersection for a given period of time, generally a one-hour peak period. It is a qualitative measure of the effect of a number of operational factors including roadway geometrics, travel delay, freedom to maneuver and safety. Level of service categories for roadway segments and descriptions are described in Tables VI-4A and VI-4B.

Table VI-4A: Maximum Daily Traffic for Each Level Of Service by Roadway Type (Per Two Way Single Lane Volume)

	LOS A	LOS B	LOS C	LOS D	LOS E
Expressway (4-Lane)	28,889	46,222	68,800	86,756	97,778
Expressway (6-Lane)	43,333	69,333	103,200	130,133	146,667
Other Principal Arterial	8,400	14,100	19,800	23,700	30,000
Minor Arterial	6,720	11,280	15,840	18,960	24,000
Major Collector	5,600	9,400	13,200	15,800	20,000
Minor Collector	4,760	7,990	11,220	13,430	17,000

Source: Derived from procedures in the 1994 Highway Capacity Manual.

Table VI-4B: Level of Service for Lyndeborough Roads

Road	Functional Classification	Level Of Service
NH 31 (Forrest Rd.)	Rural Major Collector	A
Francetown Turnpike	Rural Minor Collector	A
Perham Corner Rd.	Rural Minor Collector	A
Center Rd.	Rural Minor Collector	A
All Other Roads	Local	A

Source: NH Department of Transportation.

According to Table VI-4b, NH 31 operates under level of service “A” conditions. Traffic at selected locations on NH 31 ranges between 2,932 and 4,524 vehicles per day, which falls within the threshold for LOS “A.” The traffic on NH 31 would have to increase to over four times its existing volume to approach the 20,000 vehicle per day threshold for LOS “E,” which represents the theoretical capacity of the highway. Center Road is classified as a Rural Minor Collector Highway. The average daily traffic on Center Road is 1,270 vehicles per day, which also falls within the LOS “A” threshold. The Francestown Turnpike, and Perham Corner Road are also classified as Rural Minor Collector roads. Those roads also operate under Level of Service “A” conditions. Based on the traffic counts, Lyndeborough’s roadway network currently operates at the highest level of service.

3. Accident Analysis

Accidents for the Town’s roads are compiled by the New Hampshire Department of Transportation (NHDOT) based on the reports filed at the local police station. Tables VI-5A to VI-5C are based on the NHDOT’s accident database for the latest three years of available data (1997 - 1999). Accidents involving personal injury are more 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.

There were seven traffic accidents reported in 1998 and nineteen reported in 1999. This represents a 171% increase in reported traffic accidents between 1998 and 1999. This may be due to more severe weather conditions in 1999. Of the seven accidents reported in 1998, two (29%) involved personal injury. Of the nineteen accidents reported in 1999, six (32%) involved personal injury. While the total number of reported accidents between 1998 and 1999 increased significantly as a percentage, the percentage of reported accidents involving personal injury during that same period of time did not.

Table VI-5A: Accidents on Lyndeborough Roads and Intersections 1999

Road	Intersecting Street	Fatalities	Personal Injuries	Road Conditions/ Type of Accident
Cemetery Rd	Cider Mill Rd	0	0	Dry, Head on
Center Rd	Bullard Dr	0	0	Dry
Center Rd	Johnson Corner Rd	0	0	Dry, Right angle
Center Rd	Milford T/L	0	0	Ice
Center Rd	Perham Corner Rd	0	0	Snow
Center Rd	Wilton Rd	0	1	Dry
Center Rd	Bracketts Cross Rd	0	0	Ice
Center Rd	Johnson Corner Rd	0	0	Snow
Crooked S Rd	Mountain Rd	0	0	Sand
Herrick Rd	Center Rd	0	1	Ice, Sideswipe
Richardson Rd	Mountain Rd	0	1	Ice
NH 31	Buck Rd	0	1	Dry, Head on
NH 31	Center Rd	0	1	Dry
NH 31	Fay Rd	0	3	Snow, Rear end
NH 31	Greenfield T/L	0	0	Dry
NH 31	Greenfield T/L	0	0	Dry
NH 31	Old Temple Rd	0	0	Dry, Rear end
NH 31	Wilton T/L	0	0	Snow
North Rd	Buck Rd	0	0	Wet

Source: NH Department of Transportation.

Table VI-5B: Accidents on Lyndeborough Roads and Intersections 1998

Road	Intersecting Street	Fatalities	Personal Injuries	Road Conditions/ Type of Accident
Center Road	Dutton Road	0	0	Dry road, single vehicle
Center Road	Perham Corner Road	0	0	Icy road, single vehicle, overturn
Center Road	Emery Holt Road	0	1	Dry road, single vehicle, hit tree
Crooked S Road	Old Mountain Road	0	0	Dry road, single vehicle, hit tree
NH 31	Cram Road	0	0	Snowy Road, single vehicle, hit guardrail
Perham Corner Road	Center Road	0	0	Dry road two vehicles
Purgatory Road	Johnson Corner Road	0	2	Dry road two vehicles

Source: NH Department of Transportation.

