MASTER PLAN

Stratham, New Hampshire

August, 1998

STRATHAM MASTER PLAN

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Appendices

MASTER PLAN
of the
TOWN OF STRATHAM

The attached Master Plan was adopted to replace and update the existing Town of Stratham Master Plan by a vote of the Planning Board on August 26th 1998. The Plan was adopted in accordance with RSA 675:6, following seveal duly noticed public hearings held on May 6th, May 20th, June 3rd, June 17th, August 5th, and August 26th.

STRATHAM PLANNING BOARD

10/29/98

John A. Hutton III (Chairman)

11/18/98

11/18/98

11/18/98

11/18/98

11/18/98

Date of filing with the Office of the Town Clerk: 11-18-98

Received by: _____
(Town Clerk)

RECORD OF ADOPTION AND AMENDMENTS

ACKNOWLEDGMENTS

In the spring of 1995 the Stratham Board of Selectmen, with advice from the Planning Board, appointed a 15 member committee to review and revise the Stratham Master Plan. Organized on April 26, 1995, the new Master Plan Revision Committee planned monthly meetings for the committee as a whole, with sub-committees working on individual chapters. The Rockingham Planning Commission had been engaged by the Town to provide technical assistance. The planning commission's work was partially funded by the Coastal Program of the New Hampshire Office of State Planning, using federal grant funds from the National Oceanic and Atmospheric Administration.

As a means of providing maximum citizen involvement in the Master Planning process, the assistance of the Office of State Planning was secured to conduct a Community Stewardship Program for Stratham. The work of the Revision Committee during the summer and fall of 1995, provided current inventory and statistical data for the Stewardship Program, which was initiated in December of 1995. Twelve representative citizens were appointed to join the Master Plan Revision Committee in forming a Community Stewardship Steering Committee. The Stewardship Program was an intensive series of meetings culminating in a two day design workshop in March of 1996. A team of planning and design professionals worked to stimulate participation, and introduce new approaches to guiding the Town's future. The complete report was available in June of 1996. The Stewardship Program not only determined the community's desires for the future, but also produced a number of recommendations for solving problems and building toward the future they envisioned. Utilizing the Stewardship report as a guide, the Master Plan Revision Committee has developed the following documents.

MASTER PLAN REVISION COMMITTEE

Debra Bailey
Gordon Bailey
Gerald Batchelder
William Day
Joseph Derwicki
Dennis Guilfoyle
Michael Keane
Dorothy Long
Donna Maskwa
Lawrence Morse
Patricia Parnell
Joyce Rowe, Secretary
Fay Rubin, Vice Chairman
Kirk Scamman
Walter Smyk
James Stuart, Chairman

ADDITIONAL STEWARDSHIP STEERING COMMITTEE MEMBERS

James Bolduc
Sally Boyd
Victor Collinino
Louise Duffy
Fred Emmanuel
Edward Geppner
Ronald Houghton
Thomas Keane
Jack Keating
Barbara Krooss
Bette Lanzillo
Ray Wenninger

Appreciated was the cooperation of Town Department Heads and especially the assistance from Town Administrator Paul Deschaine and Cliff Sinnott of the Rockingham Planning Commission

VISION STATEMENT

The Town of Stratham desires to maintain a well planned community with a rural residential and agricultural character, affordable housing, diversified but limited commercial and economic development, quality education, and protected natural and historic resources.

EXECUTIVE SUMMARY

SETTING

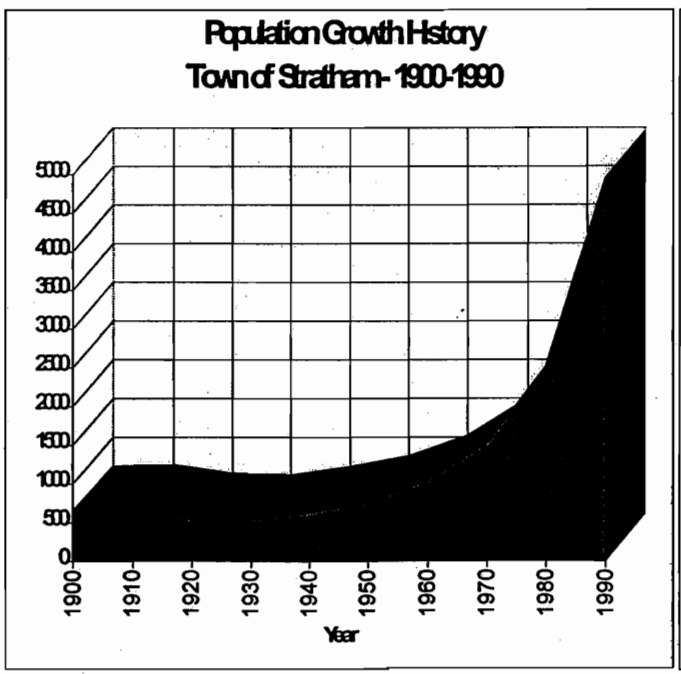
Stratham is a primarily rural-residential community located in the south-eastern corner of New Hampshire, roughly seven miles from the Atlantic Ocean. With Interstate 95 and Route 101 in close proximity, Stratham residents have easy access to Boston, Manchester and Portland, Maine. Stratham does not have the traditional New England "town center," but a number of small centers reflecting its agrarian past. The current pattern of residential development is one of housing developments scattered throughout Town. Industrial and commercial development are fairly well confined to specific areas. Established in 1716, the Town has had a long tradition of being a farm-based community. Stratham has grown and slowly changed into a bedroom community, with a population that has more than doubled in the last fifteen years (2,507 residents in 1980 - 5,393 as of 1994). Much of the growth in population can be attributed to the late 1980's development boom in New Hampshire, which particularly affected those communities near the Massachusetts border.

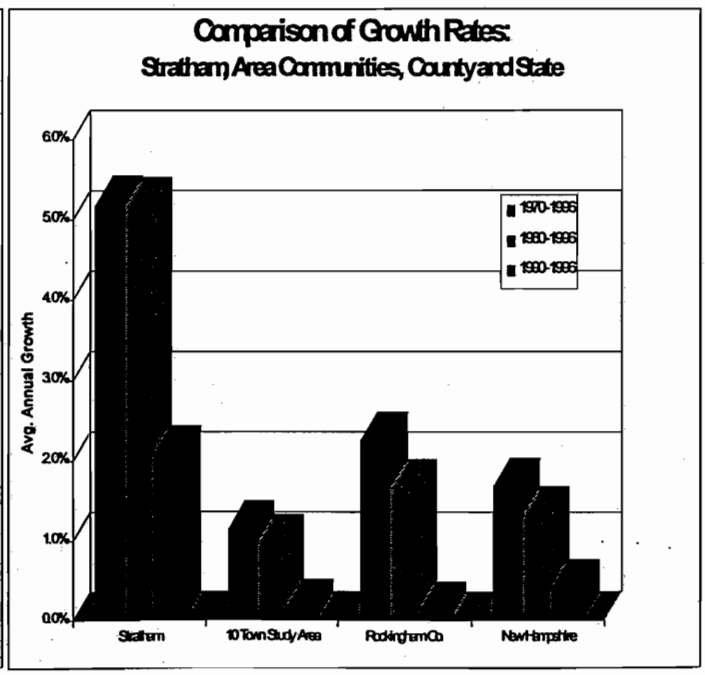
A location between the historic and cultural centers of Durham, Exeter and Portsmouth is doubtless appealing to prospective homeowners as is the quality of the school system. Large tracts of agricultural and forest land have been converted to residential use and the number of commercial farms has steadily declined. Lacking municipal water or sewage disposal, protection of the Town's surface and ground water quality has been a major on-going concern of the community.

COPING WITH GROWTH

Stratham has, for several decades been among the fastest growing towns in the region. The following graph and table documents the magnitude of recent growth in Stratham and compares it to that of neighboring towns, the region and the State over the past thirty years. The Stratham Town Office estimates the 1997 population at 6,000.

Stratham has also long been on the forefront of comprehensive municipal planning. The Town was one of the first in the region to establish a Planning Board (1942), adopt a Zoning Ordinance (1957), adopt Subdivision Regulations (1958), and adopt Site Plan Review Regulations (1977). The Town has also undertaken a number of innovative zoning approaches, including: cluster development regulations, a growth management ordinance, and several environmental zoning districts covering shorelands, wetlands, floodplains and aquifers.





Population of Selected Towns

	1960	1970	% Change	1980	% Change	1990	% Change
STRATHAM	***1,033***	***1,512***	***46.4%***	***2,507***	***65.8%***	***4,955***	***97.6%***
Exeter	7,243	8,892	22.8%	11,024	24.0%	12,481	13.2%
Greenland	1,196	1,784	49.2%	2,129	19.3%	2,768	30.0%
Newfields	737	843	14.4%	817	-3.1%	888	8.7%
Newmarket	3,153	3,361	6.6%	4,290	27.6%	7,157	66.8%
North Hampton	1,910	3,259	70.6%	3,425	5.1%	3,637	6.2%
Rye	3,244	4,083	25.9%	4,508	10.4%	4,612	2.3%
Portsmouth	26,900	25,717	-4.4%	26,254	2.1%	25,746	-1.9%
Rockingham Planning Commission	77,972	106,459	36.5%	134,145	26.0%	161,071	20.1%
Rockingham County	99,029	138,951	40.3%	190,345	37.0%	245,845	29.2%
New Hampshire	606,921	737,681	21.5%	920,610	24.8%	1,109,252	20.5%

Providing facilities, services, and adequate land use regulations to meet the needs of a rapidly expanding population has posed a real challenge to the Town. However, the accompanying growth in industrial and commercial property has provided additional tax revenue to ease the financial burden of expanding the Town's
facilities. Examples of facilities expanded since the last Master Plan was written are a new elementary school, new municipal center, and additional school accomodations provided by the formation of the Exeter Regional Cooperative School District.

Although detached single family homes still represent the majority of the dwelling units in the Town, the addition of attached condominiums and duplexes, during the past 15 years, has provided balance. They have added to the Town's affordable housing and have been a factor in keeping the increase in the school population at a slower rate than that of the total Town population.

THE ROLE OF THE MASTER PLAN

In New Hampshire, a master plan is prepared in accordance with RSA 674:2-4. That Statute was adopted in 1983, and it represented a recodification and amplification of laws on community planning that go back to model statutes adopted in New Hampshire in 1935. The 1983 Statute defines the master plan and what it must contain in order to be a valid document on which to base a zoning ordinance or on which to base growth management regulations.

RSA 674:2 states in part that,

> "The master plan shall generally be comprised of a report or set of statements and land use and development proposals with accompanying maps, diagrams, charts and descriptive matter designed to show fully as is possible and practical the planning board's recommendations for the desirable development of the territory...within its planning jurisdiction. The master plan shall be a public record...the sole purpose of which shall be to aid the planning board in the performance of its duties."

In recent years both the Legislature and the Courts have placed increased emphasis on the importance of the master plan. In several decisions, the Supreme Court

has stated beginning in Patenaude v. Town of Meredith (1978) that, "...comprehensive planning with a solid scientific, statistical basis is the key element in land use regulation in New Hampshire." Therefore, the master plan must result from careful study of existing conditions and future needs of the community.

STRATHAM'S MASTER PLAN

The Stratham Master Plan prepared under the auspices of the Master Plan Committee and the Planning Board, is designed to be a working document to guide the community in making decisions that affect the land use and the future development of the community. It covers all geographic areas of Stratham and all functions which affect development patterns of the community. It provides a review of the community's history, socio-economic data, land use and development patterns, and governmental trends. The Master Plan describes community aspirations by articulating overall goals and development policies, and it provides guidance for the Town's future direction and growth. It identifies short and longer term needs, and methods of implementation. Finally, a Master Plan, if used appropriately can help shape a better community for the future.

Based on the Master Plan, the Planning Board recommends specific ordinance and regulation changes to begin the implementation of the community policies. The Planning Board reviews future proposals for ordinance changes, new ordinances, or subdivisions to make certain they are compatible with the intent of this document. While the Planning Board adopts the Master Plan, recommendations for ordinance changes and expenditures based on the Master Plan and capital improvements program go to a Town Meeting vote.

In 1985 Stratham adopted a new Master Plan which addressed the problems associated with growth to a greater degree than the 1980 Master Plan. In 1989 the statistics in the Master Plan were brought up to date and the status of the goals and recommendations was reviewed. It was found that many had been adopted, many were on-going at that time and some had been rejected.

The Master Plan was strengthened by the adoption of the Open Space and Recreation Plan in 1990. Another significant addition was made to the Master Plan in 1993 when the Water Resource and Protection Plan and the Wellhead Protection Program were included.

Although the Town's subdivision activity tailed off during the first half of the 1990's, Stratham is once again feeling development pressure. Hundreds of new building lots were created in Stratham during the late 1980's, and the majority of these lots have subsequently been built upon; thus, the current pressure to create new building lots. With the region's development activity heating up, the Town began revising the 1985 Master Plan. A Master Plan Revision Committee was formed in early 1995, with technical assistance provided by the Rockingham Planning Commission.

COMMUNITY STEWARDSHIP PROGRAM

In 1995 the Stratham Master Plan Revision Committee sought to utilize the Community Stewardship Program offered by the Office of State Planning as a means of obtaining the true give-and-take dialogue and broad cross-section of public input necessary for a meaningful community Master Plan. The contractual logistics were worked out so that the Stewardship project would begin in December of 1995 and conclude in early 1996. In the meantime, the Master Plan Revision Committee began collecting the data necessary for the inventory of existing conditions (the meat of most master plan chapters).

One of the key aspects in revising a community's Master Plan is obtaining input from the citizens. Although Master Plan workshops are advertised and open to the public, actual attendance is scant at best; in fact, some communities are lucky to have any audience at all. Those who do attend are usually not representative of a true cross-section of the community, and often reflect special interests. Other communities use citizen surveys or questionnaires to gain public input. However, such surveys have their own problems. It can be difficult to design a survey which will elicit usable and valid data; distribution and tabulation of surveys can be difficult and expensive; the data collected may or may not be useful, and, in the end, may not contribute any more knowledge than is already present.

What is missing from both of the above examples is the spirit of community. This spirit can only be understood through open dialogue and citizens listening to each other. Such a dialogue is essential for a meaningful

community Master Plan, especially for the future development policy section where the community tries to reconcile its vision of itself with the development needs of the future. This vision and future development policy is strong and meaningful when developed by the citizens. Plans created by an active group of citizens become living documents and are understood by people who create change within the community. This is important, for a community Master Plan which does not have buy-in from its citizens is meaningless and ineffective. These are the community Master Plans which sit on the town hall shelves instead of being on hand for every Planning Board meeting.

The Master Plan Revision Committee, originally consisting of fourteen members, was expanded in December of 1995 to include ten additional participants. The expanded group acted as the Town's Community Stewardship Steering Committee, overseeing the project throughout its duration. The Steering Committee was made up primarily of citizens and business owners, however, several municipal officials were also on board. Beginning with a very well attended community listening session held in early February 1996, a series of community meetings were held over the next two months, concluding with a design workshop held on the weekend of March 22 & 23, 1996.

One of the pillars of the Community Stewardship Program is to foster an atmosphere within a community for self exploration and understanding. Towards this end, roughly forty citizens volunteered their time and efforts to perform research on Stratham's four primary issues as identified at the community listening session: Portsmouth Avenue and traffic; future land use; natural and historic resources; and community infrastructure. The analysis and data collection performed by these people created a shared base of knowledge by a large group of residents who can make educated decisions about the Town's future. It was through this process that a community vision statement was drafted and tested. At this same meeting, many of the issues to pursue at the March design workshop were identified and clarified.

The Community Stewardship process, and its final report (copies of which are available in the Library and Town Office) have served as the "visioning" element of this Master Plan. Many of its findings and recommendations have been incorporated into this Plan.

RECOMMENDATIONS FOR USE AND REVISIONS

All Master Plans must be reviewed and revised periodically to be a useful tool in the planning process. In Stratham's case, the rapid rate of growth requires that this take place very frequently, ideally each year. It is only though frequent "revisits" that the Plan will serve as an active guide to the Planning Board. Two recommendations are made achieve this. First the Planning Board should consider appointing a standing Master Plan Advisory Committee whose job it would be to review and update one or more chapters annually. This will prevent the Plan from ever getting too seriously out of date. Second, the Planning Board should formally consider consistency with the Master Plan, perhaps as an item on the review checklist, as part of its normal review process for all subdivisions and site plans. This will help establish the connection between the goals and policies of the Plan and the manner in which the community is developing.

POPULATION & HOUSING

1.0 INTRODUCTION

Stratham has experienced rapid growth in population and accompanying residential development since the mid 1950s. This sustained growth has brought challenges to every aspect of the community to keep pace with the growing demand for services, including, roads, schools and community facilities. One of the principal challenges now facing the community is to determine how best to accommodate additional growth while remaining a predominantly residential community and retaining the small town character which attracted so many of its residents in the first place.

2.0 POPULATION

Perhaps the great need to plan carefully for Stratham's future comes from the continued rapid growth in population the Town is experiencing. As shown in **Tables P-1** and **P-2**, rapid growth has been a near constant for the Town since the 1950s. Since 1950, Stratham has grown at an average rate of 4.4% per year, compared with 1.7% for the 10 surrounding towns and 2.8% for Rockingham County. Compared with its population in 1930, Stratham has grown by a full order of magnitude (i.e. ten-fold). Only a handful of towns in New Hampshire have experienced this kind of growth; Stratham has typically ranked in the top five fastest growing communities in the State. Between 1970 and 1996, for example, Stratham's growth rate (5.2%) was nearly five times the average for the 10 surrounding communities (1.1%), and more than double that of fast-growing Rockingham County (2.3%).

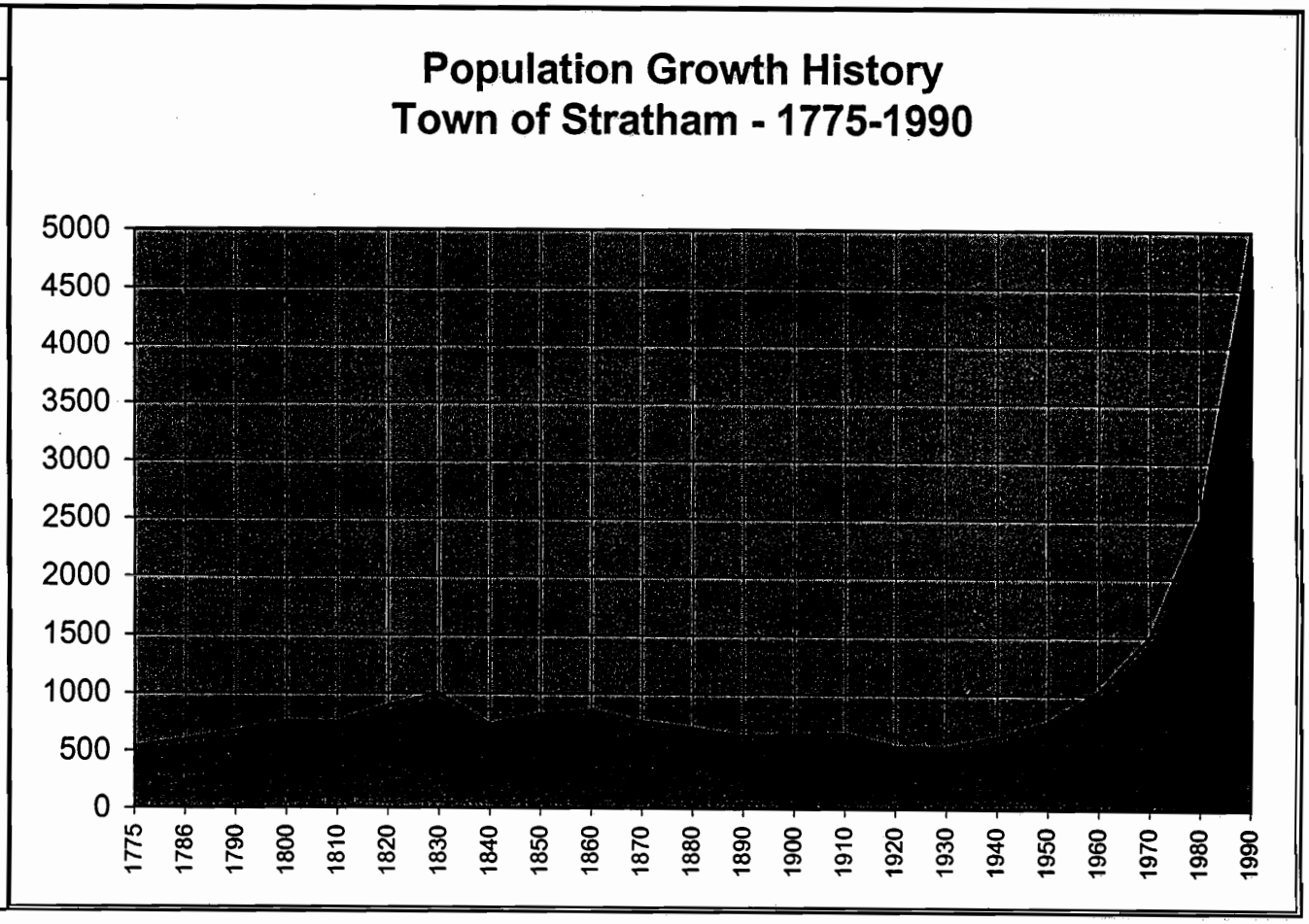
Following completion of the previous Master Plan in 1985, the Town grew rapidly for several years, from a population of 3,520 in 1986 to 4,955 in 1990 (**Table P-3**). The recession and real estate market contraction of 1989 to 1992 caused a leveling of growth from 1990 to 1993. Since 1993, the real estate market for housing has slowly recovered throughout the State and region. For Stratham, this has meant a resumption of growth, but at a somewhat reduced rate. From 1993 to 1996, the Town has experienced an average growth rate of 4.2% per year — about half the 8.9% per year rate experience in the "boom" years of 1986 to 1990. Though slower than in recent times, the Town's current growth is still double that of the surrounding communities.