Table VI-5C: Accidents on Lyndeborough Roads and Intersections 1997

Road	Intersecting Street	Fatalities	Personal Injuries	Road Conditions/ Type of Accident
Center Road	Bracketts Cross Road	0	0	Dry road, single vehicle, hit light pole
Center Road	Perham Corner Road	0	0	Dry road
Curtis Brook Road	Dutton Road	0	1	Icy road, two vehicles
NH 31	Old Temple Road	0	0	Dry road, single vehicle, hit sign post

Source: NH Department of Transportation.

4. Pavement Conditions

At the request of the Town of Lyndeborough, the Nashua Regional Planning Commission performed a study of the road surface conditions utilizing the Road Surface Management System (RSMS) software. The RSMS study was completed in the summer of 1999. Complete copies are on file with NRPC, the Road Agent and at the Lyndeborough Citizens Hall.

The RSMS software includes a number of different databases. The databases include a road inventory, an inventory of the road surface distresses, and a number of repairs recommended for the extent and severity of the surface distresses for paved and unpaved roads. The software allows the user to tailor the repair strategy database based on the Town's preferences. The RSMS software matches a repair strategy to a road or road segment based on the extent and severity of the distress and the weight given by the user for the volume of traffic on the road. The final decision on the repair strategy is made by the Road Agent based on experience and the Town's preferences.

The advantages of utilizing the results of the RSMS study are that it: 1) establishes a priority for road maintenance and repairs; 2) generates a maintenance and repair budget; and 3) standardizes the process of ranking the condition of the many roads in the Town.

The Lyndeborough Road Agent has been using the 1999 report to help prioritize the strategy for maintaining the Town's road network. In addition, the Road Agent is in the process of updating the study to reflect Fall 2001 conditions.

5. Paved vs. Unpaved Roads

Approximately forty five (45%) percent, or 27.7 miles of the roads in Lyndeborough are unpaved. These roads contribute significantly to the rural character of the Town and should remain unpaved wherever possible.

Table VI-6: Paved vs. Unpaved Roads

Paved vs. Unpaved	Miles	% of Total
Paved	33.62	54.8%
Unpaved	27.70	45.2%
Total	61.32	100%

Source: NH Department of Transportation.

6. Bridge Conditions

The NH DOT inspects locally and State owned bridges on local roads. RSA 234:4 enables the Town to annually apply to the Department of Transportation for “bridge aid” to repair or maintain bridges on the Town’s Class V highways. However RSA 234:2 requires that the bridges must have a clear span of at least 10 feet to be eligible for bridge aid. Inspection and maintenance of culverts and other structures on local roads that do not meet this 10-foot span definition are the responsibility of the Town.

Although the NH DOT inspects all locally and State owned 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 four bridges in the Town of Lyndeborough in their mini-list for state bridges. They are listed in Table VI-7 below, along with the railroad bridge over Glass Factory Road. The Lyndeborough Fire Department has stated that they cannot take their fire fighting apparatus over the bridges that span Stony Brook on Old Temple Road and Gulf Road. The Fire Department must use the bridge on Pettingill Hill Road to access that area of Town. NHDOT has scheduled an upgrade of the bridges on Gulf and Old Temple Roads for the year 2004. Several designs are under consideration and have yet to be approved.

Table VI-7: Bridges

Road (Facility Carried)	Feature Crossed	Owner	Load Limit
Gulf Rd	Stony Brook	Lyndeborough	03P (Load limit is 3 tons, passenger cars only)
Old Temple Rd	Stony Brook	Lyndeborough	03P (Load limit is 3 tons, passenger cars only)
Old Temple Rd	Stony Brook	Lyndeborough	03P (Load limit is 3 tons, passenger cars only)
Pettingill Hill Rd	Stony Brook	Lyndeborough	(Load limit approximately 6 tons)
NHRR	Glass Factory Rd	State	Rail Road Bridge

Source: NH Department of Transportation.

7. Travel Patterns

Information on origin and destination patterns for travel to workplace is available from the 1990 US Census and is shown on Table VI-8. The Census data represents the latest available information on destination patterns for travel to work. Census data for 2000 is estimated to be available in summer 2002 and this section of the plan should be updated at that time. According to the 1990 date, most commuters in Lyndeborough are travelling within the Town itself or to Milford, Nashua or Wilton.

Table VI-8: Commuting Patterns from Lyndeborough

Place of Work	Number of Commuters 1990 Census	Percentage
Amherst	15	2.4%
Hollis	3	0.5
Hudson	11	1.7
Lyndeborough	107	16.9
Merrimack	21	3.3
Milford	108	17.1
Mont Vernon	3	0.5
Nashua	110	17.4
Peterborough	21	3.3
Wilton	94	14.9
Bedford/Goffstown	20	3.2
Hillsboro/Weare	14	2.2
Manchester area	30	4.7
Salem/Windham	5	0.8
Boston Area	33	5.2
Concord area	6	0.9
Keene area	3	0.5
Lowell Area	18	2.8
Acton/Fitchburg	10	1.6
Total	632	100%

Source: 1990 US Census Journey to Work Data.

8. 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 rural roads that constitute an important asset to the State. To prevent the elimination of scenic roads, communities are enabled by NH RSA 231:154 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. Approximately 18.1%, or 11.4 miles, of Lyndeborough's roads are designated as Scenic Roads. A majority of these are unpaved. The Scenic Roads are described in Table VI-9.

Table VI-9: Scenic Roads

Road	From	To	Mileage	Surface
Bracketts Cross Rd	Cemetery Rd	Center Rd	0.4	Unpaved
Cram Rd	Center Rd	Forest Rd	1.9	Unpaved
Collins Road	Old Temple Road	Wilton T/L	0.3	Unpaved
Crooked "S" Rd	Mountain Rd	Cummings Rd	1.2	Unpaved
Curtis Brook Rd	Center Rd	Johnson Corner Rd	1.2	Unpaved
Dutton Rd	Center Rd	Curtis Brook Rd	0.7	Unpaved
Gulf Rd	Forest Rd	Greenfield T/L	1.0	Unpaved
Highbridge Rd	New Boston T/L	Dead End (Bridge)	0.2	Unpaved
Locust Lane	Putnam Hill Rd	Dead End	0.5	Paved
New Rd	Center Rd	Mountain Rd	1.0	Unpaved
New Rd	Mountain Rd	Francistown Tpke	0.5	Paved
Old Temple Rd	Forest Rd	Temple T/L	1.7	Both
Old Temple Rd	Forest Rd	Cram Rd	0.5	Both
Salisbury Rd	Purgatory Rd	Mont Vernon T/L	0.3	Unpaved
Total			11.4	

9. Non-Motorized Transportation

In 1995, the NRPC endorsed a Regional Bicycle and Pedestrian plan for the NRPC member communities, which includes Lyndeborough. The plan recommended physical and institutional improvements and a regional non-motorized network that is comprised of local and state roads. The NRPC is presently updating the plan to ensure compatibility between the NHDOT Statewide and Regional Bicycle and Pedestrian Plan with the needs and desires of local NRPC communities. The focus has been on developing prioritized trails on a map that meets local needs while creating a region-wide system. The update will also be used to prioritize, schedule, fund, design, and build improvements along the identified routes.

The NH DOT has stated that it will, as part of its normal road striping operations on resurfaced roads, restripe roads to allow for paved shoulders where none exist now, as long as travel lanes meet width requirements.¹ NHDOT has also stated that it will consider bicycle/pedestrian concerns in all projects.

E. FUTURE TRAFFIC FORECASTS

NRPC has developed a MINUTP traffic model for forecasting traffic in the Nashua region. Future traffic forecasts are based on anticipated future land use patterns. Projected housing units, employment, and school enrollment are used to generate trip productions and attractions within the model. The projected growth in land use was made in consultation with local planners from the Nashua region and through a review of present and proposed zoning, physical constraints, and assumptions made regarding future area-wide growth rates. The NRPC traffic model provides a twenty-year horizon for growth in the NRPC communities including Lyndeborough. The results of the future model runs for

¹ State of NH, *NH Statewide Bicycle and Pedestrian Plan*, May 2000

the year 2020 are shown in Table VI-10. The model projects that the existing highway system in Lyndeborough is fully expected to provide adequate capacity to accommodate future needs to 2020.

Table VI-10: Future Traffic Forecasts

Location	Latest Available Traffic Count	Projected Year 2020 Traffic Count	Projected Year 2020 LOS
NH31 (Forest Rd.) @ Wilton T/L	4,524 (1997)	5,300	B
NH31 (Forest Rd.) @ Greenfield T/L	2,932 (1998)	3,000	A
Francestown Tpke@ Francestown T/L	802 (1997)	1,000	A
Center Rd South of New Rd	331 (1992)	500	A
Center Rd@ Wilton T/L	931 (1998)	1,500	A

Source: Nashua Regional Planning Commission.