All this growth has placed considerable pressure on the community and the delivery of services. To date, the Town has coped with this growth within the framework of a small-town. The Town is governed by Town Meeting, Board of Selectmen and Town Administrator; the Fire Department and Recreation Department are operated with volunteers; the Police and Highway Department remain relatively small; the Planning Board utilizes the circuit rider planner service of the Rockingham Planning Commission for part-time assistance. As Stratham continues to grow, the Town may need to respond to additional demands on service delivery by adding facilities, staff and basic modes of operations.

Schools have seen the most tangible impact of this growth. At the elementary school level, total enrollment has risen from 246 in 1985 (grades 1-6) to 696 in 1996 (grades K-6). School capacity of the Memorial School, which was constructed in 1990, reached 77% in 1996. With the expected opening of the new Exeter Region Cooperative Middle School in 1998, the sixth grade will move out of the Elementary School, extending the capacity of the Elementary School for several years. The construction of the new Middle School itself was motivated by serious over crowding in the Exeter AREA Junior High School. The new facility is designed for a student enrollment of 1,250; on opening day it will house an expected 1,150 students. Given additional growth in both Stratham and the other Cooperative towns, expansion of both the Elementary and Middle schools are inevitable.

TABLE P-1
STRATHAM'S POPULATION HISTORY

Year	Population	Persons Per Square Mile*
1775	529	34.1
1786	592	38.2
1790	663	42.8
1800	751	48.5
1810	742	47.9
1820	889	57.4
1830	998	64.4
1840	726	46.8
1850	818	52.8
1860	846	54.6
1870	753	48.6
1880	695	44.8
1890	632	40.8
1900	641	41.4
1910	656	42.3
1920	543	35.0
1930	538	34.7
1940	630	40.6
1950	758	48.9
1960	1033	66.6
1970	1512	97.5
1980	2507	161.7
1990	4955	319.7
1996	*5610*	*361.9*



Area of Town: 15.5 square miles

*Sources: 1767-1940, Unpublished report, N.H. Office of State Planning.
1940-1990, U.S. Bureau of the Census.
1997, N.H. Office of State Planning.

TABLE P-2
Population Growth
Town of Stratham and Area Communities
1950-1996

TOWN	1950	1960	1970	1980	1990	1996	Average Annual Growth Rate (%) 1970-1996	1980-1996	1990-1996
Stratham	*758*	*1,033*	*1,512*	*2,507*	*4,955*	*5,610*	*5.2%*	*5.2%*	*2.1%*
Brentwood	819	1,072	1,468	2,004	2,590	2,887	2.6%	2.3%	1.8%
Exeter	5,652	7,243	8,892	11,024	12,481	13,258	1.5%	1.2%	1.0%
Greenland	717	1,196	1,784	2,129	2,768	2,993	2.0%	2.2%	1.3%
Hampton	2,817	5,379	8,011	10,493	12,278	13,003	1.9%	1.3%	1.0%
Kensington	540	708	1,044	1,322	1,631	1,722	1.9%	1.7%	0.9%
Newfields	470	737	843	817	888	1,185	1.3%	2.4%	4.9%
Newmarket	2,722	3,153	3,362	4,290	7,157	7,586	3.2%	3.6%	1.0%
No. Hampton	1,099	1,910	3,259	3,425	3,637	3,948	0.7%	0.9%	1.4%
Portsmouth	18,793	26,900	25,717	26,254	25,925	22,830	-0.5%	-0.9%	-2.1%
10 Town Study Area	**34,387**	**49,331**	**55,892**	**64,265**	**74,310**	**75,022**	**1.1%**	**1.0%**	**0.2%**
Rockingham Co.	**70,059**	**99,029**	**138,951**	**190,345**	**245,845**	**247,812**	**2.3%**	**1.7%**	**0.1%**
New Hampshire	**529,880**	**606,921**	**737,681**	**920,475**	**1,109,117**	**1,137,000**	**1.7%**	**1.3%**	**0.4%**

Source: U.S. Census Bureau - 1900-1990; N.H. Office of State Planning Population Estimates, 8-13-97

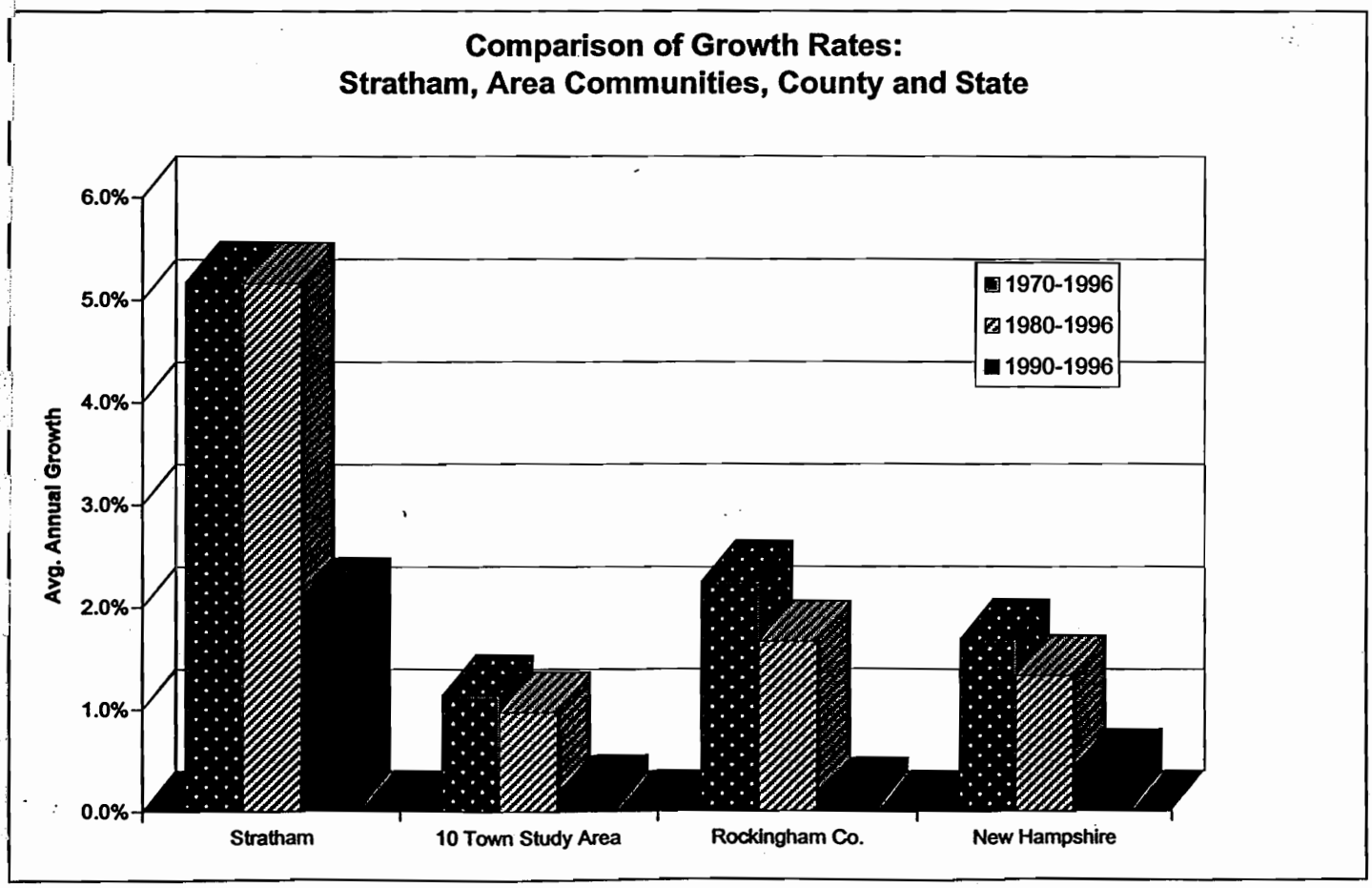
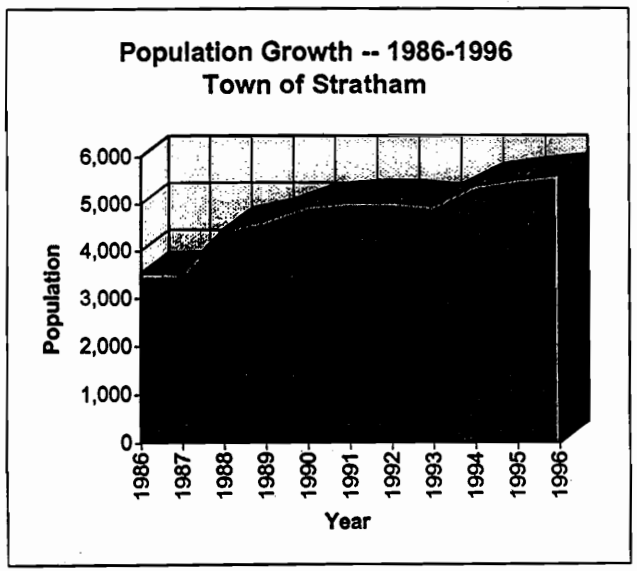
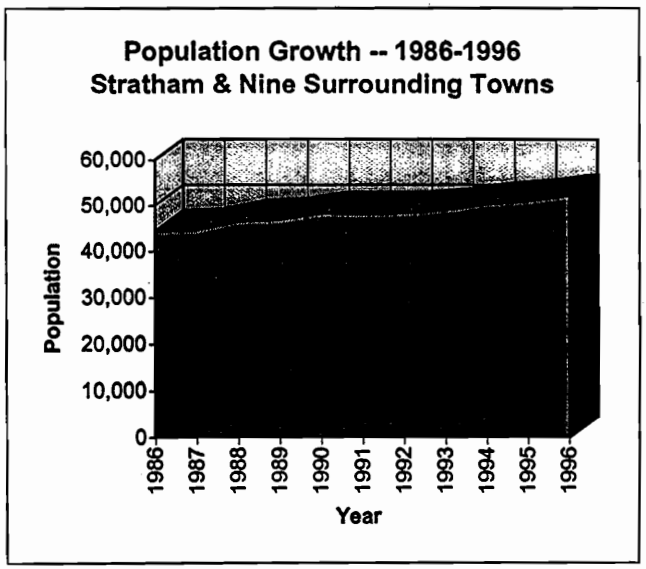


TABLE P-3
Recent Population Growth -- 1986 to 1996
Stratham and Area Communities

TOWN/AREA	1980 (Census)	1986	1987	1988	1989	1990 (Census)	1991	1992	1993	1994	1995	1996	Average Annual Percent Change			
													1980-1990	1986-1990	1990-1996	1993-1996
Stratham	3,507	***3,520***	***3,531***	***4,453***	***4,652***	5,255	***5,035***	***5,040***	***4,955***	***5,393***	***5,524***	***5,610***	***7.1%***	***8.9%***	***2.1%***	***4.2%***
Brentwood	2,004	2,382	2,301	2,270	2,323	2,590	2,586	2,592	2,677	2,768	2,836	2,887	2.6%	2.1%	1.8%	2.5%
Exeter	11,024	11,846	12,030	12,473	12,592	12,481	12,294	12,356	12,500	12,811	12,899	13,258	1.2%	1.3%	1.0%	2.0%
Greenland	2,129	2,234	2,231	2,325	2,357	2,768	2,781	2,790	2,863	2,904	2,931	2,993	2.7%	5.5%	1.3%	1.5%
Hampton	10,493	12,077	12,114	12,292	12,448	12,278	12,172	12,269	12,466	12,608	12,792	13,003	1.6%	0.4%	1.0%	1.4%
Kensington	1,322	1,327	1,476	1,492	1,497	1,634	1,628	1,627	1,631	1,669	1,694	1,722	2.1%	5.3%	0.9%	1.8%
Newfields	817	846	879	848	877	888	898	909	964	1,031	1,088	1,185	0.8%	1.2%	4.9%	7.1%
Newmarket	7,157	6,497	6,336	6,639	6,404	7,157	7,167	7,196	7,308	7,349	7,426	7,586	5.3%	2.4%	1.0%	1.3%
No. Hampton	3,425	3,635	3,799	3,790	3,811	3,637	3,638	3,642	3,733	3,838	3,871	3,948	0.6%	0.0%	1.4%	1.9%
Portsmouth	26,254	27,295	29,014	26,887	25,063	25,925	22,260	22,342	22,561	22,655	22,736	22,830	-0.1%	-1.3%	-2.1%	0.4%
10 Town Study Area	38,011	**44,364**	**44,697**	**46,582**	**46,961**	48,385	**48,199**	**48,421**	**49,097**	**50,371**	**51,061**	**52,192**	2.4%	2.2%	1.3%	2.1%
Rockingham Co.	190,345	222,542	228,495	232,799	234,411	245,845	242,436	243,793	247,812	251,821	254,721	258,775	2.6%	2.5%	0.9%	1.5%
New Hampshire	920,475	1,027,008	1,057,000	1,085,000	1,107,000	1,109,117	1,105,000	1,111,000	1,125,000	1,137,000	1,148,000	1,162,000	1.9%	1.9%	0.8%	1.1%

Source: N.H. Population Estimates - Total Population For Cities And Towns 1986-1996





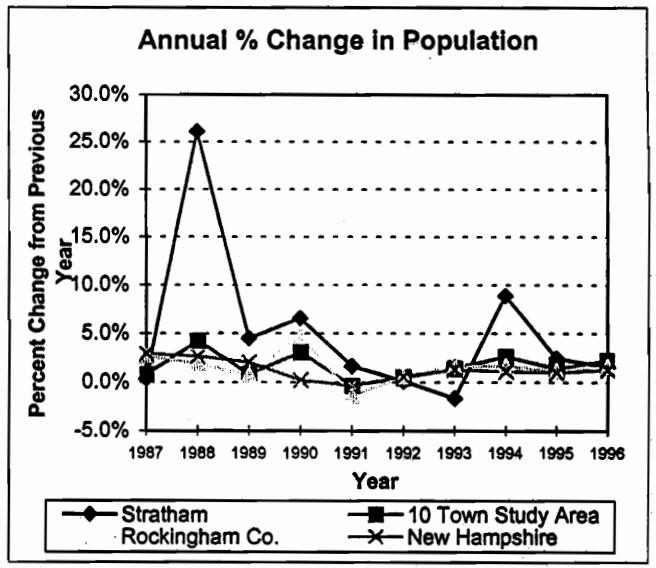
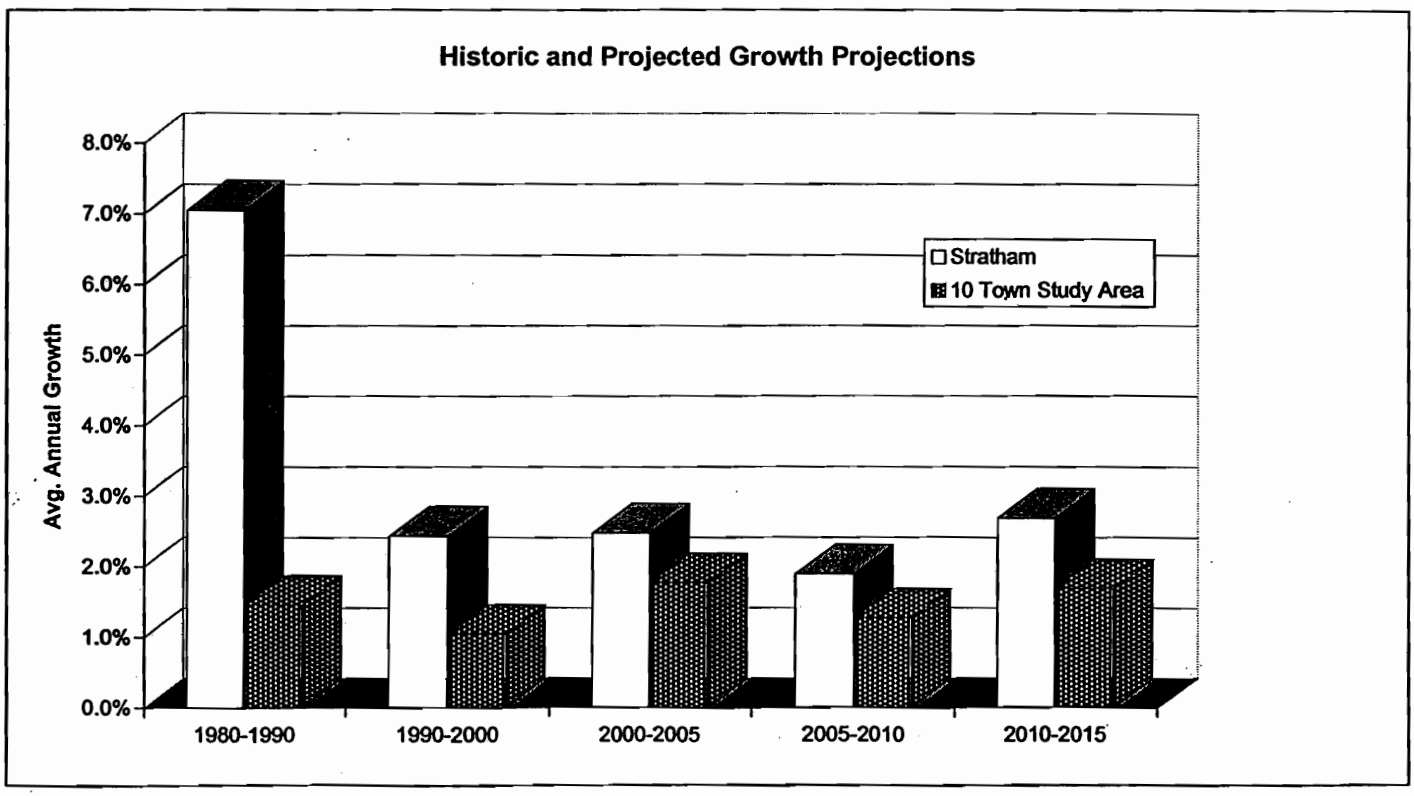


TABLE P-4
Population Projections - 2000-2015
Stratham and Area Communities

TOWN/AREA	1980 (Census)	1990 (Census)	2000	2005	2010	2015	2020	Average Annual Percent Change 1990-2000	2000-2005	2005-2010	2010-2020
Stratham	2,507	4,955	***6,303***	***7,124***	***7,826***	***8,936***	***10,105***	***2.4%***	***2.5%***	***1.9%***	***2.6%***
Brentwood	2,004	2,590	3,370	3,784	4,136	4,693	5,280	2.7%	2.3%	1.8%	2.5%
Exeter	11,024	12,481	14,297	15,477	16,355	17,558	18,723	1.4%	1.6%	1.1%	1.4%
Greenland	2,129	2,768	3,257	3,547	3,774	4,097	4,426	1.6%	1.7%	1.2%	1.6%
Hampton	10,493	12,278	14,187	15,376	16,261	17,482	18,708	1.5%	1.6%	1.1%	1.4%
Kensington	1,322	1,631	1,908	2,098	2,245	2,461	2,689	1.6%	1.9%	1.4%	1.8%
Newfields	817	989	1,193	1,281	1,345	1,434	1,527	3.0%	1.4%	1.0%	1.3%
Newmarket	7,290	7,157	8,265	9,012	9,596	10,428	11,275	1.4%	1.7%	1.3%	1.6%
No. Hampton	3,429	3,637	4,305	4,655	4,905	5,249	5,611	1.7%	1.6%	1.1%	1.4%
Portsmouth	26,254	25,925	25,388	27,703	29,477	31,984	34,407	-0.2%	1.8%	1.2%	1.6%
10 Town Study Area	64,255	74,310	82,473	90,057	95,920	104,322	112,751	1.0%	1.8%	1.3%	1.6%

Source: **PRELIMINARY DRAFT: N.H. Population Projections- Total Population For Cities And Towns 2000-2020 (SUBJECT TO CHANGE)**



3.0 HOUSING

Housing is one of the most important and challenging issues to be addressed in the master planning process. Over the past decade, New Hampshire communities, especially those in the southern tier of the State have become increasingly judged by the Courts on their performance in allowing for a wide range of housing needs -- housing which serves the requirements of a wide spectrum of age and income groups, including low and moderate income families. While facing the need to actively accommodate such housing needs communities are also facing fiscal challenges which argue toward promoting higher valued housing development to help offset property tax impacts.

During the period of rapid building expansion, which followed the completion of the 1985 Master Plan, housing costs in southern New Hampshire escalated rapidly and exceeded the ability of many wage earners to keep pace with the increases. Housing affordability became a major issue in Southern New Hampshire as steep housing costs put home ownership out of reach of even moderate income households.

Since the last update of the Stratham Master Plan was completed in 1989, changes in the State Planning Enabling laws which specify master plan content (RSA 674:2) as well as the results of the Rockingham Superior Court cases *(Lewis Builders et.al. vs. Atkinson, and Britton et.al. vs. Chester)* require Towns to assess housing needs of all income groups, including housing needs in context with the surrounding region. RSA 674:2 III requires that a master plan contain a housing section which

> "... analyzes existing housing resources and addresses current and future housing needs of residents of all levels of income of the municipality and of the region in which it is located, as identified in the regional housing need assessment performed by the regional planning commission pursuant to RSA 36:47, II."

To adequately address these issues, this chapter of the Master Plan will assess the existing housing stock and housing costs of Stratham in comparison to surrounding communities, review the Town's existing residential zoning requirements, and consider the results of the latest regional housing needs assessment prepared by the Rockingham Planning Commission. The Chapter will conclude with general recommendations regarding policies and actions that may be needed to address present and future housing needs of the town and region.