F. KEY HIGHWAY ISSUES

1. Access to Roads and Highways

The maintenance of safe and convenient access to roads and highways is an important element of transportation systems planning. To achieve this end, it is recommended that the guidelines and standards of the NHDOT be used in the placement of access points to highway and road corridors. The State requires that the safest possible location for access shall be selected (NH RSA 236:13). There must also be adequate drainage and grades to permit a safe and controlled approach to the highway in all seasons of the year (NH RSA 236:13). The American Association of State Highway and Transportation Officials (AASHTO) standards should be applied in those instances where State standards are discretionary.

Specific design standards for public roads should be considered in order to minimize site disruption caused by roadways and the associated grading caused by their construction:

- New roadways should follow existing contours to minimize the extent of cuts and fills.
- The maximum number of units per cul-de-sac or dead end street should be 25.
- In order to preserve existing open fields, new roads should not bisect fields, but should be located along the edge of fields where possible.
- Where sites include linear features such as existing access roads, tree lines, and stone rows, roads should follow these features to minimize their visual impact.
- Minimum distance between access points and curb cuts on public roads should be 200 feet.
- Access points to new developments should include common drives in addition to individual drives and on-site roads.

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.”² 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

² AASHTO, *Policy on the Geometric Design of Highways and Streets*, 2001.

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.³

The segment of NH31 from approximately the fire station north to School Street and including the area around Citizens Hall Road could be improved through the use of Access Management techniques. General policies that would help achieve Access Management goals are:

- Reduce the number of curb cuts along this segment NH 31 and encourage the use of common driveways for commercial developments.
- The minimum distance allowed between curb cuts along NH 31 should conform to Table VI-11:

Table VI-11: Minimum Recommended Distance Between Curb Cuts

Posted Speed Limit	Minimum Spacing
30 MPH	335 feet
35 MPH	355 feet
40 MPH	400 feet
45 MPH	450 feet
50 MPH	520 feet
55 MPH	590 feet

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

- Place parking behind or beside buildings 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.
- Separate vehicular and pedestrian traffic as much as possible.
- Connect parking areas with pedestrian footpaths. Crossing points for pedestrians should be across driveways rather than through parking areas.
- Driveways and tapers should be long enough to permit deceleration of entering vehicles.
- 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. Right-of-Way

A right-of-way (ROW) width of 50 feet (minimum) is recommended for all local roads in the Town, with the exception of private ways and drives. This will allow the upgrading of any road, if necessary, should development occur in a manner that was not anticipated. It will also allow for the inclusion of pedestrian and bicycle paths, where desired. A greater width may be required for arterial and collector streets.

³ NRPC, *Access Management Guidelines*, April 2002.

4. Road Width



The NH Department of Transportation distributes suggested guidelines for the minimum geometric and structural lay out of local roads and streets. These standards can be used as a guide in street design. Road width may vary depending on the type of road and the nature of the traffic. A minimum single lane width of nine (9) feet is recommended for each direction of traffic traveling at slow speeds on local roads.⁴ Given that most of Lyndeborough's roads are local in nature, this nine (9) foot lane width is appropriate and a wider lane width may only be appropriate for roads with

higher speeds or traffic volumes. Narrower lane widths can reduce the area of impervious surface, the quantity of stormwater runoff and traffic speeds. In addition, narrower lane widths can reduce construction costs, and are more aesthetically pleasing in a rural area such as Lyndeborough.

Generally, the centerline of the road should coincide with the centerline of the ROW. The fifty-foot minimum ROW not only allows upgrading of the road as stated earlier, but also allows for the diversion of the road to avoid difficult or sensitive natural formations during the course of construction. Five foot wide bike lanes should be included and marked on arterial and collector roads such as NH 31. There is no need to indicate bike lanes on local roads because of the lower vehicle speeds.

5. Connections between Subdivisions

Streets that connect subdivisions should be encouraged, but long, straight, continuous stretches of road should be avoided. Instead, "T" intersections, roundabouts, or other traffic calming techniques should be employed. This type of design discourages speeding in residential neighborhoods, encourages bicycle and pedestrian traffic, and helps to promote a better sense of community.

6. Cul-De-Sacs

Cul-de-sacs can be an integral part of an efficient road network if properly designed. If improperly designed, cul-de-sacs can lead to an inefficient road system and level of service problems on collector roads. They should be the minimum required width to accommodate emergency apparatus. A pedestrian/bike link should also be provided from the end of the cul-de-sac to adjacent roads in order to provide non-motorized connections to adjacent properties.

One of the many issues raised when reviewing plans with cul-de-sacs is whether the road should extend to the property boundary. The Planning Board should encourage cul-de-sacs to the property edge in order to reduce curb cuts off of major routes or where a future possible connection may be appropriate for establishing an efficient road network in the Town. The Planning Board should discourage cul-de-sacs to the property boundary in the following situations:

- Where the cul-de-sac would be between two zones. For example, a through road leading from a residential zone to a commercial zone may not be appropriate. A through road may encourage truck traffic and patrons to drive through a residential neighborhood to get to the commercial area.
- Where extending it would produce a dangerous intersection.
- Where it is coming off of an existing cul-de-sac. This may produce long cul-de-sacs, when an option of building a connected road network exists.