4.0 PREVIOUS HOUSING STUDIES

While there have not been any formal housing studies conducted within the past ten years, the 1985 and 1989 Master Plan and Master Plan updates have identified the importance of housing issues. The 1985 Master Plan and 1989 update included statistical reviews of the housing stock, projected future needs, and addressed several issues regarding growth management. More recently, through its Growth Management and Innovative Land Use Control Ordinance, the Town has established a system by which it can review number of new lots created, and the numbers, types and costs of new housing units. From this information the Planning Board can review current housing issues and problems and can make recommendations.

In the past two Master Plans there has been a desire to "maintain a well planned community with a rural residential and agricultural character with affordable housing, diversified but limited commercial and economic development, and protected natural resources." To this end, the Town of Stratham has established the following housing policies:

1. Encourage Affordable Housing: The Town of Stratham should encourage the investigation of the innovative development of decent, safe housing which can be purchased or rented by low, moderate or middle income households.

2. Encourage Increase of Elderly Tax Exemption: The Town of Stratham should consider increasing the availability of tax exemptions for elderly residents.

3. Consider Elderly Housing Overlay: The Town of Stratham should consider the establishment of elderly housing and/or the establishment of an overlay district for elderly housing. These policies remain valid today, though they have not yet been implemented.

5.0 HOUSING DEMOGRAPHICS

A wide diversity in housing types is an indication that a community's housing policies are responsive to the needs of various income and age groups. The aforementioned court cases (*Atkinson and Chester*) both involved allegations that local zoning and land use regulations, taken as a whole, caused discrimination against low and moderate income groups by limiting opportunities for affordable housing. A comparative assessment of Stratham's housing stock and costs is important to determine the adequacy of the housing supply for meeting a wide range of need. The following paragraphs review recent demographic information pertaining to growth, type and costs of the housing stock in Stratham as compared with ten surrounding towns as well as the County and the State. In addition, comparisons of median income and income distribution are made to further illustrate community housing characteristics.

Growth in Housing 1980-1990

According to the 1990 federal Census, there were a total of 1,917 housing units of all types in Stratham in 1990. Of these, 1,812 or 94 % were year-round, occupied units. Between 1980 and 1990, 1,073 units were added to the Town's housing supply, representing a 122% increase (see **Tables H-1** and **H-2**). This compares to a population increase of 71% (from 2,507 in 1980 to 4,955 in 1990) during the same period.

This disparity is explained by the continuing decline in the average number of persons per unit, which declined from 3.1 to 2.7 in the period (see **Figure H-1**). Similar declines in household size were seen in all of the surrounding communities as well. Stratham's housing supply grew at faster rate than most of the surrounding communities, in part due to its large size, amount and availability of undeveloped land, and due to a more permissive zoning ordinance regarding residential development compared to surrounding communities.

Ownership and Occupancy

The proportion of renters versus owners among the occupied housing units is typical of communities of Stratham's size, though somewhat lower than the region's average. That average is pushed up by the larger communities which typically have a much higher percentage of rental units. The vacancy rate in 1990 was 5.5% -- considerably lower than the County average at the time of 12.4%. These figures were

Table H-1
Housing Units and Persons per Unit
1970-1995

	Housing Units (occupied, yr round units)				Avg. Annl. Growth Rate		Average Persons per Unit	
TOWN/AREA	1970	1980	1990	1995	70-'80	80-'95	1980	1990
STRATHAM	***457***	***844***	***1,917***	***2,208***	***6.3%***	***6.6%***	***3.0***	***2.6***
Brentwood	381	598	778	898	4.6%	2.7%	3.4	3.3
Exeter	3,081	4,406	5,346	5,663	3.6%	1.7%	2.5	2.3
Greenland	528	728	1,082	1,186	3.3%	3.3%	3.0	2.8
Hampton	2,716	4,437	8,599	8,996	5.0%	4.8%	2.4	1.4
Hampton Falls	382	483	591	695	2.4%	2.5%	2.8	2.5
Kensington	334	450	585	629	3.0%	2.3%	2.9	2.8
Newfields	231	301	324	441	2.7%	2.6%	2.7	2.7
Newington	293	257	251	279	-1.3%	0.5%	2.7	2.6
North Hampton	1,031	1,255	1,495	1,659	2.0%	1.9%	2.7	2.4
Area Total	**9,434**	**13,759**	**20,968**	**22,654**	**3.8%**	**3.4%**	**2.6**	**2.1**
Rock. County	**44,562**	**65,951**	**89,118**	**89,118**	**4.0%**	**2.0%**	**2.9**	**2.8**
New Hampshire	**246,789**	**323,493**	**411,186**	**411,186**	**2.7%**	**1.6%**	**2.8**	**2.7**

Source: 1970, 1980 and 1990 US Census and NHOSP Housing Estimates

Table H-2
Housing Ownership, Vacancy and Tenure
1990 US Census

TOWN/AREA	All Housing Units	Owners vs. Rental Status -- all units					Vacancy Status	
		Owner		Renter		Total Occupied	Vacant Units	%
		No.	%	No.	%			
STRATHAM	***1917***	***1,537***	***84.8%***	***275***	***15.2%***	***1,812***	105	5.5%
Brentwood	778	673	89.1%	82	10.9%	755	23	3.0%
Exeter	5346	3,385	68.0%	1,590	32.0%	4,975	371	6.9%
Greenland	1082	745	73.9%	265	26.3%	1,008	74	6.8%
Hampton	8599	3,146	62.3%	1,900	37.7%	5,046	3,553	41.3%
Hampton Falls	591	500	93.8%	33	6.2%	533	58	9.8%
Kensington	585	495	88.6%	64	11.4%	559	26	4.4%
Newfields	324	257	82.4%	55	17.6%	312	12	3.7%
Newington	320	205	68.8%	91	30.5%	298	22	6.9%
North Hampton	1495	1,197	86.3%	190	13.7%	1,387	108	7.2%
Area Total	**21037**	**12,140**	72.8%	**4,545**	27.2%	**16,685**	4,352	20.7%
Rock. County	**101773**	**64,324**	72.2%	**24,794**	27.8%	**89,118**	12,655	12.4%
New Hampshire	**503904**	**280,372**	68.2%	**130,814**	31.8%	**411,186**	92,718	18.4%

strongly affected by the 1989-92 recession that was currently in mid-course at that time. Stratham and nearby communities were less affected due to its higher proportion of owner-occupied units.

Housing Types

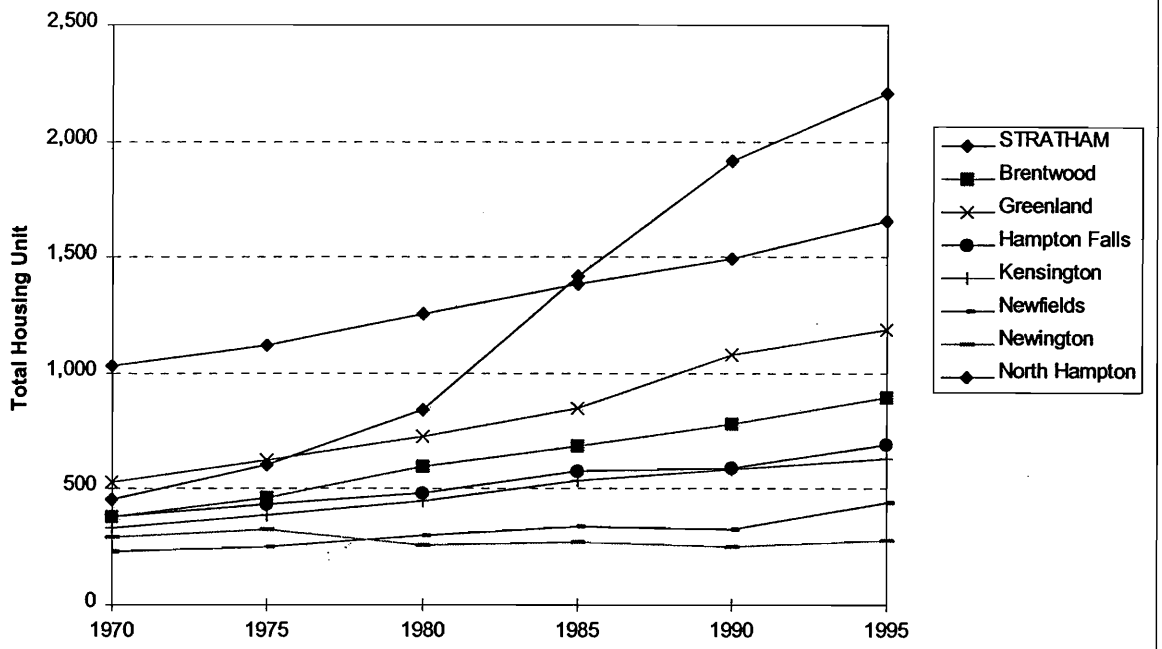
As evident in **Table H-3,** Stratham has a comparatively diverse housing stock, which includes single family, duplex, multifamily and mobile home units. (NOTE: For the purposes of these tables, "single family" includes both single family and duplex structures; "multifamily" includes all residential structures with 3 or more housing units within them; manufactured housing includes any transportable structure built on a permanent chassis and designed to be used as a dwelling with or without a foundation; it does not include prefabricated or "pre-site built" housing) A very large increase in multifamily units in Stratham occurred between 1980 and 1990. In that period multifamily housing grew from 109 units, representing 12.9% of the housing stock, to 659 units, representing nearly 35% of the total. Multifamily unit increases in surrounding communities was much more modest, growing from an average of 25.9% in 1980 to 32.9% in 1990. With only 65 mobile home units, Stratham has a strikingly low number of manufactured housing (i.e., mobile homes) - much less than the County average and than most of the surrounding communities. Since 1990, the growth in multifamily and manufactured housing units has declined, with single family units becoming the predominant housing type for new construction.

Housing Cost

The available Census data for housing cost suggests that rents and home prices in Stratham are slightly higher to those of the surrounding area. According to the 1990 Census, the median rent paid for housing in Stratham in 1990 was $661. -- approximately $120 more than the average rent paid for the surrounding communities and for all of Rockingham County (see **Table H-4**). The median value of homes reported by their owners in 1990 was $177,700. This is approximately 10% above that of the surrounding communities' average value of $165,727., but approximately 19% above the County median value of $149.800.

A second source of data regarding housing costs comes from the annual rent and purchase price surveys conducted by the NH Housing Finance Authority (NHHFA). The most recent NHHFA survey year, 1992, shows the median purchase price for homes in Stratham to be $116,000., nearly 20% below the

FIGURE H-1
Housing Growth History, 1970-1995
Stratham and Surrounding Towns



average price the surrounding communities of $129,720.(see **Table H-5**). The NHHFA surveys provide data for previous years as well. A comparison between 1990 and 1992 indicates that median home purchase prices in Stratham have declined 37.3% in that short period -- a rate of decline not unlike the rate of cost escalation seen in latter years of the 1980s. Similar **declines** are shown for the surrounding communities as well, although the County and Statewide averages show a much less precipitous drop. Based on the NHHFA surveys, it appears that current home purchase prices are now at comparable levels to what they were in the 1985-1986 time frame. NHHFA rent survey results are not reported on a town-specific basis, however, survey results for Rockingham County and for the Portsmouth/Dover/Rochester urbanized area are available from 1985 onward. The trend in rental costs does not show the same degree of rise and fall as exhibited by housing purchase prices. The average rent for a two bedroom unit in Rockingham County was $658 per month in 1986, peaked at $675 in 1989, and has slowly declined since then to $652 in 1992.

Income

Like housing mix and cost, measures of income can be important indicators of the openness of a community for providing housing opportunities to individuals and families with low and moderate incomes. In communities without lower cost housing opportunities, individuals and families with lower incomes are forced to seek housing in other locations. As a result, communities which afford little opportunity for affordable housing tend to have higher median incomes than those with a greater supply of affordable housing.

Table H-3
Housing Distribution by Type
1980 & 1990

	1980						
		Single Family		Multi-Family		Manufactured	
TOWN/AREA	Total	number	%	number	%	number	%
STRATHAM	***844***	***713***	***84.5%***	***109***	***12.9%***	***22***	***2.6%***
Brentwood	598	478	79.9%	31	5.2%	89	14.9%
Exeter	4406	2355	53.4%	1314	29.8%	737	16.7%
Greenland	728	625	85.9%	103	14.1%	0	0.0%
Hampton	4437	2622	59.1%	1726	38.9%	89	2.0%
Hampton Falls	483	432	89.4%	47	9.7%	4	0.8%
Kensington	450	400	88.9%	26	5.8%	24	5.3%
Newfields	301	244	81.1%	54	17.9%	3	1.0%
Newington	257	171	66.5%	25	9.7%	61	23.7%
North Hampton	1255	988	78.7%	132	10.5%	135	10.8%
Area Total/Avg.	**13759**	**9028**	**65.6%**	**3567**	**25.9%**	**1164**	**8.5%**
Rock. County	**68132**	**45559**	**66.9%**	**17423**	**25.6%**	**5150**	**7.6%**
New Hampshire	**347758**	**218351**	**62.8%**	**108575**	**31.2%**	**20832**	**6.0%**

	1990						
		Single Family		Multi-Family		Manufactured	
TOWN/AREA	Total	number	%	number	%	number	%
STRATHAM	***1917***	***1193***	***62.2%***	***659***	***34.4%***	***65***	***3.4%***
Brentwood	778	640	82.3%	46	5.9%	92	11.8%
Exeter	5346	2279	42.6%	1945	36.4%	1122	21.0%
Greenland	1082	792	73.2%	275	25.4%	15	1.4%
Hampton	8599	4437	51.6%	3736	43.4%	426	5.0%
Hampton Falls	591	539	91.2%	39	6.6%	13	2.2%
Kensington	585	511	87.4%	22	3.8%	52	8.9%
Newfields	324	260	80.2%	50	15.4%	14	4.3%
Newington	320	213	66.6%	51	15.9%	56	17.5%
North Hampton	1495	1106	74.0%	125	8.4%	264	17.7%
Area Total/Avg.	**19120**	**10777**	**56.4%**	**6289**	**32.9%**	**2054**	**10.7%**
Rock. County	**101773**	**61147**	**60.1%**	**31688**	**31.1%**	**8938**	**8.8%**
New Hampshire	**503541**	**297474**	**59.1%**	**164178**	**32.6%**	**41889**	**8.3%**

Source: "Current Estimates & Trends in New Hampshire's Housing Supply, 1980-1990. N.H. Office of State Planning, January 1992.

Table H-4
Housing Costs
Rental and Owner Occupied Housing Units

TOWN/AREA	Median Rent 1990	Percent of Rock. Co. Average	Median Value Owner Occup. Units - 1990	Percent of Rock. Co. Average
STRATHAM	***$661***	***122%***	***$177,700***	***119%***
Brentwood	$517	96%	$169,400	113%
Exeter	$539	100%	$154,000	103%
Greenland	$690	128%	$168,100	112%
Hampton	$540	100%	$162,500	108%
Hampton Falls	$583	108%	$221,200	148%
Kensington	$505	93%	$171,000	114%
Newfields	$517	96%	$142,800	95%
Newington	$539	100%	$197,300	132%
North Hampton	$547	101%	$187,400	125%
Area Total/Avg.	**$564**	**104%**	**$175,140**	**117%**
Rock. County	**$541**	**100%**	**$149,800**	**100%**
New Hampshire	**$479**	**89%**	**$129,400**	**86%**

Source: 1990 Census of Population and Housing, Summary Population and Housing Characteristics

Table H-5
Median Housing Purchase Prices -- 1990 and 1992
Stratham and Area Communities

Communities	1990 Sample Size*	1990 Median Price	1992 Sample Size*	1992 Median Price	Percent Change 1991-1992
STRATHAM	***37***	***$185,000***	***73***	***$116,000***	***-37.3%***
Brentwood	9	$125,048	11	$105,048	-16.0%
Exeter	21	$136,287	50	$109,189	-19.9%
Greenland	9	$193,000	17	$150,000	-22.3%
Hampton	26	$160,000	33	$131,302	-17.9%
Hampton Falls	11	$194,000	12	$191,150	-1.5%
Kensington	7	$128,900	11	$136,000	5.5%
Newfields	7	$158,000	4	$150,429	-4.8%
Newington	2	$530,240	3	$340,000	-35.9%
North Hampton	20	$194,350	31	$159,900	-17.7%
Area Total/Avg	149	$200,483	245	$158,902	-20.7%
Rockingham County	1,133	$119,048	1,095	$112,381	-5.6%
New Hampshire	3,956	$107,524	3,470	$99,048	-7.9%

Source: N.H. Housing Finance Authority.
Purchase Price Median, 4 Quarters 1991 and 1992.

*Sample sizes under 50 are not statistically reliable.

Table H-6
Median Family and Per Capita Income
1979 & 1989 - Rockingham County

TOWN/CITY	- 1979 - Median Family Income	- 1979 - Per Capita Income	- 1989 - Median Family Income	- 1989 - Per Capita Income	Percent of Rock. Co. Avg. Per Capita 1989	Per Capita Income Rank Rock. Co. 1989
STRATHAM	***$23,664***	***$8,272***	***$57,350***	***$23,104***	***131%***	***7***
Brentwood	$20,635	$6,101	$47,222	$16,112	91%	24
Exeter	$19,481	$7,392	$42,556	$18,531	105%	11
Greenland	$23,973	$7,588	$48,467	$19,637	111%	9
Hampton	$21,547	$8,299	$45,447	$18,371	104%	13
Hampton Falls	$25,474	$9,516	$58,814	$23,736	134%	4
Kensington	$21,215	$8,216	$47,083	$17,645	100%	17
Newfields	$21,354	$7,381	$44,659	$15,821	89%	26
Newington	$17,407	$7,392	$45,625	$17,954	101%	15
North Hampton	$22,705	$9,433	$53,873	$23,672	134%	5
Area Total/Avg.	**$21,746**	**$7,959**	**$49,110**	**$19,458**	**110%**	--
Rock. County	**$21,181**	**$7,445**	**$46,942**	**$17,694**	**100%**	--
New Hampshire	**$19,724**	**$6,966**	**$41,628**	**$15,959**	**90%**	--

Source: 1990 US Census, STF 3A

Data from the 1990 Census indicates that Stratham had a higher median family income than the average for surrounding towns and for the County. Median family income in Stratham for 1989 (the reporting income year) was $57,350 or 18% above the average median of $48,670. for the surrounding towns and 22% above the median or $46,942. for Rockingham County (see **Table H-6**). Per capita income figures for Stratham are comparatively higher with the Town ranked 7th in the County.

Measures of median income, while a useful indicators for comparison purposes, do not tell the whole story. In addition to overall income levels, it is important to understand how the total population of an area (i.e. Stratham and its eleven neighboring communities) is split among various income ranges. Such an analysis shows what proportion Stratham has for each income range compared to the other communities. An even percentage of the area's population across all ranges would indicate an evenly balanced distribution of income groups. **Table H-7**, however, shows clearly that Stratham has a larger fraction of its population share in the three upper-most income ranges than do most of the other communities.

4.0 REGIONAL HOUSING NEEDS ASSESSMENT

In 1988 the N.H. Legislature amended RSA 36:47 to mandate that all regional planning commissions in New Hampshire prepare a regional housing needs assessment which "...shall include an assessment of the regional need for housing for persons and families of all levels of income" (RSA 36:47,II). The stated purpose of the law is to assist municipalities in complying with RSA 674:2 which requires communities to assess housing needs in their own master planning process. The regional housing needs assessment must be updated every 5-years.

In 1989, the Rockingham Planning Commission prepared a Regional Housing Needs Assessment as a component of its regional master plan. In September of 1993 the RPC released a draft update of the Needs Assessment which incorporated data from the 1990 Census regarding housing characteristics and income.

Table H-7
Percent of Households By Income
1990 Census
Stratham and Area Communities

TOWN/AREA	Percent of Area Population	Income Ranges					
		$0 to $14,999	$15,000 to $29,999	$30,000 to $49,999	$50,000 to $74,999	$75,000 to $99,999	$100,000 and over
STRATHAM	***11%***	***5%***	***8%***	***11%***	***12%***	***19%***	***16%***
Brentwood	6%	4%	1%	5%	5%	5%	5%
Exeter	29%	38%	34%	32%	25%	20%	25%
Greenland	6%	6%	6%	6%	9%	7%	3%
Hampton	28%	35%	33%	29%	27%	31%	24%
Hampton Falls	3%	2%	3%	2%	4%	5%	7%
Kensington	4%	2%	4%	3%	4%	4%	3%
Newfields	2%	1%	2%	2%	2%	1%	1%
Newington	2%	1%	2%	2%	2%	1%	1%
North Hampton	8%	6%	7%	8%	11%	7%	13%
TOTAL	100%	100%	100%	100%	100%	100%	100%

Source: 1990 U.S. Census, STF3A - Tables P80, P107, and P110.

For the purpose of assessing regional housing needs for use in the Stratham Master Plan, the 1993 update to the Regional Housing Needs Assessment has been used in place of the original report so that the most accurate and up-to-date data could be incorporated into this plan.

The RPC identifies as the purpose of their Needs Assessment to quantify the size and distribution of the need for affordable housing in the region, and to provide communities with the information needed for their own housing needs assessments. Although a fair share apportionment of affordable housing is included in the report, the report states that this result is intended to be used only as a general indicator of the distribution of housing need in the region, not as a prescription of units needed in any particular community.

The Regional Housing Needs Assessment develops a fair share apportionment method which attempts to fairly distribute the unmet need for affordable housing to all communities in the region. The method involves distributing the identified need according to five factors relating to fair share. A numerical assessment is determined for each and is averaged for the purpose of distributing the housing need.

The five factors used and their rationale is as follows:

FACTOR	RATIONALE
Employment in community	*Jobs create demand for housing*
Equalized assessed value	*Related to town's ability to absorb low valued housing without undue impact on tax rate*
Vacant Developable Land	*Related to ability to develop new housing*
Income	*Related to existing balance or imbalance of income groups*
Housing Units	*Larger communities can absorb larger numbers of new units*

The following steps are involved in developing the regional housing needs assessment:

1. Quantify need for affordable housing: called "indigenous" housing need; this is defined as

the number of renter households among less than 80% of the region's median income and spending more than 30% of gross income on rent.

2. Identify "Excess Need": excess need occurs when the number of units identified for a specific community as indigenous need (in step one), exceeds the community's proportionate share of that need based on existing housing units.

3. Distribute "Excess Need": based on a numerical composite of the five factors described above, the excess need is redistributed to the region's communities. This result, combined with indigenous need is the fair share distribution.

4. Adjust for Housing Credits: the final step is to subtract "credits" from the fair share allocation for those communities in which affordable housing units have been added since the Census year (1990). Credits include mobile home building permits, units rehabilitated for rent assisted housing and units rehabed under the CDBG program.

The results of the fair share apportionment, which are shown in **Table H-8**, shows that Stratham has a lower percentage of "fair share" need compared to the regional average -- 6.0% for Stratham compared to 8.8% for the region. This result is consistent with the housing demographics presented in Section 4 above which, taken together, indicate that Stratham has provided a greater diversity of housing opportunity than many of the surrounding communities. This conclusion does not mean, however, that there is no need for additional affordable housing in Stratham. As indicated in the Regional Housing Needs Assessment, in 1990 there were approximately 70 low and moderate income households in Stratham that were unable to find housing that was affordable to them (called the "indigenous housing need").

Some of the obstacles effecting the availability of affordable housing base lessened due to the large downward shift in real estate values and mortgage rates, and modest decreases in rents from peak levels in the late 1980s. But the problem has not "gone away", because other obstacles, such as increased property tax burden for home owners and lost home equity have risen.

6.0 Analysis of Existing Zoning and Land Use Regulations

6.1 Zoning Districts

The Town's current zoning ordinance includes five of seven (non-overlay) zoning districts in which residential uses are permitted. Together they comprise the vast majority of the land area of the community. The only zones in which residential use is not permitted are the Office Research Zone and Industrial Zone which together total less than 10% of the total land area. The general residential provisions of the zones are as follows

- Residential -Agricultural (R/A): This is the basic underlying district in Stratham. The intent is to promote agricultural, low density residential and open space-conservation uses. Permitted residential uses include single and duplex units on individual lots and single, duplex and multifamily (up to 4 units per building) units in residential cluster developments. Manufactured housing is permitted anywhere in the district; however, conventional mobile homes are not permitted.

- Manufactured/Mobile Homes (MAH): Located south of Portsmouth Avenue adjacent to the Greenland Town line. This district permits manufactured housing, including conventional mobile homes, on individual lots, conventional subdivisions or in cluster developments. The underlying uses permit ted in the R/A district are permitted as well.

- Professional Residential (PRE): This zone extends along both side of Portsmouth Ave. from Bunker Hill to Mill Brook. It permits a mixture of residential and professional businesses. Single family and duplex units are permitted by right, cluster development is permitted by special exception and manufactured housing/mobile homes are not permitted.

- Town Center (TC): Located in the vicinity of the

Stratham Circle, the zone permits the same residential uses as the PRE district and permits small scale commercial and institutional uses.

- General Commercial (GC): Located along Portsmouth Avenue from NH 101 to just south of Bunker Hill Ave., this zone limits residential use to duplex units which are permitted by special exception. It is primarily designed for larger scale highway commercial development dependent on high traffic volumes.

6.2 Development Density

Since 1983, Stratham has employed soil-based lot sizing to determine lot size for conventional development and unit density for cluster development. Soil-based lot sizing is the accepted standard in Rockingham County as the best method for determining the density of development in areas served by on-site septic systems. By tying development density to the soil's capacity to assimilate waste effluent, soil-based lot sizing is less arbitrary than conventional lot zoning. Its use ensures that groundwater will not be degraded by the recharge from septic systems.

6.3 Cluster Development

Stratham allows and encourages cluster development as an alternative to standard residential subdivision practice. Cluster Development allows for the placement of buildings, roads and septic systems where they are best suited to the land and is commonly considered as a good zoning strategy for promoting affordable housing. By making best use of the land, limiting the linear extent of roads and utilities, and allowing for common water and septic systems, cluster development housing can be made more affordable than conventional development. It also can help protect large useable areas of open space in exchange for higher lot densities. The actual implementation of cluster development has not always met these objectives and has sometimes lead to higher densities and less useable open space than intended. The Cluster provisions of the ordinance are in need of review to increase the planning board's discretion in approving cluster development design and limiting the amount of wetland areas that can be calculated in the density determination.

6.4 Accessory Apartments

In 1990, the Town amended the zoning ordinance to permit accessory apartments, for the purpose as stated in the ordinance is "to provide a housing alternative for family member in a personal hardship situation, while maintaining neighborhood aesthetics..." Allowing accessory apartments is another important zoning measure which has the affect of increasing the supply of affordable housing Stratham's ordinance is somewhat limited in this respect in that it limits occupant of accessory apartments to family members.

6.5 Evaluation

As highlighted in the number of residential zones included in current zoning, Stratham permits a good diversity of housing types through its land use and zoning regulations. Considered as a whole, the ordinance provides a relatively high degree of flexibility for residential development -- especially compared to surrounding communities of similar size and development stage.

In evaluating the adequacy of zoning to accommodate housing need, two specific issues need to be examined: (1) the degree to which the remaining land available for residential use is sufficient to accommodate additional growth, and (2), technical compliance with New Hampshire manufactured statute (RSA 674:72).

In Chapter 8, **Existing and Future Land Use,** of the Master Plan, a build-out analysis is undertaken to assist in determining the adequacy of existing zoning to meet future needs. That analysis concludes that there are about 3700 acres of vacant developable land remaining in Stratham. This total excludes wetlands (hydric "A" and "B" soils, as well as conservation or other protected land. Under present zoning, approximately 3100 acres of this total, or about 84% are available for future residential development. According to the most recent NHOSP population projections (unpublished Draft, May 1997), Stratham is expected to grow from its 1995 population of 5524 to a projected population in 2015 of 8936. The following table illustrates that some 1376 additional housing units would be needed to meet that projection. Assuming a future net residential development density of approximately 1.50 acres per unit, an additional 2000 acres or so will be needed to accommodate this growth.

Table H-8
1993 Fair Share Housing Needs Apportionment
Prepared by the Rockingham Planning Comission per RSA 36:47

COMMUNITY	Indigenous Housing Need	Year Round Occupied Dwelling Units	Housing Need If Equal Distri-Bution	Excess Need	Fair Share Factor Average**	Excess Units Allo-Cated	Fair Share	Credits	Total Fair Share	Fair Share as %of 1990 Housing Units
Atkinson	62	1774	159	--	0.037	47	109	0	109	6.2%
Brentwood	28	755	68	--	0.032	40	68	1	67	8.9%
Danville	24	895	80	--	0.027	35	59	1	58	6.5%
E. Kingston	15	463	42	--	0.024	30	45	6	39	8.5%
Epping	114	1846	166	--	0.043	55	169	5	164	8.9%
Exeter	615	4975	447	168	--	0	447	0	447	9.0%
Fremont	36	865	78	--	0.031	40	76	4	72	8.3%
Greenland	85	1010	91	--	0.041	52	137	0	137	13.6%
Hampstead	107	2359	212	--	0.041	53	160	3	157	6.6%
Hampton	621	5046	453	168	--	0	453	0	453	9.0%
Hmpt. Falls	6	533	48	--	0.035	45	51	0	51	9.6%
Kensington	13	559	50	--	0.028	35	48	0	48	8.7%
Kingston	65	1911	172	--	0.042	54	119	1	118	6.2%
New Castle	25	345	31	--	0.031	40	65	0	65	18.8%
Newfields	11	312	28	--	0.028	36	47	0	47	15.2%
Newington	23	296	27	--	0.087	111	134	0	134	45.4%
Newton	81	1198	108	--	0.027	34	115	0	115	9.6%
No. Hampton	74	1387	125	--	0.041	52	126	0	126	9.1%
Plaistow	220	2601	234	--	0.052	66	286	0	286	11.0%
Portsmouth	1771	10329	928	843	--	0	928	52	876	8.5%
Rye	143	1905	171	--	0.041	53	196	0	196	10.3%
Salem	652	9185	825	--	0.157	201	853	0	853	9.3%
Sandown	60	1304	117	--	0.032	41	101	2	99	7.6%
Seabrook	355	2808	252	103	--	0	252	10	242	8.6%
So. Hampton	2	257	23	--	0.025	31	33	0	33	13.0%
STRATHAM	***70***	***1812***	***163***	--	***0.044***	***56***	***126***	***18***	***108***	***6.0%***
Windham	72	2830	254	--	0.057	73	145	0	145	5.1%
Total (Avg)	5350	59560	5350	1282	1.000	1282	5350	103	5247	8.8%

** The "fair share factor average" includes relative measures for five factors: employment, equalized assessed valuation, vacant developable land, median income, and total housing units valuation

NOTE:

This Housing Need Apportionment is intended for use as part of an overall Regional Housing Needs Assessment as required by RSA 36:47. The Rockingham Planning Commission does not support the use of this table to identify specific housing unit needs units to individual communities due to the inherent imprecision of any such apportionment method. It should be used only as a general indicator of housing needs within the region and as a reference in the preparation of local housing needs analyses.

Regarding total residential units, the available residentially zoned land appears to easily meet this need. The limiting factor for residential zoning, however, is likely to be in manufactured housing. According to the build-out analysis in Chapter 8, there are approximately 91 acres of vacant developable land in the Manufactured Housing district (MAH).

Table H-9
Projected Housing Needs for 2015
Stratham, N.H.

	1990	1995	2015	'95-'15 Change
Population	4955	5524	*8936*	*3412*
Persons/-Unit	2.58	2.48	*2.48*	--
Total Housing Units	1917	2227	*3603*	***1376***
Single Fam.	1193	1408	*2277*	***869***
Multi-Fam.	659	677	*1095*	***418***
Manuf. Hous	65	88	*142*	***54***

Source: NHOSP Current Estimates in Housing Supply, 1995 Update, November 1996
NOTE: Housing units include unoccupied units; - projected numbers in italics

Applying the same development density assumption of 1.5 acres/unit, this land could accommodate a maximum of 61 additional units — very close to the 54-unit projected need.

In conclusion on the first issue, given the amount of developable land zoned for residential purposes and the flexibility inherent in Stratham's zoning ordinance, sufficient residentially zoned land exists to meet the projected need for additional residential development.

Regarding compliance on manufactured housing, the statute requires that the Town "afford reasonable opportunities for the siting of manufactured housing" and that the majority of the residentially zoned land in the town permit such housing either on individually owned lots or in manufactured housing subdivisions. The combination of uses permitted in the R/A and MAH zones appear to meet this standard.

Regarding affordable housing, it is important that Stratham provide reasonable and practical opportunities for low/moderate income persons to obtain affordable housing. While it is not necessary nor expected that the Town will take steps to actually "provide" such housing, it is important that a realistic opportunity exist for private individuals and developers to fill the need for lower cost housing. The Town effects this through its development regulations and policies. In some communities, these policies and regulations are made unnecessarily restrictive in an attempt to discourage growth and the development of lower cost housing. While this is true in some cases, it must also be acknowledged that communities have an obligation to ensure that development standards are adequate to protect public health, safety and the environment and to protect against future public expenditures to correct for faulty design or construction. These standards inevitably, but necessarily, raise the cost of building houses. A reasonable test for the fairness of Stratham's Zoning land use regulations is that, when taken together, they do not place such stringent conditions on development so as to effectively discourage or preclude the development of lower cost housing.

Given the flexibility for residential development, including allowances for cluster development, including multifamily housing, manufactured housing subdivisions, manufactured housing on individual lots in most residential districts, duplexes, accessory apartments and soil-type lot sizing, the Town easily meets this test. That being said, there are several areas where the Town can make modest adjustment to existing development policies to promote the development of a more balanced housing supply.

Stratham already has many of the regulatory policies in place that are commonly recommended to promote a balanced housing supply. These include allowances for cluster development , multifamily housing, accessory apartments, and soil based lot sizing. Other techniques including incentive zoning, inclusionary zoning, modified development standards, and others are discussed in detail in the 1994 RPC *Regional Housing Needs Assessment.*

7.0 RECOMMENDATIONS

The 1985 Master Plan contained a number of policies and recommendations which the present Master Plan Committee believes remain, in whole or in part, valid.

These are included below. In most cases they have modified somewhat to reflect current needs.

1. As an overall goal the Town of Stratham should encourage a housing pattern that preserves and protects the Town's rural characteristics while providing diversified housing alternatives.

2. The Planning Board should undertake a review of current cluster development district regulations and propose changes, as needed. The following specific issues should be reviewed: the maximum density of development allowed under varying soil conditions; the quality and usability of open space for conservation and recreational uses; strengthen existing authority for the planning board to evaluate overall development design, (including use and location of open space; lot, building and road placement) by incorporating design guidelines into the Town's development regulations.

3. The Planning Board should encourage, as part of the review process, all large scale developments to dedicate land for open space.

4. The Planning Board should investigate and consider implementing innovative zoning and land use regulations, including the development of affordable housing in new residential developments to help maintain a balanced housing supply.

5. The Planning Board should consider proposing an overlay zone for elderly housing which would include provisions designed to encourage the development of such housing, including a larger limit in units per building, collocation of limited health care facilities, and others as needed.

6. The Planning Board should review the existing Mobile Home District (MAH) and consider and recommend alternatives, including expanding or establishing additional districts, to assure that the opportunity for manufactured housing continues in Stratham. The review should specifically examine the remaining development potential within the existing MAH district.

7. The Planning Board should encourage the provision of useable open space in all residential developments.

8. The Planning Board should include sufficient rights of way in residential subdivisions to allow for the construction of future utilities, sidewalks and bicycle paths. Where appropriate to the location, size and expected residential population, sidewalks and bicycle paths should be included in residential development designs.

In addition to the above the following new recommendations are made:

9. The Planning Board should monitor the need for additional land zoned for Manufactured Housing and identify areas that may be suitable for a modest expansion of the existing zone to accommodate projected needs beyond 2015.

10. In an effort to encourage the use of single family cluster development, the Town should consider reducing the minimum size of individual lots in clustered development from the existing 30,000 square feet to between 15,000 and 20,000 square feet, to be determined by the Planning Board .

11. The Town should revise the current accessory apartment provisions in the zoning ordinance to remove or modify stipulations which tend to discourage its use.

TRANSPORTATION

1.0 INTRODUCTION

An important factor in Stratham's future development will be the impact of additional growth in traffic on the highway network. Stratham, like many other seacoast New Hampshire towns, developed along waterways and trails connecting it to larger nearby communities -- in Stratham's case-- Portsmouth and Exeter. In contemporary times Stratham has developed with primary reliance on the automobile and the highway network. Other forms of transportation, though represented, are of lesser consequence. As the community has grown residentially and commercially the roadway network has expanded to serve newly developed areas and land uses. In recent years, Stratham's commercial businesses have become much more of a destination point to an increasing number of nearby residents. The steady increase in traffic volumes that has accompanied this growth has resulted in a rise in congestion, traffic accidents and traffic circulation problems, particularly on and adjacent to Portsmouth Avenue. The planned reconstruction of NH 101 will have a major and prolonged impact on the Town as the project moves into final construction phases over the next four years. The convergence of other major routes (State Routes 33 and 108) in Stratham continues to generate traffic volumes and congestion that push local roads to their capacity. Maintenance and expansion of the roads, improvements in circulation, and wise planning of the location and extent of further development will all play an important role in the Town's future.

Many of the Transportation challenges facing the Town are associated with Portsmouth Avenue and the continued impact of growth along this major highway. The recently concluded Stratham Community Stewardship process highlighted a large number of important issues related to transportation. These issues, along with others identified by the Master Plan Committee include the following:

- poor road systems circulation, especially in the residential areas west of Portsmouth Avenue;
- poor east-west road intersection alignment in several locations along Portsmouth Avenue;
- lack of signalization at several major intersections along Portsmouth Avenue;
- inadequate capacity of secondary roadways east of Portsmouth Avenue and safety concerns about bicycle and pedestrian use of these roads;
- the need to contain the linear extent of further commercial development on Portsmouth Avenue;
- the future configuration of the Stratham Circle and its impact on the Town Center District;
- the development of secondary service roads to connect commercial developments on Portsmouth Avenue and consolidate existing curb cuts.

This chapter provides an overview of Stratham's transportation system, reviews the recommendations contained in the NH 101 Feasibility Study and attempts to address the issues listed above.

2.0 EXISTING TRANSPORTATION SYSTEM

2.1 Highways

Highway Classification

Stratham relies primarily on its highways to provide the transportation network for private cars, trucks and buses. Stratham is served exclusively by State-classified Class I, II and V highways. Class I roads are State maintained primary or trunk line highways. As shown in Table 1 there are presently 9.96 miles of Class I highways in Stratham which include NH 101, NH 33 and part of NH 108. Class II roads are State maintained secondary highways. There are 7.72 miles of Class II roads in Stratham, including NH 108, (North of the Circle), Bunker Hill Avenue, Winnicutt Road, and Squamscott Road, Stratham Heights Road was formerly a State maintained road, but was turned over to the Town by agreement in 1995 when the signalized intersection was installed at the intersection with Portsmouth Avenue. All other roads in Town, except for privately owned and maintained roads, are Class V "Rural Highways" which are the responsibility of the Town to maintain. Class V roads number 31.8 in mileage according to the NHDOT and are the only road type that has grown appreciably in

Table T-1
Road Mileage in Stratham by State Classification

STATE CLASS	1970	1975	1980	1984	1995
Class I (State maintained)	9.59	9.59	9.59	9.59	9.96
Class II (State maintained)	7.78	7.80	7.80	7.80	7.72
Class V (Town maintained)	13.71	13.71	18.02	20.41	31.86
TOTAL	31.08	31.10	35.41	37.80	49.54

NOTE: There are no Class III (recreational roads), Class IV (urban compact) or Class VI (discontinued public ways) listed for Stratham
Source: NH Department of Transportation

the past several decades. New residential subdivision streets that are turned over to the Town become Class V roads once they become public. It should be noted that Town records indicate that there are more than 45 miles of Class V road in Stratham. The source of this discrepancy has not been researched.

In 1970 and 1975, before the years of rapid residential subdivision development in Stratham, the Town had about 14 miles of Class V road; by 1980 it had grown by about 29% to 18 miles. By 1995, the most recent count available, the mileage had increased to nearly 32 miles, representing another 78% increase. Since 1975, the Town has, on average, increased its town-maintained road mileage by nearly 4.5% per year. **Map T-1 – Transportation and Utilities Map** – shows the state roadway classifications for roads in Stratham.

In 1993 the NHDOT, in cooperation with the Federal Highway Administration and regional planning commissions, established a revised functional classification of all highways in New Hampshire. These classifications, which complement the State classifications, are primarily based on the traffic capacity and volumes attributed to the roads. They are important because they are used to determine where and under what conditions Federal highway funds may be utilized. Roads that have a functional class of Collector or higher are eligible for Federal highway funds. There are four classes, each represented in Stratham:

Principal Arterial: Serves major centers of activity, the highest traffic volume corridors, and the longest routes. In addition, they generally carry the major portion of traffic entering and exiting the community.

Minor Arterial: Links and supports the principal arterial system. Minor arterials are roads which place a greater emphasis on land access than the principal arterial and therefore offer a lower level of mobility.

Collector: Provides both access to land uses along the roadway and circulation within residential neighborhoods, and commercial and industrial areas. It differs from the arterial system in that the facilities on the collector system may penetrate residential neighborhoods. Conversely, the collectors also collect traffic from the local streets in residential neighborhoods and channel it into the arterial system.

Local Roads: Comprise all facilities not on one of three systems described above. Their function is to primarily provide direct access to abutting land and access to the higher order systems. They offer the lowest level of mobility, and service to through traffic movement is usually deliberately discouraged.

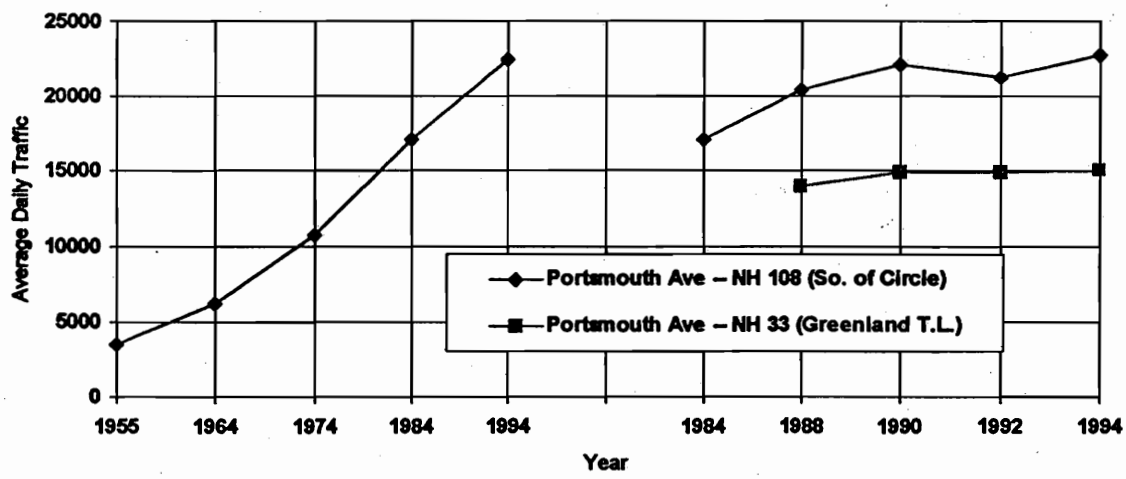
Under this system, NH Route 101 is classified as a principal arterial, and NH 108 South of the Stratham Circle and NH 33[1] are classified as minor arterials, and NH 108 north/west of the Circle is a major rural collector. The balance of Stratham's roads are classified as local roads which feed traffic into either collectors or arterial roads.