⁴ Source: NH DOT, *Suggested Minimum Design Standards for Rural Subdivision Streets*, 1995; and Kulash, Walter, *Residential Streets*, (ULI: 2001).

- Where an extension of the cul-de-sac to abutting property would not be feasible due to steep slopes, major wetland areas or other natural features of the land.
- Where an extension would lead to property, which would be better serviced from another road.

G. RECOMMENDATIONS

- Lyndeborough's existing highway system provides adequate capacity for vehicles traveling to and from or within the Town. This highway system is also expected to provide adequate capacity to accommodate future needs during the planning period and therefore new arterials are unnecessary. New roads in the Town should be public or private local roads in function and classification and limited to providing access to subdivisions and adjacent parcels.
- Lyndeborough is the most rural of all communities in the Nashua region. In order to maintain this rural character, existing unpaved roads should remain unpaved wherever practical and new local roads should be unpaved when connecting to an existing unpaved road.
- The Planning Board should review ordinances and/or regulations concerning the design and construction of roadways, and amend as necessary to ensure new roads are of a design in keeping with the rural character of Lyndeborough. Specific issues to be considered should include lane width and surfacing, connections between subdivisions, cul-de-sac design, non-motorized connections and access management.
- Continue to utilize the Road Surface Management System (RSMS) in order to: 1) establish priority for maintenance and repairs; 2) generate maintenance and repair budgets; and 3) standardize the process of ranking the condition of the many roads in Town.
- The Town should request NH DOT to include clearly marked bike lanes on NH 31 when the road is resurfaced.
- The Town should support the upgrading of the bridges spanning Stoney Brook on Gulf and Old Temple Roads in 2004.
- Enter into a Memorandum of Understanding (MOU) with the NH DOT to ensure coordination of the review and issuance of driveway permits to access state roads.

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CHAPTER VII FUTURE LAND USE AND RECOMMENDATIONS

A. INTRODUCTION



Each chapter of this Master Plan identified recommendations to be pursued during the planning period. The recommendations are meant to serve as a guide for managing the future growth and development of Lyndeborough and are the culmination of the planning process undertaken in the drafting of this Plan. The recommendations were generated from data collection and analysis, Master Plan Advisory Committee discussions and the results of the Community Profile, and are designed to implement the Goals and Objectives stated in Chapter I. These recommendations, if implemented, will guide the future use of land in Lyndeborough. This chapter provides a summary of: 1) projected future growth; 2) the preferred future land use pattern; and 3) Future Land Use recommendations and a summary of the recommendations from the Population and Housing, Natural Resources, Community Facilities and Transportation chapters.

B. PROJECTED FUTURE GROWTH

In 2000, the population of Lyndeborough was 1,585, only slightly higher than it was during the first US Census 210 years ago. As such, Lyndeborough has remained a rural community. Population is projected to grow by approximately 1.02% annually to 2,427 people by 2020. A large percentage of this growth is projected to be from in-migration generated by the economic growth of the region and the attractiveness of Lyndeborough's rural quality of life. This growth rate translates into approximately 842 additional residents by 2020. At an average household size of 2.70 persons per household, this additional population could demand approximately 312 new housing units. Factors that may affect future housing demand are the national trends in the reduction of household size and the gradual aging of the population.

The great majority of future development pressure in Lyndeborough is likely to be residential. This is due to employment growth in the Nashua region and the high cost of housing. These two factors combined create a demand for both additional and less expensive housing. "Outlying" communities such as Lyndeborough appear attractive for future residential development because of the lower land costs and the attractive rural setting. Therefore, the challenge of planning for a preferred future land use pattern in Lyndeborough is to determine how this growth can best be accommodated, designed and managed.

C. THE PREFERRED FUTURE LAND USE PATTERN

The capability of the land to accommodate on-site septic disposal and to provide adequate drinking water are primary considerations in determining appropriate locations for growth. Also of great importance is the capacity of the roadway system to accommodate additional traffic and the physical and fiscal ability of the Town to provide public services. Vehicle access is also vital in terms of providing emergency medical care and fire protection. Also to be considered in determining appropriate land use patterns are the potential for adverse environmental impacts, such as erosion and other water quality threats, and the desire to retain the Town's rural character and historic resources.