Traffic Volumes and Growth

Stratham has exhibited significant increases in traffic volumes over the past several decades. In an effort to monitor changes in traffic volumes the NHDOT and RPC conduct annual traffic counts using automatic recorders at varying locations throughout the region. In addition, the NHDOT maintains a network of permanent counters at key locations around the State to monitor long term trends. One such device is located in Stratham on Portsmouth Avenue just south of the Stratham Circle for which volume records are available dating back forty years. These records, as depicted in **Figure T-1**, show steady growth of Average Daily Traffic (ADT, bi-directional) volume from 3,457 in 1955 to 11,074 in 1975, to nearly 23,000 in 1994.

Recent traffic volume statistics for other locations in Stratham are shown in **Table T-2 and Figure T-2.** Not surprisingly, the road segments with the highest volume are on Portsmouth Avenue in the vicinity of Shaws and Kings Highway Plaza, showing 32,641 ADT in 1995. At the other end of Portsmouth Avenue near the Greenland town line, volumes are less than half that amount -- about 15,000 ADT. This is readily explained first by the branching of NH 108 and its associated traffic (11,000 ADT) at the Stratham Circle and second by the additional localized traffic at the southern end of Portsmouth Avenue which is transiting to and from Exeter and/or NH 101. The Greenland end of Portsmouth Avenue has experienced traffic growth at about the same rate as the southerly sections. Traffic volume at the Green-land town line grew from 9,000 ADT in 1980 to 15,000 today -- an annual average growth rate of 3.5%. At the permanent recorder station south of the Circle, traffic volume grew at an average rate of 4.1% per year over the same period.

Figure T-1
Traffic Volume History -- Portsmouth Ave., Stratham



With the growth in congestion on Portsmouth Avenue has come an increase in the use of secondary roads to bypass Portsmouth Avenue. These secondary roads include Stratham Heights Road, Bunker Hill Avenue, Union Road, Winnicutt Road and others. Although long term historical data is not available, recent trends can be inferred from the changes in volume measured from 1990 to the present, as shown in **Table T-3.** The counts taken at Stratham Heights road in 1990 and 1996 are not comparable because the 1990 count was positioned west

[1] NH 33 is the portion of Portsmouth Ave. that runs from the Stratham Circle to the Greenland Town line and was formerly designated as NH 101.

Table T-2
Recent Traffic Counts in Stratham

Road	Location	ADT	Year	Type	Source
NH 108	Newfields T.L.	15,540	1994	AADT	NHDOT
NH 108	north/west of Circle	11,000	1994	AADT	NHDOT
NH 108	south/west of Bunker Hill Ave.	22,795	1994	AADT	NHDOT (perm sta.)
NH 108	near NH 101 interchange	32,641	1994	AADT	NHDOT
NH 33	Greenland T.L.	15,000	1994	AADT	NHDOT
NH 33	Over Mill Brook	24,000	1995	AADT	NHDOT
Winnicutt Rd.	near NH 33	3,016	1995	ADT	RPC
Squamscott Rd.	Not indicated	5,360	1990	ADT	NHDOT (KCI)
High St.	north of Union	801	1996	ADT	RPC
Union Rd.	east of Bunker Hill Avenue	897	1996	ADT	RPC
Lovell Rd.	Near NH 33	988	1994	ADT	RPC
Bunker Hill Avenue	Near NH 33	2461	1994	ADT	RPC
Frying Pan Lane	Near NH 33	989	1994	ADT	RPC
Stratham Heights	at Guinea Road	1,536	1996	ADT	RPC
Guinea Rd.	Exeter T.L.	1,990	1996	ADT	RPC

AADT=average annual daily traffic which has been factored for seasonal variation
ADT = average daily traffic, uncorrected for seasonal variation.

of Guinea Road (and captured traffic traveling between Portsmouth Avenue and Guinea Road), while the 1996 count was positioned east of Guinea Road and therefore missed this popular bypass. The decline in ADT on Union Road is not readily explained except by assuming that the counts were taken on different sides of the intersection with Winnicutt Road. The unusually large increase in the volume on Bunker Hill Ave. is partially explained by the opening of the Municipal Center in 1991. Bunker Hill Avenue and Winnicutt Road counts show what most Town residents can attest to: the amount of traffic on these back roads is growing at least as fast as on Portsmouth Avenue itself. Unfortunately, these roads were not designed to safely accommodate high volumes of traffic. Poor sight distances and sub-standard road and intersection alignments are common. The frequent use of these roads by pedestrians and bicyclists raises safety concerns

Circulation

Figure T-3 -- Average Weekday Traffic Bandwidth Diagram provides a graphical view of the relative size of traffic flows on Stratham's major roads and in neighboring communities. This map was included in the *NH Route 101 Feasibility Study* (1992) conducted by the NHDOT. Although the traffic volumes have grown somewhat since then, the relative volumes for the roads remain valid.

Portsmouth Avenue acts as the central spine for travel in Stratham, connecting the Town with NH 101 and Exeter to the south and Greenland and Portsmouth to the north. Portsmouth Avenue and NH 108 likewise connect Stratham to Newfields, Newmarket and Durham.
As previously discussed, a secondary circulation pattern has developed as an alternative to Portsmouth Avenue. Motorists use a combination of Stratham Heights Road connecting to Union and Winnicutt Road as a bypass around the most congested portions of NH 101. Although the 1992 NH 101 Feasibility Study proved that travel times on this "bypass" are slightly greater (by about 2 minutes) than traveling on 101, many people prefer the relative free flow of travel even if there is a time penalty.

Other alternative circulation patterns in evidence are NH 108 to NH 33 north via Squamscott Road; High Street short cut onto Winnicutt Road, and the Stratham Heights Road--Guinea Road--Hampton Rd. connection which serves as a back entrance between the south side of Exeter and the congestion sections of Portsmouth Avenue.
The Town's road network on the east side of Portsmouth Avenue provides relatively good circulation to the existing residential development. The same is not true of the residential roads on the west side, both north and south of the Stratham Circle. At present none of these roads (River Road, Raeder Drive, Butterfield Lane, Jason Drive and Depot Road) connect with one another on their interior ends. This means that virtually all trips originating from these residential areas must access Portsmouth Avenue, regardless of destinations.
Likewise, circulation from the western to eastern sections of Stratham is made more difficult by the poor alignment of intersecting roads between east and west. Examples of this are River Road/ Frying Pan Lane, Raeder Drive/ Bunker Hill Avenue; Squamscott Road/ Crestview Terrace. As a result of these non-alignments, additional traffic and Portsmouth Avenue.

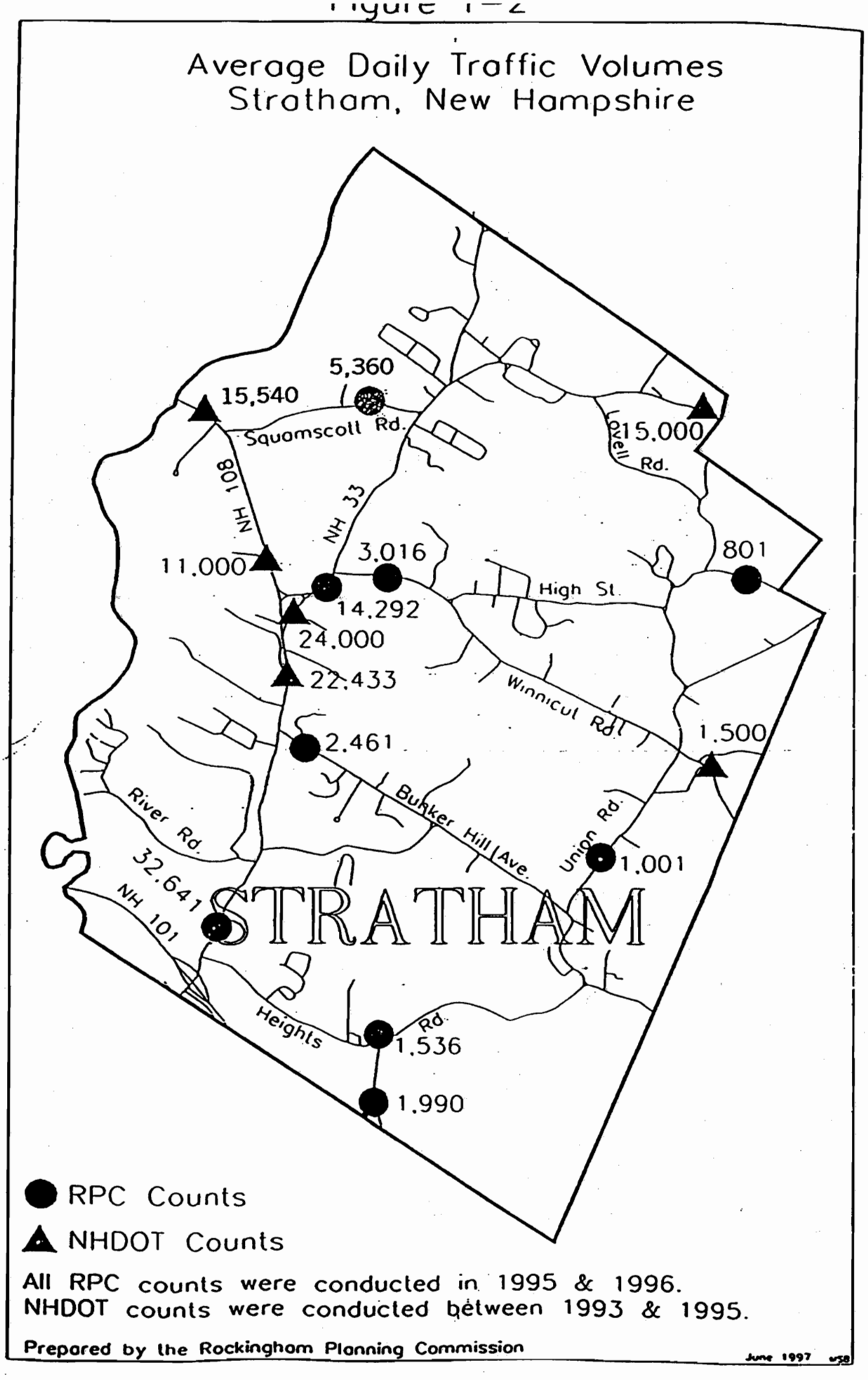
Levels of Service

The 1992 NHDOT 101 Feasibility Study included a comprehensive level of service analysis for the major intersections along Portsmouth Avenue. The results of

Table T-3
Secondary Road Traffic Counts

Road	1990 ADT	1995 ADT	1996 ADT	Avg. Annual Growth
Stratham Heights Road	1900	na	1536	-3.5%
Bunker Hill Avenue	1600	2461	na	9.0%
Winnicutt Rd.	2600	3016	na	3.0%
Union Rd.	1400	na	1023	-5.1%

Figure 1-2


Average Daily Traffic Volumes
Stratham, New Hampshire
5,360
15,540
Squamscoll Rd.
15,000
Lovell Rd.
NH 108
NH 33
11,000
3,016
801
High St.
14,292
24,000
22,433
Winnicut Rd.
2,461
1,500
River Rd.
Bunker Hill Ave.
Union Rd.
1,001
32,641
NH 101
STRATHAM
Heights
Rd.
1,536
1,990
RPC Counts
NHDOT Counts
All RPC counts were conducted in 1995 & 1996.
NHDOT counts were conducted between 1993 & 1995.
Prepared by the Rockingham Planning Commission
June 1997

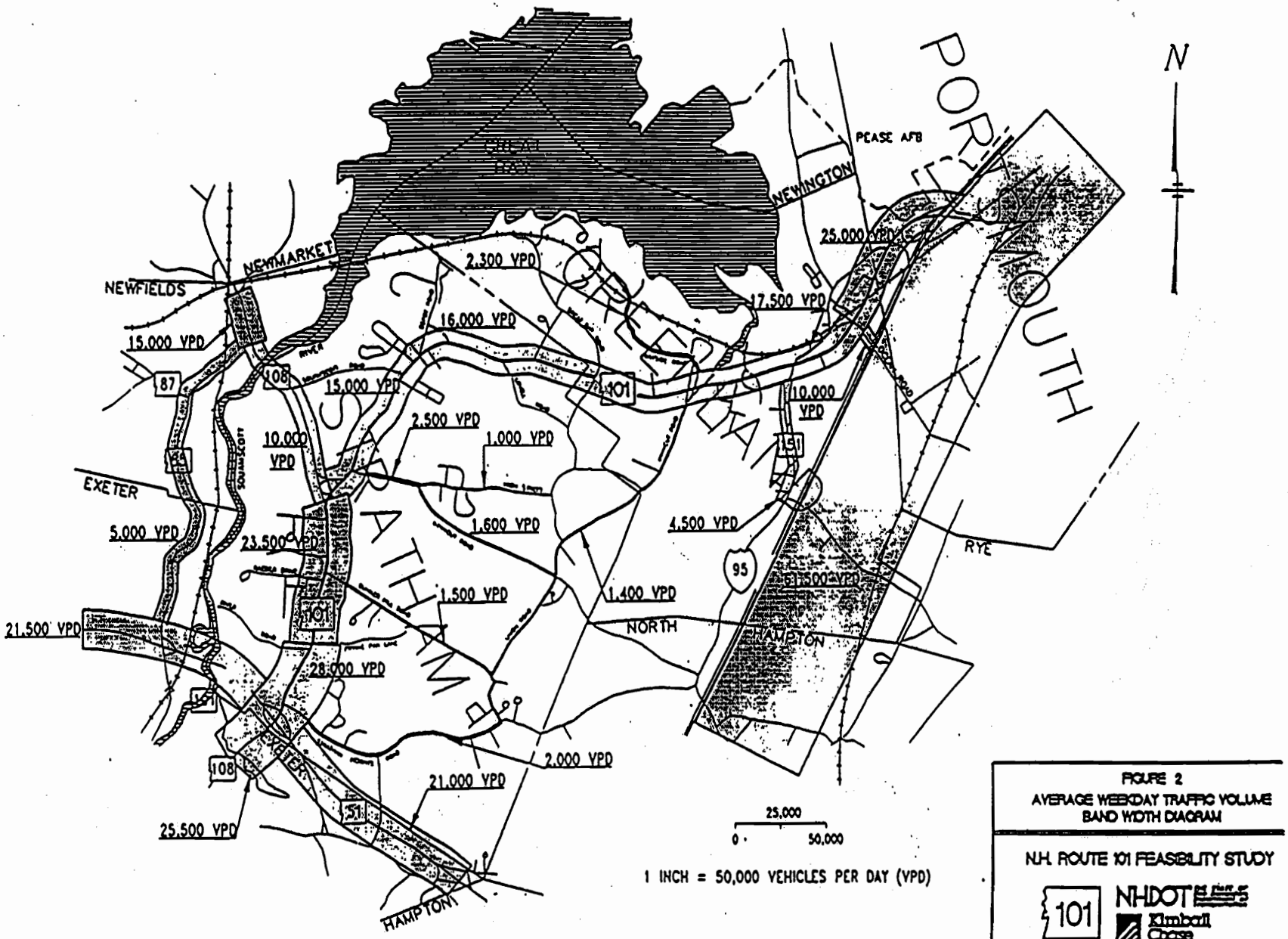


Figure T-3 Average Weekday Traffic Volume Band Width Diagram

Table T-4

Intersection Capacity Analysis
Summary of Existing Conditions--1992

Stratham	AM Peak Hour (LOS)*	PM Peak Hour (LOS)*
NH101 / NH108 EB Ramps		
-existing signalized intersection	B	B
NH101 / NH108 WB Ramps		
-existing unsignalized intersection	F	F
-potential signalized intersection	B	B
NH108 / Stratham Heights Road		
-existing signalized intersection	na	D
-w/ potential left turn lane on NH101/108		A
NH101 / 108 Shaws Plaza		
-existing signalized intersection	na	C
NH101 / 108 / Market Basket/Kings Plaza		
-existing signalized intersection		D
-with potential 2nd through lane on NH101/108 WB approach	na	B
NH101/108 Bunker Hill Road		
-existing unsignalized intersection	na	F
NH101/108 Winnicutt Road		
-existing unsignalized intersection	na	F
-potential signalized intersection		B
NH101 / Squamscott Road		
-existing unsignalized intersection**	F	F
-potential signalized intersection**	B	B

* LOS = level of service; A = free flow, no delay; F = extreme congestion; maximum delays

** intersection was unsignalized at the time of the 101 Study; signals and turning lanes were subsequently installed as a safety improvement as a joint NHDOT/Stratham funded project

this analysis are shown on Table T-4. Of the four intersections showing a level of service of "E" or "F," the NH 33/ Squamscott Road intersection has since been signalized due to its history of serious accidents. The NH 101/108 West Bound ramp will be fully reconstructed and signalized as part of the NH 101 Expansion Project. The remaining two -- Bunker Hill Avenue and Winnicutt Road -- are not presently scheduled for signalization. At the time of the NH 101 Feasibility Study, the Bunker Hill Road intersection did not meet the minimum signalization warrant standard (because of too low minor street volume). However, the warrant was re-analyzed by the RPC in 1995 and found to meet signal warrants.

Travel Patterns

Origin-Destination Study

The Route 101 Feasibility Study included a full roadside origin-destination travel survey. Approximately 25% of all vehicles passing the survey station (south of Bunker Hill Avenue on Portsmouth Avenue) during a full day (6am-6pm) were stopped and interviewed to determine their trip purpose, origin and destination. A vast amount of information was collected about the travel patterns of Portsmouth Avenue users. The results which are included in the 101 Study are summarized as follows:

- **Trip Purpose**: 54% of trips were work related; 20% were for shopping; 8% were for recreation; 5% were for school and medical each, and 9% were for other purposes.
- **Vehicle Type**: 76.9% of vehicles were automobiles; 20.7% were 2-axle trucks of all types; 1.7% were semi-trailers; less than 1% were motorcycles and buses.
- **Origins:** Nearly 40% of trips origins were in Exeter, followed by Stratham at 18%, then Brentwood-Kingston, Manchester and all other NH and Mass. -- all less than 10%.
- **Destinations:** Trip destinations were divided nearly evenly between Stratham and Portsmouth at about 26% each, followed by Newmarket (12%) and Maine (11%). Oddly, very few trips on Portsmouth Ave. (<1%) were destined for Exeter -- a result that is probably erroneous.

Commuting Patterns

An analysis of commuting patterns was obtained through data received from the 1990 U.S. Census on place of residence by place of work. Although this data is limited in scope, it is useful in identifying broad patterns of commuting to and from Stratham.

Approximately 2,630 Stratham residents commuted to a job in 1990. Approximately 2,467 or 94 % of residents commuted either alone or car pooled. The majority of commuters stayed within New Hampshire for employment. **Table T-5 -- Journey-to-Work** is a compilation of the 1990 Census data for residents commuting from Stratham to work in other locations and for workers from other locations commuting to Stratham. In 1990, nearly 75% of Stratham residents worked in New Hampshire and 50% worked in the nearby seacoast towns of Portsmouth, Exeter, Hampton, Seabrook -- or Stratham itself. About 17% of working residents commuted to jobs in Massachusetts; 3.3% commuted to Boston.

Public Safety and Highway Accidents

There are several locations in Town with a high incidence of traffic accidents. Many of these locations are characterized by high traffic volumes and/ or multiple curb cuts. In 1995, traffic accidents happened most frequently at the locations listed in **Table T-6** and shown on **Figure T-4**.

Table T-6
Most Frequent Accident Locations

Location	No.	% of Total
NH 108/NH101 interchange	22	19.8%
NH108/Kings Plaza and North to Frying Pan Ln.	15	14%
Stratham Circle (all segments)	7	6.3%
NH 108: Shaw's Plaza	6	5.4%
NH 108/Stratham Heights Rd.	4	3.6%
NH 108/Squamscott Rd.	4	3.6%

The Squamscott Road/NH 33 intersection, the site of many serious traffic accidents in the past, has been addressed by the installation of traffic signals and turning lanes. Accidents along Portsmouth Avenue between the shopping plazas are usually minor to moderate in nature due to the relatively low travel speeds. Serious accidents are more likely at Bunker Hill and Winnicutt Road due to the higher average speeds of traffic in those locations. A record of total motor vehicle accidents for the past five (5) years is shown in **Table T-7** below. No obvious trend regarding an increasing or declining number of accidents is in evidence; this may be related to the relatively slow growth in traffic volume that occurred over this period.

There is growing concern about pedestrian and bicycle safety due to the lack adequate shoulders on many of the highly traveled secondary roadways. As bicycle and pedestrian usage on these roads increases (especially on roads used by school children traveling to Memorial School and the new Middle School) the potential for serious accidents will grow.

TABLE T-7
Motor Vehicle Accidents

Year	# Motor Vehicle Accidents	# Involving Injury
1992	215	50
1993	254	52
1994	229	67
1995	203	41
1996	244	47

Source: Stratham Town Reports

An additional immediate safety concern is the capacity and geometry of Guinea Road to safely accommodate the high volume of school buses, cars, bicycles and pedestrians that will use this road after the new Cooperative Middle school opens in the Fall of 1998. The road will need significant improvements, including possible widening and signalization at the intersection with NH 27 and the addition of sidewalks and crosswalks at and near the school.

Emergency Vehicle Access

Two characteristics of the Town's transportation system have the potential to negatively impact public safety and, in particular, emergency vehicle access. First is the high degree of peak hour traffic congestion on Route 108 near the Exeter Town line. At these peak periods it becomes difficult Fire and Police vehicles to travel this route -- the main route to the Exeter Hospital -- to respond to emer-

gencies. Absent an alternative road in close proximity to this route to the west end of Town, this represents an impediment to public safety. Secondly, the preponderance of dead end streets which do not connect with one another, particularly on the west side of Portsmouth Avenue, could prevent emergency vehicle access should the single dead-end roadway become temporarily blocked.

Other Highway Issues

Truck Traffic

As the area grows, additional truck traffic can be expected. In order to ensure that trucks use the proper roads, the town should enforce RSA 47:17, Section VIII "Traffic Devices and Signals" which empowers the Board of Selectmen:

> "To make special regulations as to the use of vehicles upon particular highways, except as to speed, and to exclude such vehicles altogether from certain ways; to establish stop intersections, erect and provide for the control of traffic by, stop signs or other traffic devices or signals which shall conform to standards set by the highway commissioner and shall be approved by him as to type, size, installation and method of operation."

This RSA allows Stratham to adopt an ordinance restricting vehicles above certain weights (to be determined by the road agent) from designated Town roads during seasonally wet periods.

Dead-End Roads

There are a large number of dead-end roads in Stratham. The town now limits the length of dead-end roads to 800 feet. This policy is in place because long dead-end roads create an inefficient road network which tends to require the use of a small number of major roads for most trips (e.g. Portsmouth Ave.) and necessitating that vehicles retrace routes. It also is a safety concern due to longer than necessary travel time and possible blockages to access. A large number of residences served by only one access increases the risk of emergency vehicles not being able to respond because the one road entrance is blocked for some reason. For these reasons, the Planning Board should maintain and enforce the limit on the length of dead-end streets.

Route 101 Reconstruction

The NHDOT's plan to reconstruct 17 miles of highway from Epping to Hampton will have a significant effect on the Town of Stratham. The plan will expand the existing two lane roadway into a four lane, limited access, divided highway. Most of the new highway will either closely parallel or replace the existing road. The Route 101 Expansion project began construction in 1992 with the reconstruction of the Route 85/101 interchange and the bridge replacement over the Squamscott River; reconstruction of the Route 101/108 interchange and the associated widening of Portsmouth Avenue are expected to be completed in 1999. The State's target is to complete the entire 17 miles of reconstructed highway by the year 2001.

Scenic Roads

Roads may be designated within a town as scenic roads, as specified by RSA 231:157. In order to designate any road in a town as scenic, other than a Class I or Class II highway, 10 persons owning land abutting the proposed road can petition the town to do so. In turn, the Town votes on it at any regular or special town meeting. Voters can also rescind the designation of a scenic road at a regular meeting upon petition.

There are two potential benefits for the town in designating scenic roads. First, it establishes a procedure for protecting the rural landscape within a public right-of-way. Secondly, it can demonstrate the public's interest to preserve the rural and historic qualities of a road. Both can help preserve the scenic quality of the road in the event that changes to the road are proposed (i.e. widening, removal of walls and trees, etc.).

The effects of designating a road scenic are detailed in RSA 231:158. Included are restrictions upon the repair, maintenance, reconstruction or paving work which is done to the road. Two important facets of the designation are that it does not affect the eligibility of the Town to receive construction, maintenance, or reconstruction funds, or affect the rights of any land owner. To date, no roads have been designated in Stratham as "scenic". An effort to designate Stratham Heights, Union and River Roads as Scenic Roads in 1995 failed at Town Meeting.

2.2 Public Transportation

Limited public transportation service is available in Stratham through COAST (the Cooperative Alliance for Seacoast Transportation). COAST provides both a "demand-response" service and a newly established fixed

route service. The demand-response service is provided through Lamprey Health Care and is available by arrangement for medical and shopping trips for the elderly and disabled. In 1995, COAST inaugurated a new fixed route service, known as Route 7, which connects Exeter to Portsmouth and Newington via Stratham and Greenland. Route 7 runs 5 days per weeks making four round trips per day. The bus stops in two locations in Stratham, Kings Plaza (Stratham House Restaurant) and the NH Technical College. The Technical College played a key role in initiating and funding the Route to provide alternative means of transportation to students with no cars.

COAST reports steady growth in ridership on Route 7. However, the continuation of the service will depend on the continuation of Federal Transit Administration subsidies, as well as financial support from communities and organizations served by the route. The Town should consider modest financial support for the service, to help ensure that the service remains in place. In the future, such service may play a much more important role in reducing traffic congestion on Portsmouth Avenue and increase mobility for students and the elderly and other dependent on transportation.

2.3 Rail

One active rail line exists in Stratham. Known as the Portsmouth branch, the line connects the B&M Main Line (running through New Hampshire via Exeter and Dover) to Portsmouth via Newfields, Stratham and Greenland. This line primarily serves the NH Port Authority, the Portsmouth Naval Shipyard and several businesses along the Hampton Branch line. The line is in poor condition and supports maximum speed of only 10 mph. Presently, an average of one train per day travels the line between Portsmouth and Rockingham Junction in Newfields. The railroad bridge crossing the Squamscott River mouth blocks River access from vessels with a freeboard of greater than 5 to 6 feet at high tide. Any rehabilitation of the line and/or bridge should be required to include the restoration of the swing function of the bridge to allow unimpeded access to these navigable waters.

Passenger rail service on the B&M Mainline may become accessible to Stratham residents once again should the proposed Amtrak service between Boston and Portland proceed as planned. This service, which is now projected to start in the summer or fall of 1998 would run on the Boston & Maine main line and include station stops in Exeter and Dover. Three to four round trips per day are expected.

COAST has indicated its intent to coordinate its bus schedules with those of the train service, in which case, it would be possible for Stratham residents and daily commuters to access the train using public transportation. Although a number of issues between Amtrak and Guilford Transportation (the B&M) are yet to be resolved, it appears that rail passenger service will be restored from Portland to Boston and will include a stop in Exeter.

2.4 Pedestrian Travel

While not normally considered an alternative mode of transportation, pedestrian movement does, in fact, represent another means of travel and as such merits consideration. While the Town has no sidewalk system, about 25 Stratham residents walk to work (according to the 1990 Census) and many children walk to and from school. In terms of location, pedestrian travel occurs most frequently on sidewalks, paved and unpaved shoulders and road rights of way.

In general the Town does not encourage the construction of sidewalks in new residential subdivision construction. This is because the residential development in Stratham lacks sufficient population density to warrant their construction and maintenance expense. The Public Works Department does not have the available workforce to maintain sidewalks. However, in the future, the Town should consider adding sidewalks in areas with high pedestrian and bicycle usage. Three examples are along the roads close to Memorial School, within and connecting the Shopping Centers along Portsmouth Avenue, and on Guinea Road serving Exeter Region Cooperative Middle School (scheduled to open in 1998).

2.5 Bike Travel

Bicycle transportation represents a seasonally dependent alternative to motorized transportation in Stratham. According to the 1990 Census, few Stratham residents -- less than 1%-- utilize bicycles to travel to and from work. However, there is a fairly significant number of youth (primarily elementary students) who travel to and from school by bicycle. In contrast to the relatively low number of bicycling commuters, a large and growing number of individuals use bicycles for recreational purposes. Many of the roads in Stratham most used by bicyclists have inadequate shoulders to accommodate

Table T-5
Journey-to-Work Data for Stratham
1990 Census

Residents Commuting *FROM* Stratham *TO*:

New Hampshire	Total Workers	1,958
WORKPLACE	WORKERS	% OF TOTAL
Portsmouth	451	17.1%
Stratham	376	14.3%
Exeter	302	11.5%
Hampton	114	4.3%
Seabrook	90	3.4%
Newington	74	2.8%
Rye	55	2.1%
Newfields	46	1.7%
Manchester	42	1.6%
Dover	42	1.6%
New Castle	36	1.4%
Somersworth	35	1.3%
North Hampton	33	1.3%
Rochester	31	1.2%
Greenland	26	1.0%
Other Towns	205	7.8%
Total New Hampshire	1,958	74.4%

Massachusetts	Total Workers	456
WORKPLACE	WORKERS	% OF TOTAL
Boston	88	3.3%
Newburyport	79	3.0%
Andover	62	2.4%
Danvers	33	1.3%
Wilmington	33	1.3%
Amesbury	31	1.2%
Other Towns	130	4.9%
Total Massachusetts	456	17.3%

Maine	Total Workers	83
WORKPLACE	WORKERS	% OF TOTAL
Kittery	68	2.6%
Portland	10	0.4%
Kennebunk	5	0.2%
Total Maine	83	3.2%

Other Locations	Total Workers	133
WORKPLACE	WORKERS	% OF TOTAL
Other Locations	133	5.1%
All Workers from Stratham	2,630	100%

Workers Commuting *TO* Stratham *FROM*:

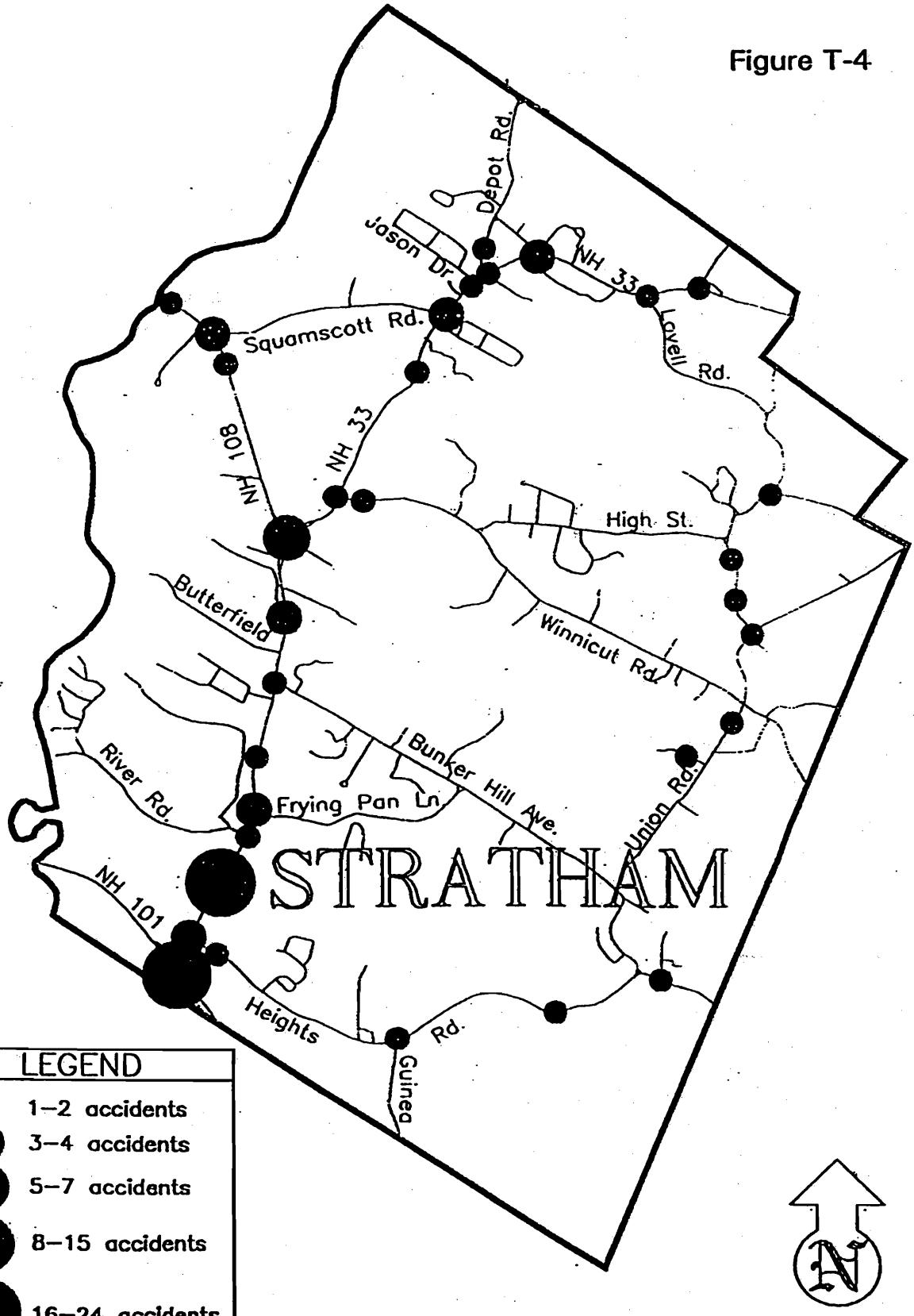
New Hampshire	Total Workers	1,901
RESIDENCE	WORKERS	% OF TOTAL
Stratham	376	18.4%
Exeter	273	13.3%
Newmarket	200	9.8%
Portsmouth	102	5.0%
Dover	88	4.3%
Rochester	71	3.5%
Epping	51	2.5%
Hampton	51	2.5%
Durham	47	2.3%
Brentwood	46	2.2%
Kingston	46	2.2%
Raymond	45	2.2%
Manchester	36	1.8%
Somersworth	36	1.8%
Nottingham	35	1.7%
Kensington	31	1.5%
North Hampton	30	1.5%
Newfields	28	1.4%
Barrington	28	1.4%
Greenland	22	1.1%
Derry	21	1.0%
East Kingston	21	1.0%
Lee	21	1.0%
Strafford	21	1.0%
Fremont	20	1.0%
Other Town	155	7.6%
Total New Hamsphire	1,901	92.8%

Massachusetts	Total Workers	45
RESIDENCE	WORKERS	% OF TOTAL
Salisbury	10	0.5%
Haverhill	9	0.4%
Plymouth	8	0.4%
Georgetown	7	0.3%
North Andover	7	0.3%
Amesbury	4	0.2%
Total Mass.	45	2.2%

Maine	Total Workers	103
RESIDENCE	WORKERS	% OF TOTAL
Kittery	45	2.2%
Kennebunk	16	0.8%
South Berwick	13	0.6%
Eliot	12	0.6%
York	9	0.4%
Lebanon	6	0.3%
Arundel	2	0.1%
Total Maine	103	5.0%
Total Workers	2,049	100.0%

Stratham, New Hampshire
Accident Locations

Figure T-4



LEGEND

- 1–2 accidents
- 3–4 accidents
- 5–7 accidents
- 8–15 accidents
- 16–24 accidents

Source: Stratham Police Department 1995 accident reports
Prepared by the Rockingham Planning Commission

October 1996

them safely. This is generally true of all of main secondary roads in town, as previously identified.

The NHDOT and Seacoast MPO have jointly developed a regional bicycle plan which is designed to create a basic network of bike route statewide. This network is designed to serve non-recreational users, and as such, often follows high volume state route. Four roads in Stratham are included on the state/regional bicycle routes network: NH 108, NH 33, Squamscott Road and Winnicutt Road (see **Map T-2**). As these roads are reconstructed in the future, the State will include 4 ft. (or wider) paved shoulders in each direction to be used as bike paths. As each functional segment of the bicycle network is constructed, the shoulders will be striped, and signed to invite public use. The town's planning and site review process should be cognizant of these plans and incorporate bicycle facilities in site and subdivision plans wherever appropriate.

2.6 Park and Ride Lots/ Ridesharing

The NHDOT has constructed 21 park and ride lots around the State in support of individual efforts to carpool. There are no such lots in Stratham however, the NHDOT maintains a park and ride lot in Hampton. The lot is located on Route 27 near the I-95 toll plaza and is well situated to serve Stratham residents who commute via I-95. This lot was recently upgraded and expanded to include pavement and striping, lighting and a public telephone. This lot is served by daily commuter buses to Boston operated by the Coach Company. The lot has the capacity for approximately 65 cars and averages half to two-thirds utilization on a typical weekday. An additional combination P&R lot and intermodal bus terminal will be constructed in 1998 on Pease Tradeport property adjacent to Exit 3 on I-95. Hourly weekday commuter service to downtown Boston and Logan airport, and frequent weekend service, will be available from this lot via C&J Trailways.

Organized Ridesharing is an important opportunity for residents who commute long distances to their jobs. The NHDOT, in cooperation with the Seacoast MPO and COAST has initiated ridematching services in order to help commuters find potential ridematches. Individuals may call the NHDOT Rideshare coordinator at 1-800-462-8707 and have their commute requirements entered into a database which can then be searched for potential ridematches. In addition the Massachusetts organization Carivans-for-Commuters assists groups of commuters to organize vanpools for ridesharing. The Town should assist in promoting such services as a way to reduce overall peak hour traffic congestion on the region's roadways.

3.0 Future Road Layouts

3.1 Potential Improvements to the Road Network

The Master Plan Committee has identified internal road circulation problems in several locations in Town, as well as potential solutions to some of those problems. These problems largely result from three different but related conditions: first, misaligned intersections with Portsmouth Avenue, second, multiple curb cuts in the congested sections of Portsmouth Avenue, and third, dead end residential streets on the west side of Portsmouth Avenue. The misalignment of several roads intersecting Portsmouth Avenue causes unnecessary turning movements onto the highway. With minor relocations they could form aligned four-way intersections and greatly ease east-west travel in Town. There are two such instances that could be corrected with minor relocations:

- River Road-/-Frying Pan Lane;
- Raeder Drive-/-Bunker Hill Avenue;

Multiple curb cuts on Portsmouth Avenue, especially those across from Shaw's Shopping Center worsen the congestion on this part of the highway. These could be consolidated to a single perpendicular drive which meets the Shaw's entrance in a four way intersection. This type of alignment is shown in the NH 101 Feasibility Study. Properties which lose direct access to the highway would gain access through an interior service driveway parallel to Portsmouth Avenue Future curb consolidations on the east side might be made possible with the layout of a new commercial access road behind existing development connecting Stratham Heights Road with Frying Pan Lane. Such a road would have the added benefit of opening access to additional commercially zoned land without further extending commercial zoning on Portsmouth Avenue. The same opportunity may exist on the west side of Portsmouth Avenue with the layout of an access road from River Road south to intersect with the proposed extension from the Shaw's entrance.

The problems associated with dead end streets have already been discussed. The Master Plan committee has

identified three connections that would help improve internal circulation:

-- connect Raeder Drive and River Road;

-- connect Doe Run Lane and Butterfield Lane at the intersection with Oak Court, and possibly relocate the entrance of Butterfield to join Raeder Drive at the proposed four way intersection with Bunker Hill Avenue

-- connect Tansy Ave. to Crestview Terrace;

A fourth connection was considered (Depot Road and Jana Lane, with the closure of the Portsmouth Avenue entrance of Jason Drive) but has doubtful feasibility due to existing development in the area. All of the proposed connections and consolidations will need detailed site evaluations to determine feasibility.

3.2 Protecting Future Road Corridors

The consideration of desired future road layouts raises the question of protecting these corridors from future development An example of this is found in the recent development of two commercial establishments across from River Road where the Frying Plan Road realignment would likely have been built. Although the Planning Board was aware of the long range plan for relocating Frying Pan Lane, the Town had no ability to prevent the development short of condemning and purchasing a ROW easement.

Under New Hampshire RSA 674:9-13, Towns have the ability to establish an "Official Map" which formally establishes future road layouts as established by the Planning Board The following steps are required:

1. the Town Meeting must authorize the Planning Board to prepare a "major street plan"

2. the Planning Board would then need to develop the street plan and have the exact location of the recommended street lines surveyed and adopt it as part of the Master Plan

3. the Town Meeting may then adopt an ordinance establishing the major street plan as the Official Map

4. the Map, as certified by the Town Clerk, would then be filed at the Registry of Deeds.

There are several problems with this approach. First it presumes that the Planning Boards will know or can determine the exact locations and alignments of future roads; second, it will be very costly to complete the surveys required, and third, once established, the Town may be exposed to "inverse condemnation" liability and be forced to purchase development rights on land adversely impacted by the road layout. Perhaps for all of these reasons, few communities in New Hampshire have used the Official Map provisions of the State's planning statutes.

An alternative approach is for the Planning Board to develop a general, "non-official map" showing a conceptual plan of future roads and connections, but not specify the exact locations or routes. The specifics rights-of-way would be developed by negotiating with individual land owners as they seek approvals from the Planning Board for specific development plans.

4.0 Portsmouth Avenue Corridor Plan

The most important transportation planning issue for Stratham can be summed up in two words "Portsmouth Avenue." As has been referenced repeatedly in the chapter, the entire corridor from the Exeter-Stratham town line to Portsmouth was the subject of a highly detailed planning study entitled the ***NH Route 101 Feasibility Study*** which was prepared in 1992 under direction of the NHDOT by the Kimball-Chase with assistance from the Rockingham Planning Commission. The study included an in-depth analysis of existing traffic conditions, projected traffic growth along the roadway based on a development buildout analysis, and identified both short term improvements that were needed immediately, and longer range improvement that are expected to be needed by the year 2010. The Study is an invaluable planning document in that it provides the Town with a clear picture of the likely future configuration of Portsmouth Avenue which they can "plan around". It also previews the consequences of unchecked development in the corridor: a five-lane typical road cross-section with center turning lane and occasional raised medians, and many new signalized intersections. This is not a vision that most Stratham residents would like to see for the central corridor in their community.

As with any long range plan, it is likely that the 101 Feasibility Study will prove to be incorrect in some respects. Nonetheless it will continue to be the basis for

identifying specific roadway improvements to be implemented in the corridor. It is incumbent on the Town to periodically review the recommendations made in the Study, revise them as needed and communicate these changes to the NHDOT. Perhaps even more important, the Town should evaluate all future development proposals on Portsmouth Avenue to ensure their consistency with the corridor recommendations of the Study which the Town accepts.