Lyndeborough's zoning districts are based on accessibility, the capability of land to accommodate development and a desire to retain rural character. In addition to the three residential zoning districts, areas for light industry and a village mixed use district are provided for. The light industrial and village districts were determined based on historic development patterns, accessibility and compatibility with surrounding land uses. Because of Lyndeborough's mountainous terrain, the residential districts are defined by elevation, with increasingly large lot requirements as elevation rises. This land use pattern achieves a variety of important objectives. By allowing only limited development, many of the negative impacts of development in steep slope and shallow soil areas are avoided. Additionally, development in these remote areas which would be difficult to service with fire, medical and road maintenance operations is avoided. Remote, steep and sub-standard roadways are difficult and costly to maintain and their development should be avoided. Another benefit of limiting development at higher elevation areas, is to help protect the scenic and wilderness qualities of these areas.

An optional method of developing large tracts of land is also provided for in the zoning ordinance; any property may be subdivided without going through the formal subdivision review process if the average size of all lots is not less than 25 acres in area and no single lot is less than 10 acres in area. This optional method streamlines the process and provides an incentive to preserve Lyndeborough's historic rural development pattern.

The remaining lands are zoned as Rural 1 and require a minimum 2 acre lot size. Because Lyndeborough does not have municipal water or sewer, the two acre minimum was established to provide a reasonable amount of land area to accommodate on-site septic and water supply. In addition, the subdivision regulations include a 100 foot septic system setback from various soil classifications inappropriate for septic system siting.

Additional protection is afforded wetlands which are protected from development impacts by a wetland conservation overlay zoning district. All lands which are identified as poorly or very poorly drained soils by Soil Conservation Service Maps, are protected from development. However, a buffer zone from the edge of wetlands should also be considered.

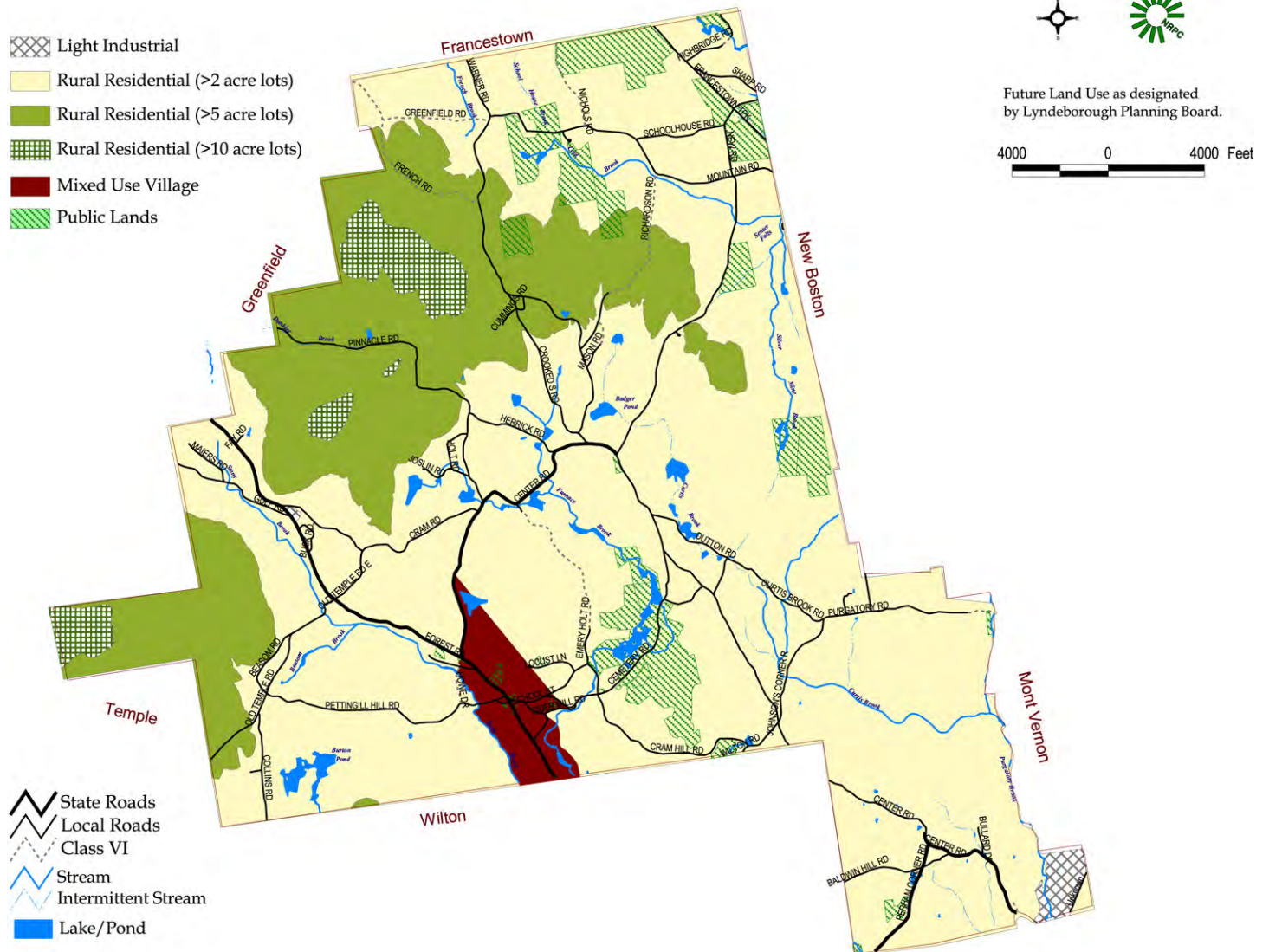
The current zoning, subdivision and site plan ordinances function well and are likely to result in a preferred future land use pattern as illustrated on Map VII-1. However, additional refinements to the current land use controls may be considered desirable, and are outlined below.