As part of their review of transportation issues the Master Plan Committee has reviewed both the long range and short range highway facility recommendations in the Study to determine their applicability and consistency with the Town's view of the corridor's future. The Matrix found on the following page summarizes the results of that review.

No specific funding is in place to construct the conceptual plans shown in the Study, nor are any included in the current State Ten Year Program (FY 1997-1999, June 1996). Given that some of these improvements are already overdue on the basis of need, it is important that the Town work

closely with the Seacoast MPO and NHDOT during the transportation project selection process to secure funding support for agreed-upon projects.

5.0 FEDERAL AND STATE TRANSPORTATION PLANNING

5.1 ISTEA

The enactment of the national Intermodal Surface Transportation and Efficiency Act of 1991 (ISTEA) and the Clean Air Act Amendments of 1990 (CAAA) have begun to significantly change the way transportation planning and project programming is done in New Hampshire.

These changes are most significant for communities such as Stratham which are not part of existing "metropolitan areas" but are within the area considered not in attainment for meeting air quality standards. The basic thrust of ISTEA is to increase and elevate the importance of local decision making in the regional, state, and federal transportation planning process. Since 1982, much of the responsibility for transportation planning in the Seacoast of New Hampshire has been carried out by the Seacoast Metropolitan Planning Organization (MPO). The Seacoast MPO is responsible for developing a transportation plan and a prioritized list of capital improvements for transportation. However, until 1993, the Seacoast MPO's area of jurisdiction covered only the urbanized towns of eastern Rockingham and Strafford counties. In October of 1993, the Seacoast MPO was formally expanded due
to requirements of the Clean Air Act, to include 23 other Seacoast communities, including Stratham and all of its neighboring towns.

The expansion of the MPO is meaningful to the Town in several ways. First, Stratham now has appointed representation on the MPO's technical advisory and policy committees.

These committees oversee and approve the transportation planning activities, including specific traffic, corridor and transit studies, that can be carried out in the community. Second, the Town can now request transportation planning assistance from the MPO. Third, Stratham is now included in the MPO's long range transportation plan. Last, and probably most importantly, transportation improvements planned for Stratham that involve federal funds, must now be included in MPO transportation improvement programs in order to be funded.

5.2. MPO Project Selection and Planning Process

ISTEA's transportation planning requirements call for the development of a project specific long range transportation plan, covering a twenty year horizon. The MPO Plan will, in the future, draw heavily on the Transportation components of local master plans and will identify conceptual transportation improvements needed in the region. From this plan, the MPO will develop the Transportation Improvement Program (TIP) on an ongoing two year cycle. The TIP will be developed as a prioritized list of projects for implementation.

Under the federal rules for Metropolitan Planning, adopted in October of 1993, the Seacoast TIP and the NH State TIP (previously known as the 10 year plan) must be completely consistent for at least the first three years of implementation. Given the importance of both the MPO Plan and TIP in defining the future transportation system in the region, it behooves the Town to become and remain actively involved in the MPO – both at the Technical and Policy Committee levels.

Table T-8
STATUS OF PORTSMOUTH AVENUE FACILITY RECOMMENDATIONS
(Recommendations from: *"NH Route 101 Feasibility Study,"* NHDOT, 1992)

FACILITY LOCATION	CONCEPTUAL DESIGN	CONSISTENT WITH LOCAL PLANS	TIME FRAME	COMMENTS
NH 101/ 108 Interchange	Full signalization of all 101 off ramps.	generally consistent	1999	Design in Feasibility Study has been superseded to combine with 101 expansion project.
Portsmouth Avenue - Shaws to River Road	Additional left turn lanes; Left turn lane to Ames.	generally consistent	Short term 2000	Needs further study regarding curb consolidation.
River Road/ Frying Pan Lane Realignment	Locate Frying Pan Lane to meet River Road.	partially	short term	New development on Portsmouth Avenue precludes original plan; Substitute with partial relocation of both River Road and Frying Pan Lane.
Bunker Hill Avenue	Full signalization with left turn lanes.	yes	short term	The Town should propose the project through the MPO TIP selection process.
Emery Lane	Realign south entrance to 108; Close north entrance.	yes	long term	Implementation should coincide with Stratham Circle reconstruction.
Stratham Circle	Major reconstruction (see scheme 1 - Feasibility Plan)	uncertain	long term	Design will need full reevaluation prior to preliminary engineering.
Winnicutt Road	Full signalization	yes	short term	The Town should propose the project through the MPO TIP selection process; should include realignment of Raeder Dr.
Squamscott Road	Full signalization	yes	completed	Already constructed.
Squamscott Road/ Shirley Lane Ext.	Close Crestview Terrace; Construct Extension to Shirley Lane to intersect at Squamscott Road; Close existing Laurel Lane access and build new access 1,000 ft. from intersection.	no	long term	Improves safety and east-west circulation.
Portsmouth Avenue - All Segments	5 lane typical section with center turn lane.	West of Circle, yes; East of Circle, no	long range	Planning Board believes 3 lanes (center turning) volume in 2010 will be adequate on NH 33 section of Portsmouth Avenue.
Raised Medians at Intersections	Construct raised medians on approaches to most intersections	generally consistent	short term & long term	Should be evaluated on case by case basis.

In the future. the Town should develop and submit to the MPO a specific list of needed transportation improvements eligible for federal funding, for consideration during the next TIP development cycle.

6.0 RECOMMENDATIONS

The following series of policies and recommendations are based on the information and analysis presented in this chapter, and on two other sources: recommendations generated from the Stratham Community Stewardship Project held in the Spring of 1996, and the policies and recommendations from the 1985 Master Plan that continue to be valid.

It is a fundamental goal of the Town of Stratham to achieve and maintain a safe, efficient transportation system which supports the rural character of the community and is adequate to support the transportation needs of the community. To attain this goal both now and in the future, the following policies are established and recommendations made.

POLICY 1: It is the policy of the Town of Stratham to work in cooperation with the NH Department of Transportation and the Seacoast MPO (RPC) to accomplish the phased implementation of agreed-upon highway facility improvements along Portsmouth Avenue.

Recommendations

1. Use the 1992 *NHDOT Route 101 Feasibility Study* as a guide for identifying, planning, and timing for highway facility improvements and communicate with the NHDOT regarding recommended changes to the corridor plan.

   a. Recommend the following changes in the Study recommendations:
      - the addition of a signalized intersection at Bunker Hill Avenue;
      - the elimination of the Crestview (Shirley Lane Ext.) and Squamscott Road alignment.

   b. Request the Seacoast MPO to reevaluate the traffic projections for the year 2010 in the NH 33 section of Portsmouth Ave. to determine if a 3 lane (one turn lane) configuration will be adequate to accommodate forecast traffic volumes.

   c. Request that the NHDOT reevaluate, with full community involvement, the proposed conceptual design for the Stratham Circle interchange prior to this design moving forward to implementation; in proceeding with the design review, the parties should consider the recommended conceptual design proposed during the Community Stewardship process. (See Community Stewardship Report)

2. Work toward early implementation of the following high priority projects for Portsmouth Avenue:
   - signalization at Bunker Hill Avenue;
   - signalization at Winnicutt Road;
   - relocation/realignment of River Road and Frying Pan Lane, and possible signalization;

   Further the Town should propose that these projects be added to the Seacoast MPO transportation improvement program and to the State 10 Year Program.

3. The Town should work in cooperation with the NHDOT and property owners through the site plan approval process to consolidate existing curb-cuts and channel access points to signalized intersections using interior service roads.

4. In cooperation with the NHDOT, the Planning Board should develop a "Portsmouth Avenue Access Management Plan" which identifies points for curb cut consolidation, and establishes a driveway access protocol with the NHDOT to ensure consistency of permitting with the management plan. The Town should request assistance from the Seacoast MPO to assist with developing this Plan, as needed.

5. The Planning Board should continue the existing policy of negotiating off-site improvements for development on Portsmouth Ave., and where feasible utilizing these improvements as local match for State-funded projects.

POLICY 2: It is the policy of the Town of Stratham to implement improvements on the Town's secondary road system needed to accommodate increased traffic volumes, as well as bicycle and pedestrian use, and to work with the NHDOT to implement like improvements on State owned secondary roads.

Recommendations

1. The Town should seek assistance of a professional transportation engineering consultant to prepare a needs analysis of the secondary road system in Stratham.

2. The Town should actively monitor changes in traffic volumes and accidents on the secondary road system and request assistance from the Seacoast MPO to carry out this task.

3. The Town should include in future construction, paved shoulders for use as bicycle/-pedestrian lanes, and appropriate signage and striping on the following secondary roads:

   - Bunker Hill Avenue
   - Union Road
   - Depot Road
   - Sandy Point Road
   - Guinea Road

   On these roads, and on roads designated on the State bicycle network (NH 33, NH 108, Squamscott Road, and Winnicutt Road) the Planning Board should require any road improvements required as a consequence of development to include shoulder improvements (widening and paving) to facilitate the bicycle routes.

POLICY 3: It is the policy of the Town of Stratham to create a well connected road system in the community that provides efficient circulation, promotes public safety and channels commercial traffic away from residential neighborhoods.

Recommendations

1. The Planning Board should develop and adopt a conceptual road layout map (the "unofficial map") showing desired connections between existing streets and general location of any new roads and rights of way that may be required. This map should be used as a guide for the evaluation of street layout proposed for new development.

2. In preparation of the road layout map, the Planning Board should evaluate the following connections and proposed streets
   - connect Raeder Drive and River Road;
   - connect Doe Run Lane and Butterfield Lane and possibly relocate the entrance of Butterfield to join Raeder Drive at the proposed four way intersection with Bunker Hill Avenue
   - connect Tansy Road to Crestview Terrace;
   - new commercial access road connecting Stratham Heights Road to Frying Pan Lane
   - new commercial access road connecting River Road to Shaws entrance extension

3. The Town should seek to acquire the easements for critical rights-of-way that will be necessary to complete or accomplish the connections listed above.

4. The Planning Board should discourage the creation of dead-end streets, and should require the reservation of one or more right-of-way parcels at appropriate connection points in all street designs for new subdivisions.

5. The Town should establish a combination on-road/off-road bicycle path connecting the Stratham Memorial School to Winnicutt Road via Stratham Hill Park, Jack Rabbit Lane, Crestview Terrace and Tansy Ave.

6. The Towns of Stratham and Exeter together with the Cooperative School District should closely monitor and be prepared to act quickly to address adverse impacts on traffic circulation and safety, and on bicycle / pedestrian safety on Guinea Road that are likely to arise when the new Middle School opens in the Fall of 1998.

7. The Town should coordinate with Exeter in planning future sidewalk and pedestrian facility improvements on Guinea Road and Hampton Roads.

POLICY 4: It is the policy of the Town of Stratham to participate in the regional transportation planning process established under Federal and State law.

Recommendation: The Town should develop and submit to the MPO a specific list of needed transportation improvements eligible for federal funding, including highway, pedestrian, bicycle and other facilities, for consideration during the next, and all future TIP development cycles.

POLICY 5: It is the policy of the Town of Stratham to encourage, support and participate in COAST, the regional public transportation system

Recommendations

1. The Town should widely publicize the availability of the COAST service (Route 7) to the citizens of Stratham, though mechanisms such as tax bill mailing, the Annual Town report, and other community announcement media.

2. The Town should consider entering into an intermunicipal agreement with the other communities and organizations served by COAST to formalize the rights and obligations of all participants.

POLICY 6: It is the policy of the Town of Stratham to maintain and improve recreational boating access to the Great Bay and Squamscott River, while carefully considering potential adverse impacts of increased access on the river environment.

Recommendations

B&M Railroad Bridge:

1. Town officials should meet with GTI, NHDOT and other appropriate officials to review current condition of the railroad bridge and possible improvements to navigation restrictions. The Town should conduct research regarding the legal limitations for restricting access on a navigable waterway.

2. The Town should consider applying for coastal program, as well as other private and public funding sources to address the solutions.

NH 108 Bridge:

1. The Town should, in cooperation with Newfields and the RPC, continue to monitor the design of the NH 108/Squamscott River replacement bridge and continue to advocate for consideration of local traffic impacts and impacts to the river of any change in its design.

2. To address navigational restrictions of the existing bridge, the Town should support a redesign of the bridge that increases freeboard clearance of up to 8 feet at mean high tide.

UTILITIES AND PUBLIC SERVICES

1.0 INTRODUCTION

Utilities and public services can have a direct and significant impact on the future development of a community and therefore are an important consideration in the Master Plan. Utility capacity and location are often decisive in determining how and when land will be used. In considering future plans for utility development or expansion it is important to consider these effects. Even though Stratham does not have municipal systems for water, sewer or other utilities, it does have the ability to influence their development through its zoning and land use regulations. In addition, elsewhere in this Plan recommendations are made to allow the development of centralized sewage disposal in the existing General Commercial and ORP zones (and the proposed Commercial/Light-Industrial/Office-Research Zone known "CLIO") and to consider the need to protect identified aquifers for the possible future development of a centralized water system. This chapter briefly discusses the status of water, sewer, gas, and telecommunication utilities in Stratham at present and the land use implications of their future development.

2.0 WATER SERVICE

Stratham residents receive their water entirely from groundwater sources; the majority are served by individual on-site domestic water wells. Many of the Condominium developments are served by common wells. According to the most recent records of the New Hampshire Department of Environmental Services, there are 34 active public water systems, including 16 community water systems (serving 25 or more connections), 12 non-community, and 6 transient water systems located in Stratham (see Table RCP-10 for a listing of these systems; for a full description of Stratham's water systems, refer to the *Description of the Infrastructure* section of the 1993 Stratham Water Resource Management And Protection Plan, prepared by the Rockingham Planning Commission). As of the 1990 Census, 87% of the housing units in the community were served by individual wells with the remainder served by community water systems.

In the past the Town has maintained a strategy for land development that avoids the necessity of developing a municipal water system. This is achieved primarily by requiring all development to provide adequate on-site water supply and sewer disposal provisions and relatively large lots. Although the Town intends to continue this policy, there is increasing concern about protecting the existing groundwater supply capacity should it become necessary to develop a municipal water system in the future. This concern is heightened by the siting of several commercial water production wells for the Hampton Water Works Company in the vicinity of the Bunker Hill Aquifer, located in Stratham and North Hampton, and by the difficultly in controlling this sort of resource mining under the existing aquifer protection district. With the latest OSP Population projections showing that the Town will nearly double in size over the next 20 years, serious consideration should be made regarding the ability of the existing groundwater supply to meet future demand.

3.0 MUNICIPAL SEWER SYSTEM

Currently, Stratham does not have a municipal sewer system or wastewater treatment facility. Except for development within the Industrial Zone, the Town is entirely served by on-site septic systems. In the Industrial Zone, a special agreement was made between the Town of Exeter and the developer to provide sewer service. In this case, more than half of the industrial development under consideration was located in Exeter, thus providing a motivation for Exeter to supply the service. Further development within the site, even though wholly in Stratham, will be able to receive sewer service from Exeter. As with water supply, the Town has maintained a strategy for land development that avoids the necessity of developing a municipal sewer system by requiring all development to provide adequate on-site sewer disposal provisions and relatively large lots.

In general the Town intends to continue to support this policy by basing lot size and development approval on the capacity of the natural soil conditions to receive and treat sewage effluent. At the same time, however, there is recognition that for commercial and industrial development, on-lot septic systems typically result in the loss of large areas set-aside for leaching fields.

Good examples are both Shaw's and Market Basket supermarkets. In both cases land that could have been used for additional commercial development with considerable potential taxable value is lost. This is especially problematic given the limited amount of such land available for development. This land should be considered and treated as a scarce resource.

Although the Town does not plan to install a municipal sewer system or a wastewater treatment facility within the planning horizon of this plan, several alternatives could be applied to the existing General Commercial, ORP and Industrial zones that would consume less land area than conventional septic systems. These include (1) the permitting of privately developed central sewer systems to serve the most densely developed portions of the non-residential zones (such development would, however, require joint responsibility by the Town for compliance to State and Federal operating regulations); (2) permitting the use of "packaged" or other non-conventional treatment plant systems; (3) developing a conventional municipal system to serve a defined sewer district area (possibly set up as a sewer district precinct), and, (4) negotiate the expansion of the Exeter Sewer system to serve the most highly developed portions of Stratham. All of these options would come at some cost to the Town. However, the additional tax revenues accrued to the Town with the higher density of development that would be permitted as a consequence should more than offset these costs. Higher density of development within these existing zones will result in most efficient use of the existing non-residential zones and help reduce pressure to zone additional commercial or industrial land in the future.

4.0 ELECTRICAL SERVICE

Electricity in Stratham is supplied by the Exeter & Hampton Electric Company (subsidiary of Unitil Inc.). Under its franchise agreement with the N.H. Public Utilities Commission (PUC), it and all other utilities are required to meet the demand for all areas within their territory. It is expected that the Exeter & Hampton Electric Company will be able to provide an adequate supply of electricity to meet local demand for the near future.

Public Service Company of New Hampshire has two large overhead transmission lines that run through Stratham. One is a 34.5 KV line that runs in an east-west direction in the northern quadrant of Town. This line originates from a PSNH substation on Ocean Road and runs northwesterly through Stratham to serve Newmarket and Durham. The other is a 115 KV transmission line that carries power from the Portsmouth's Schiller Station to the Manchester area and runs east to west more or less through the geographic middle of Town. For about one-third of its travel distance in Stratham, this latter line shares a utility corridor with the Granite State Gas Transmission System pipeline (see description below).

The present development regulations in Stratham provide the option of requiring the installation of underground electric utility lines in new subdivision developments. This option is rarely used, although some developers choose to incorporate underground utilities in their designs for aesthetic and other purposes. For "cluster" development, however, the Planning Board should consider requiring the provision of underground utilities due to the proximity of buildings to each other, to promote consistency in principals of community design, to promote uniform ornamental tree growth and to encourage development that promotes a community-based atmosphere.

5.0 NATURAL GAS

5.1 Local Service

Northern Utilities, Inc., a public utility regulated by the N.H. PUC, is the natural gas supplier for the seacoast region, including Stratham. The Granite State Gas Transmission System, a subsidiary of Bay State Gas, operates a high pressure (500 p.s.i.) eight inch transmission line which crosses Stratham in a diagonal manner from southwest to northeast. It enters the town at the southwest corner and exits at a point about 1000 feet south of and roughly parallel to Union Road. For a length of about 6400 feet in the vicinity of Frying Pan Lane there is an additional ten (10) inch high pressure line parallel to the eight (8) inch line. Neither line can be tapped for distribution purposes within Town. The Granite State transmission line is the main gas supply line to Northeast Utilities.

In 1995-1996, a natural gas service pipeline (lateral) was installed along Portsmouth Avenue extending from the Exeter Town Line to River Road. This line, for the first time provided for a local utility connection for

natural gas service. From the north another distribution line along Route 33 ends approximately at the New England Telephone complex in Greenland. Except for the lower section of Portsmouth Avenue, however, the remainder of the Town is not served by natural gas distribution mains.

Unlike electric and telephone utilities, the gas company has some flexibility in deciding whether or not it will expand its services to a given area, based on market conditions. As more potential uses of natural gas locate in Stratham along Portsmouth Ave., the gas company will have a greater interest in completing this link. The availability of natural gas can be an important locational factor in site selection for major development. It will to the Town's advantage to have local gas service available in this corridor as soon as possible.

5.2 Regional Transmission

In 1997, a major new gas transmission line has received key Federal and State permits for construction through the Seacoast portion of Rockingham County, including Stratham. The pipeline, proposed as a joint venture between the Portland Natural Gas Transmission System (PNTGS) and Maritimes-Northeast Pipeline Co. is a 30" high pressure facility that is intended to significantly expand natural gas supply to New England and the Northeast from supply fields off Sable Island, Nova Scotia, and from Western Canada. The line will connect to the larger gas transmission grid in Dracut MA.

For the most part, the new pipeline in Stratham will be constructed within or immediately adjacent to the existing pipeline corridor. This will help reduce the construction and landowner impact of the new line. The only significant diversion from the existing corridor is being make to avoid the leaching area of the Market Basket shopping center. The Town requested further alignment changes south of Frying Pan land so that the line location would have minimum impact on the remaining commercially zoned land east of Portsmouth Avenue. This modification was incorporated into the final routing plan for the pipeline. The permanent utility right of way of the new facility will be larger than the Granite State line, increasing from 35 feet to 50 feet. The new pipeline is expected to be constructed prior to December 1998.

6.0 Solid Waste Disposal/Recycling

According to the document entitled, Southeast Regional Solid Waste District - Solid Waste Management Plan, prepared by the Rockingham Planning Commission in February 1991, Stratham produces approximately 88,000 tons of solid waste per year. This total includes both residential and non-residential waste estimates. The current residential tonnage of solid waste is 2223 tons/year (1996). Commercial establishments are responsible for their own arrangements for waste disposal.

The Town contracts with a private hauler for residential curbside pickup and delivery to the Ogden-Martin waste-to-energy facility in Haverhill, MA. The private hauler also collects the recycled material at the curbside. The Town's existing recycling program has been in operation for eight years and, to date, about 25% of the annual total waste tonnage is recycled. This voluntary recycling program collects materials including: newsprint, glass, aluminum and steel cans, and plastics.

Stratham is a member community of the Lamprey Regional Solid Waste Cooperative. Although the Coop no longer operates the waste-to-energy facility at UNH, the Town maintains cooperative ownership responsibility for an ash landfill used while the incinerator still operated.