D. SUMMARY OF RECOMMENDATIONS

1. 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 according to the current land use regulations. These land use regulations should then be modified, if necessary, to meet the goals and objectives of the Master Plan.

Map VII-1: Future Land Use Map



- Develop regulatory measures that will facilitate the provision of affordable housing, such as: 1) Housing for Older Persons Ordinance; or 2) a refinement of the provisions allowing for accessory dwelling units so that such units can be constructed to a maximum of 800 square feet and contribute towards the provision of assisted housing under Federal or State programs.
- Continue to monitor Lyndeborough's rate of growth relative to first and second tier communities and review the Lyndeborough Growth Management Ordinance each year to assure that the Town maintains its fair share of growth while not overburdening the provision of public services.

2. Natural Resources

a. Topography

- Continue to protect steep slopes and high elevations from inappropriate development through the soil and elevation based Zoning.
- Consider developing special design criteria to minimize the visual impact of hillside development including the use of building materials compatible with the environment (rock, stone, brick and wood) and to preserve existing vegetation and natural land forms.

b. Soils

- When reviewing the intensity of development, the Planning Board should continue to consider soil potentials, limitations and slopes. Soils with steep slopes and/or low potential for supporting septic tank absorption fields should be limited to open space.
- The Town's few remaining 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 Land and Community Heritage Investment Program, the American Farmland Trust, the Wapak Land Trust and the Farmland Protection Program may assist the Town in this endeavor.
- Continue to require the use of Site Specific Soil Mapping Standards (SSSMS) in the subdivision regulations and consider amending the site plan regulations to require the use of SSSMS. The SSSMS are the most current standards available that can be used for a variety of land use activities.

c. Water Resources

- Consider researching the creation of a municipal waste water treatment system in South Lyndeborough since there is a heavy concentration of community and residential wells in this area.
- Protect existing wetlands and surface waters by amending the Wetlands Ordinance to include an adequate buffer from the edge of the wetland or surface water. A minimum of 100 feet is suggested for all surface waters. This buffer will protect the natural habitat surrounding wetlands and surface waters that is crucial to the proper functioning of these water resources.
- Consider increasing the building setback from wells located in glacial till soils. These wells are close to the surface and are very susceptible to contamination.

- Undertake a Prime Wetland Inventory to give these wetlands additional consideration by the Wetlands Bureau when development proposals are presented to the Town.
- Require herbicide, pesticide and arsenic testing in all new wells in former orchards in the southeast part of Town since the orchards overlay till or stratified drift aquifers and are highly susceptible to contamination.

d. Forests, Wildlife and Plants

- Consider using the Forestland Evaluation and Site Assessment (FLESA) for future forest planning and components of the FLESA Program on all Town owned lands.
- Maintain a 50 foot undisturbed, shady buffer around vernal pools and a 100 foot buffer from 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.
- Consider 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

- Conduct a Natural Resources Inventory of Lyndeborough to assist with future conservation efforts.
- The unique local and regional resource of Lyndeborough's high elevations should be preserved and encouraged to be made accessible to the public through donated recreational easements. The Town should actively seek conservation easements for such land.
- Pursue the fee purchase, purchase of development rights, or other conservation measures to protect significant properties identified by the Conservation Commission or in a Natural Resources Inventory.
- Consider raising the percent of Land Use Change Tax contributed to the Conservation Commission to help increase the number of protected open space parcels and provide matching funds for potential LCHIP applications.
- 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.

3. Community Facilities

a. Fire Department

- Consider the published standards for fire departments, as they are guidelines for safety and can assist the Town in planning for future growth.
- Include emergency vehicle access needs in planning for future development so as to increase the accessibility of fire protection services to all residences in Town.
- Consider amending the Zoning Ordinance, Subdivision Regulations and/or Site Plan Regulations as necessary to ensure adequate fire suppression facilities for new development.
- Continue planning for fire station facility in a more central location to reduce response times and adequately serve the more distant parts of Town.

b. Police Department

- The Town should consider expanding the Police Department facility to meet the needs of the population in 2020.

c. Wilton-Lyndeborough-Temple Ambulance Service

- Continue to contribute to the Service to ensure an adequate level of ambulance facilities as the Town grows.

d. Communications

- Continue to utilize the Milford Area Communications Center dispatch services.
- The Planning Board should amend the subdivision regulations to require that all shared driveways serving more than two principal structures should be named, and that numbers be assigned to each principal structure.

e. Town Offices

- Analyze staffing levels in Citizens Hall and continue renovation to allow for more efficient storage space and accessibility.

f. Highway Department

- Include a line item in the Capital Improvements Plan for infrastructure upgrades. Provide for a reallocation of monies in the budget for additional personnel as required.

g. Central Elementary School

- Continue to plan for future school facilities to meet state standards for classroom provision and to meet the goals for educational programs established by the School District.

h. Middle and High School

- Continue to plan for future school facilities to meet state standards for classroom and subject provision for Lyndeborough's students.

i. Town Library

- Expand the library within the Village Center to meet American Library Association recommended standards and to accommodate the needs of Lyndeborough's projected 2020 population.

j. Recreation

- Continue to seek commitments from neighboring towns to pool resources in planning for recreational improvements which will continue to meet the needs of the combined populations.
- Continue negotiations with the Town of Greenfield to open up trail systems along Winn Mountain, Rose Mountain, Pinnacle Mountain and North Pack Monadnock and connect to the Wapack Trail system.
- Consider providing wider shoulders or a separate bike path along NH Route 31.

k. Solid Waste

- Continue to utilize the Wilton Recycling Center.

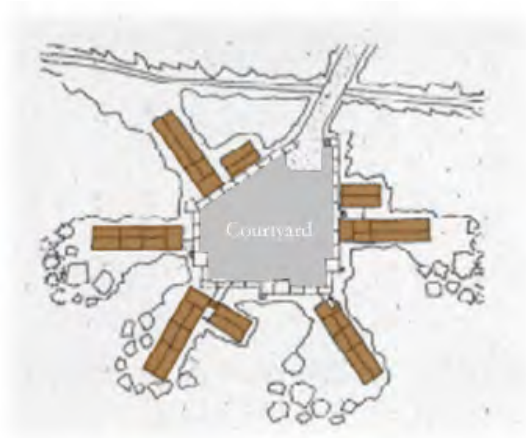
4. Transportation

- Lyndeborough's existing highway system provides adequate capacity for vehicles traveling to and from or within the Town. This highway system is also expected to provide adequate capacity to accommodate future needs during the planning period and therefore new arterials are unnecessary. New roads in the Town should be public or private local roads in function and classification and limited to providing access to subdivisions and adjacent parcels.
- Lyndeborough is the most rural of all communities in the Nashua region. In order to maintain this rural character, existing unpaved roads should remain unpaved wherever practical and new local roads should be unpaved when connecting to an existing unpaved road.
- The Planning Board should review ordinances and/or regulations concerning the design and construction of roadways, and amend as necessary to ensure new roads are of a design in keeping with the rural character of Lyndeborough. Specific issues to be considered should include lane width and surfacing, connections between subdivisions, cul-de-sac design, non-motorized connections and access management.
- Continue to utilize the Road Surface Management System (RSMS) in order to: 1) establish priority for maintenance and repairs; 2) generate maintenance and repair budgets; and 3) standardize the process of ranking the condition of the many roads in Town.
- The Town should request NHDOT to include clearly marked bike lanes on NH 31 when the road is resurfaced.
- The Town should support the upgrading of the bridges spanning Stoney Brook on Gulf and Old Temple Roads in 2004.
- Enter into a Memorandum of Understanding (MOU) with the NH DOT to ensure coordination of the review and issuance of driveway permits to access state roads.

5. Future Land Use

- Retain, enforce and monitor the existing zoning and subdivision controls, with minor amendments as needed.

- When reviewing new subdivisions, emphasis should be placed on designs that reflect the rural character of Lyndeborough and preserve as much open space and forest land as possible. One such design is the “courtyard” subdivision that provides for a single access to multiple housing units in a rural, farm-like setting. This design accommodates the existing rural density zoning. The gravel courtyard acts as community space and visitor parking, and provides for adequate emergency vehicle access. Each home in this development affords privacy as they are surrounded on three sides by forest land, meadows or other environmental features that are preserved through a development agreement. The “courtyard” design can provide an alternative to conventional subdivisions.



Typical “Courtyard” Design

#230B-7