Septage disposal from residential and commercial septic systems is handled by private arrangement between property owners and septage waste haulers. The Town has a non-binding agreement with the Hampton Wastewater Treatment Plan to guarantee access by haulers carrying waste from Stratham.

The Town maintains a transfer station at the site of the closed landfill. Residents can dispose of bulky wastes, residential construction debris, brush, and drop off recyclables. The site is open on Saturdays only.

7.0 Telecommunications Facilities

Residents of Stratham receive telephone service from Bell Atlantic, (formerly NYNEX). The Town does not have its own telephone exchange, but is part of the

Exeter exchange (772, 773, 775, 778). Due to the deregulation of the telephone industry, the choice of both conventional long distance and in state long distance telephone service providers is up to the individual customer.

The growing demand for wireless telecommunication is creating a surge in demand for the installation of wireless telecommunication towers and antennae all across southern New Hampshire. Although the need for these facilities is fully recognized by the Town, the towers themselves can be unsightly and a nuisance to surrounding property owners. The unregulated nature of the industry which provides and markets these services means that multiple towers serving the same geographic market can and probably will be sited in the same area, greatly and unnecessarily exacerbating the impact of the towers. This problem has become more acute with the advent of PCS systems which require a more dense network of antennae ("cells") to function than do conventional cellular phone systems.

To forestall the kinds of negative impact to the landscape that a proliferation of antenna would create, Stratham enacted a Telecommunication Facilities ordinance at the 1997 Town Meeting. Although the Federal Telecommunication Act of 1996 limited the ability of Towns to prohibit the siting of such facilities, it does allow the exercise of reasonable local control over siting. Stratham's ordinance limits the siting of towers in areas of town where they would have undue visual impact, encourages siting configuration to minimize visual impact, and requires co-location with existing towers wherever feasible. The ordinance establishes a telecommunications overlay indicating where towers are permitted.

8.0 RECOMMENDATIONS

8.1 Water

It is the Policy of Stratham to protect potential public water supply sources, especially those area and supplies identified as aquifers, from adverse impact from development and from exploitation.

1. The Town should maintain the aquifer protection district and augment it with provision to limit commercial extraction of groundwater supplies.

2. The Town should maintain the wellhead protection program and continue on-site monitoring of potential pollution sources, as identified.

3. The Town should consider the purchase of land or development rights for key parcels to protect future water supply & wellhead locations. This effort should be coordinated with general open space protection efforts.

8.2 Sewer

It is the Policy of Stratham to work toward the development of centralized sewer services in Commercial, Industrial and Office-Research Park (and proposed CLIO) Districts.

1. The Planning Board should encourage all such development that may need or benefit from centralized sewer service to be located in areas of Town where the future connection to existing sewer lines is possible, or where the future construction of a sewage treatment facility is feasible.

2. The Board of Selectmen and Economic Development Committee should work with the Town of Exeter to develop an equitable arrangement for allowing the expansion of the Exeter sewer district along Portsmouth Avenue.

3. In lieu of an expansion of service from Exeter, the Planning Board should amend the Zoning Ordinance to allow the development of small scale packaged sewer treatment facilities within the existing Commercial and ORP (and proposed CLIO) Zones.

8.3 Electric and Gas Utilities

1. The Town should carefully monitor the construction of the PNGTS/Maritimes high capacity gas transmission line and ensure compliance with all construction permits and conditions.

2. The Town should encourage the further expansion of natural gas service areas in Town and make appropriate accommodations in the

review of site and subdivision plans.

8.4 Solid Waste

1. The Town should review its current agreement with Hampton for disposal access to the Hampton WWTF and seek to negotiate a renewable, binding written agreement to secure future access.

2. The Town should prohibit or strictly limit overnight storage of waste within the Town by waste haulers.

3. The Town should aggressively promote recycling by residents and businesses as a means of controlling waste disposal costs.

8.5 Telecommunications

1. The Planning Board should monitor changes in FCC rules implementing the federal Telecommunication act and make adjustments to local regulations as needed.

2. The Planning Board should participate in any future development of a regional telecommunications plan to help minimize the need for additional telecommunications towers in the Town and region and achieve other common objectives with the surrounding towns.

COMMUNITY FACILITIES

1.0 SCHOOLS

Elementary School

Students in grades pre-school through six (6) attend the Stratham Memorial School on Gifford Farm Road in Stratham which was constructed in 1989. Table CF-1 shows the enrollment trends for the years 1985 through 1996 for the Stratham Memorial School. Records for the September 1996 school year indicate that 696 children attended the Stratham Memorial School. The average class size in 1996 was 24 students. Personnel at the school currently consists of a principal, an assistant principal, forty-nine professional staff and thirty-one support staff. An extensive volunteer program provides assistance in offices, the library, cafeteria and classrooms. In the 1995-1996 school year over 8,000 hours were donated by volunteers.

The construction of the Stratham Memorial School was a direct result of the booming population growth between 1970 and the mid 1980's. During this time period Stratham doubled its population. The enrollment capacity of the Stratham Memorial School on Bunker Hill Avenue was a major concern. Due to this unprecedented growth, the Town enacted a Growth Control Ordinance that was based on the number of new house lots and residences created and the capacity of the school. Also, at this time, a major study to determine educational facility needs was conducted. The Town acquired the 160 acre Gifford Farm on Jack Rabbit Lane in 1986, of which about 39 acres was sold to the School District to erect the elementary school.

The school, which opened in September 1990, contains 35 classrooms, a library, gymnasium, cafetorium, offices and other rooms. Capacity of the school is presently set at 900 students. The 1996 enrollment of 696 represents approximately 77% of total capacity.

The recreational facilities located on the school property are used by both the school students and for Town recreation activities. There are two baseball fields, two multi-use playing fields, basketball courts and playground equipment. The school and its related recreational facilities use nearly all of the 39 acres of land at the site. Adding more recreational fields or other facilities would require an expansion of the site property.

Junior High School

As a member of the School Administrative Unit (SAU) 16, Stratham's grades seven (7) and eight (8) attend the Exeter Area Jr. High School, located off Linden Street in Exeter. This facility, shared by the Towns of Brentwood, East Kingston, Kensington, Newfields, Stratham, and Exeter, was built in 1967. The 75,000 square foot facility is located on approximately 30 acres of land, which includes recreational facilities. The Junior High School is allowed to use the recreational facilities at Phillips Exeter Academy, which is a supplemental source of athletic facilities. In 1996, the newly established Exeter Region Cooperative District approved the construction of a new middle school for the six towns which will be located in Stratham on a 50 acre site (38 acres usable) off Guinea Road. The new school will include 6th, 7th and 8th grades and replace the severely overcrowded Jr. High School in Exeter. With the addition of 6th grade, additional capacity will be freed in the Stratham Memorial School as these classes, presently representing about 100 students, transfer to the Middle School. At current student populations, the removal of 6th grade would bring the Memorial School occupancy down to about 63% of capacity. As a consequence of constructing the new school, the Coop Towns will each be obligated to pay their proportionate share of the new facility. For Stratham, at the 1997 proportion of total Coop school enrollment of 22.8%, this translates into about $2.8 million of the $15 million construction cost, plus about $1.3 million in cost to "buyout" Exeter Area School facilities.

High School

Grades nine (9) through twelve (12) attend the Exeter Area High School, located off Linden Street in Exeter. This facility, built in 1920, has had a number of facilities improvements in 1954, 1962, and, most recently, a 30,000 square foot addition in 1993. The present floor area of the building is approximately 180,000 square feet. The High School shares thirty acres of land with the Jr. High School and the Seacoast School of Technology.

TABLE CF-1
School Year Enrollment, Stratham, N.H.

Grade	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Pre-school	-	-	-	-	-	-	-	11	13	21	14	20
Readiness	13	15	22	19	-	-	-	8	13	-	-	37
Kindergarden	-	-	-	-	-	82	76	75	95	89	94	93
One	44	48	62	82	96	121	118	81	82	110	109	109
Two	44	48	52	62	82	75	89	103	92	88	112	103
Three	35	47	53	53	63	88	78	90	106	91	92	105
Four	36	41	55	55	57	73	85	77	86	101	100	91
Five	41	35	40	51	56	63	71	82	81	80	100	93
Six	46	50	38	44	54	58	62	74	81	80	83	102
Seven	46	51	53	39	51	56	60	60	74	85	84	77
Eight	63	53	59	55	44	53	54	58	62	70	85	86
Nine	52	65	60	54	53	37	48	57	58	58	67	84
Ten	47	51	56	62	51	56	37	45	56	52	64	67
Eleven	51	50	46	54	61	49	53	35	41	56	47	58
Twelve	46	45	43	48	51	58	41	52	40	38	53	50
Subtotal, K-6	246	269	300	347	408	560	579	582	623	639	690	696
Subtotal, 7-12	305	315	317	312	311	309	293	307	331	380	414	422
Total, K-12	551	584	617	659	719	869	872	889	954	1019	1104	1118

In 1993 the Exeter Area School District had an enrollment of 3,195 students (29% from Stratham), supported by a staff of 207 teachers, 8 administrators, 23 clerical personnel, 34 teacher's aides, 25 plant maintenance personnel, 35 cafeteria workers, 10 staff responsible for transportation and 8 SAU personnel.

In September of 1996, the K-12 school enrollment for Stratham was 1118, with 696 (62%) in grades K through 6th. Overall, enrollment has grown nearly 30% over the past five years, compared to 12% in overall population growth in the Town.

2.0 MUNICIPAL CENTER

With the construction of the new Stratham Memorial School in 1989, the former elementary school, located on Bunker Hill Avenue, was deeded to the Town. Concurrently, a study committee was established to determine space needs of the Library, Town Government, Police Department and Recreation Department. This study resulted in plans and specifications being developed and the subsequent conversion to the present day Municipal Center. Funding for this conversion included local funds, a State Office of Energy Planning grant, and federal funds for library renovation. In addition to the library and police departments, there are a number of offices as well as a cafetorium with a stage and kitchen. Smaller in size than the school's, this area is a popular site used frequently by the Grange, the 76ers Club, the Boy Scouts, Recreation Department aerobic classes, as well as family anniversary parties and other functions and meetings. The annual Town Meeting and elections are also held in this room. The facility is in constant use.

Outside, the former school has a newly refurbished (1993) softball field and a tire play structure. Additional parking and an overall plan for the future use of the facility and property is needed.

3.0 LIBRARY

while a Library staff of five full and part-time employees, including a full-time director and a full-time children's librarian, take care of its daily operation. Since its move to the municipal complex, the staff has installed a computerized circulation system to track its books in circulation. The Library has averaged annual increases in book circulation of about 10% since 1990. As of 1994 over 60,000 books were in circulation, with a total number of adult and juvenile patrons exceeding 5,500.

The present library is significantly larger than the Wiggin Memorial Library building and is climate controlled. This larger, more contemporary facility has allowed for computerization of library operations and will allow for further expansion of an already active facility. At present the Library offers a range of programs- from the traditional children's reading hour to CD-ROM facilities to compact disks and videos.

4.0 WIGGIN MEMORIAL LIBRARY BUILDING

The former library, located at the intersection of Winnicutt Road and Route 33 (formerly Route 101), is presently occupied by the Stratham Historical Society under a lease agreement with the Town. The building is maintained by the Town with a combination of general tax dollars, and funds from the Library Trust Funds and from the Historical Society. Built of stone in 1911 and accepted by the Town at the 1913 Town Meeting, it fronts the intersection at a diagonal. The single story 45' by 30' building has 1300 square feet of space on the first floor and 550 square feet in the basement.

The Historical Society worked with the Town to have the Wiggin Library Building placed on the National Register of Historic Places. The Stratham Historical Society maintains hours of 9 am to 11 am on Tuesdays, 2 pm to 4 pm on Thursdays, and 2 pm to 4 pm on the first Sunday of every month for visitors to view displays on Stratham's history and conduct genealogical research. It is also open at other times by appointment and for bi-monthly meetings that are open to the public.

5.0 FIRE DEPARTMENT

The Stratham Volunteer Fire Department is located on Winnicutt Road near the intersection with Portsmouth Avenue (Route 33). The 1-1/2 story concrete block building was constructed in 1956 with a second addition in 1977. The first floor contains six bays with adequate room for nine trucks and related equipment. The second floor consists of a kitchen, fire fighter's lounge, and a 1,900 square foot function room. Both the lounge and the function room are used for various Stratham social events and meetings. The adjacent parking lot has a capacity of approximately 60 cars.

With approximately 80 volunteer fire fighters, three or more fire fighting teams have been formed. In addition to fighting fires, the fire fighters, Ladies Auxiliary, and the Stratham Fair Association raise money toward capital improvements to the facility and for fire fighting equipment.

The Stratham Volunteer Fire Department has and will continue to serve quality fire and ambulance squads in the area. Within the past few years increased training has placed more demands on area fire fighters. A large portion of the members are certified by the State as level 1 firefighters and several have completed about 75 hours of specialized training. Additionally, a number of the firemen are also trained as Emergency Medical Technicians (EMT's). Within the past few years the training and time demands resulted in the need to solicit new interest in this department.

The bulk of the activity of the Stratham Volunteer Fire Department includes alarm activations, car/truck fires, motor vehicle accidents, mutual aid, brush/grass fires, general house calls, and responses to residents with chest pains and/or difficulty breathing. In 1996 the S.V.F.D. responded to 160 fire calls (13 Mutual Aid) and 184 Ambulance calls (14 Mutual Aid). Although the total number of Fire and EMT calls fluctuates somewhat from year to year, over the past three years, the number of calls during the year has averaged about 350.

6.0 POLICE DEPARTMENT

Police protection is provided by a full time chief, a lieutenant, a corporal Animal Control Officer and four regular officers. In additional to the officers, there are five officers available for special duty. One secretary completes the administrative work generated by the department. Located within the Municipal Center on Bunker Hill Avenue, the Police Department occupies approximately 2,000 square feet of the building. The

department has five police cruisers and a "DARE" Drug Awareness program vehicle.

Within the past five years there has been a significant increase in the calls for service. Despite this increase, Stratham has seen a decline in the number of commercial and residential burglaries within the past two years. On the increase, however, is arrests for driving while intoxicated (DWI), which has doubled within the past year due in part to increased enforcement. The 1993 and 1994 Police Department activity reports indicate that the major Police Department activities have included responses to theft, motor vehicle violations/summons, motor vehicle accidents, animal control complaints, citizen assists/house checks, alarm activations, motor vehicle lock outs, motor vehicle tows, police information/intelligence, and assists to other departments. Robbery, burglary, assaults, drug law violations, and other serious crimes have remained low.

The Police Department is active in promoting the DARE drug awareness program and continues to be available to discuss crime prevention programs.

7.0 HIGHWAY DEPARTMENT

The Highway Department is based on the corner of Bunker Hill Avenue and Frying Pan Lane on a 2-1/4 acre site. There is a small salt shed which was constructed in 1979. A new sand and salt storage facility is scheduled to be funded in 1999, in the town's capital improvements program. The 1950s wood frame garage has five heated bays with approximately 4,000 square feet. In general, the facility is not in good condition and is limited for the number of vehicles and equipment necessary for the operation of the department.

The primary functions of the Highway Department are road maintenance, including snow-plowing, pavement, drainage, signage and right-of-way maintenance. The Department also has the responsibility of maintaining the transfer station and town cemeteries. The Highway Department has re-constructed some roads in the past, however this and routine paving of roads is generally contracted out to private firms. Thirty-one of the 50 miles (62%) of publically maintained roads in Stratham are Town roads maintained by the Highway Department. As subdivisions are approved and new roads built, the number of miles of local roads is increasing much more rapidly than the milage of state roads. The N.H. Department of Transportation maintains Routes 101, 33, 108, Winnicutt Road, Bunker Hill Avenue, Squamscott Road and Route 111 (formerly 101D).

The Highway Department was also responsible for operating and maintaining the Town Landfill, which closed in 1994.

In 1996 there are four full time employees, including a Highway Agent, and additional shared employees. The Highway Department staffing level has not changed even though the Town road system milage increased by 55% between 1984 and 1995. With more residential development likely within the next ten years, it is likely that additional staff and facilities or additional contract work will need to be considered.

8.0 CEMETERIES

The Town owns three public cemeteries. The Greenwood Cemetery is located on Route 33 east of the Town Center. Deeded to the Town on November 3, 1876, it had no remaining lots by the mid-1980s.

Harmony Hill Cemetery is located at the rear of the Community Church. The cemetery has two sections. The earliest was the original Town Cemetery and extends to about 140 feet beyond the rear of the church. Again, this cemetery has no lots remaining. The new section was private until it was deeded to the Town on March 13, 1979. The plot size is 20 feet square, with about an acre not in use. A portion of this acre is partly wooded.

Maple Lane Cemetery is located off Emery Lane near Harmony Hill. Established in 1973, it has a capacity of about 1600 plots. By the mid-1980s approximately 120 plots had been sold or were occupied. With sixteen, four foot by ten foot plots in a section, the remaining facility will be adequate well into the 21st century. A recent private donation has added approximately 0.5 acres to this cemetery.

The Cemetery Committee is active in upgrading and improving these facilities. In 1993 sections of road in the Harmony Hill Cemetery were paved and grave lots in the last unsurveyed section of the Maple Lane Cemetery were surveyed and marked. In the Greenwood Cemetery, broken or tilted gravestones

were repaired and fence and other repairs were completed.

9.0 GIFFORD FARM

Acquired in 1985 by the Town of Stratham, the Gifford Farm, originally the property of Josiah Brown, presently consists of 125+/- acres of land off Jack Rabbitt Lane. The original farmhouse remains on the property and has been rented since the Town acquired the property. Through the rental proceeds, the Town has been able to update and maintain the farmhouse and related out-buildings. Additionally, the parcel's agricultural land has been leased for farming. The property is managed by the Board of Selectmen. A Town Forest, consisting of approximately 82+/- acres of the site was created by Town Meeting Action in 1994. The Town Meeting further authorized the Conservation Commission to manage the Town Forest under RSA 31:111 & 112 to authorize the placement of any proceeds from this management into a non-lapsing forest maintenance fund.

10.0 STRATHAM HILL PARK

Located along Route 33 in the central portion of Stratham, the Stratham Hill Park consists of 70 acres, given to the Town in 1905 by Edward Tuck of Paris, France, and an additional 38 acres, which the Town purchased in 1968 from David and Elizabeth Noyes. The Park is a major recreational asset for the community and the region.

The developed part of the 108 acre park contains three ballfields, one paved basketball court, a concert shell, a skating rink area, a horse pulling area, a natural amphitheater, a barn, three 4-H buildings, three pavilions with picnic facilities and other associated facilities. For more information on the facility, see the Recreation Chapter.

The park is managed by the Stratham Hill Park Association, formed as an advisory group to the Board of Selectmen and incorporated with the State of New Hampshire in 1957. This association oversees funds that have been donated to the Park Association for specific repairs and improvements and raises funds through proceeds from the Stratham Fair and other events. Additional funds, such as those provided by the Federal Emergency Management Agency (FEMA), were used in August of 1991, when Stratham Hill Park was devastated by a micro burst. A combination of volunteer efforts, federal funds and other monetary and time and material contributions were made to rebuild pavilions, restrooms, and other areas damaged by the storm.

11.0 CAPITAL IMPROVEMENTS PROGRAMMING

Community facility needs are best planned for as part of an orderly financial planning process. In 1986, Stratham developed its first Capital Improvement Plan with assistance from the Thoreson Group. Since that time the Town has made regular use of the CIP process to plan capital purchases for the short to mid term (2-to-6 year horizon.

During the annual budget setting process prior to Town Meeting department heads are asked to supply requests and justification for capital expenditures. Those that are approved are eventually put before the voters as warrant articles or as part of Departmental budgets.

Unlike many communities, Stratham actually uses its CIP as a financial management and capital planning tool. Part of this success is owed to the fact that the CIP development extends beyond the Planning Board. The Town Administrator takes the lead in developing the annual updates for the Planning Board and ensures all Departments and the Board of Selectmen are fully involved.

If it has a limitation it is that the projects listed in the outer years of the CIP are not treated as "real" until they are one or two years away from implementation. This limits the utility of the CIP to plan and reserve funds for such expenditures

Perhaps as the result of its ten year history of using the CIP, there are no large or immediate facility needs, *for which a consensus of need exists*, that Stratham is confronting in the short term. A large exception to this are facility needs of the Coop School District. However, school capital planning needs have largely fallen outside the Town's CIP process.

Possible longer term "facility" needs elsewhere discussed in this Master Plan that would require capital planning include:

- recreation facilities (see Chapter 6)
- possible development of "package" water treatment plant for future commercial/industrial development;
- open space acquisition program;
- Portsmouth Avenue improvements.

12.0 RECOMMENDATIONS

1. The Planning Board, Board of Selectmen Department Heads and Budget Committee should continue to work cooperatively to develop and use the CIP.

2. The Town should work with the Stratham School Board and Coop District Board to incorporate capital planning for the schools into the CIP.

3. Long-term capital needs should be reviewed as a formal part of all future Master Plan updates

RECREATION

1.0 INTRODUCTION

Located in the coastal region of New Hampshire, Stratham is home to a number of recreational facilities which are heavily used by local residents and also those of abutting communities. Stratham residents are active participants and volunteers in the many programs offered through the Town's Recreation Department, particularly the youth team sports leagues. Outdoor facility needs for these sports (i.e. ball fields and soccer fields) have been met to date through the multiple use of all available field space. Baseball outfields, for example, become soccer fields depending on the season. Due to the availability of only one gym in town, indoor sports facility space and time is limited. Individual recreation needs (fishing, hiking, etc.) are met through the availability of Town and State owned boat launches on the Squamscott River, hiking and bicycle trails throughout town, and a variety of programs available through the Recreation Department. In addition, many residents are able to take advantage of nearby regional recreation opportunities such as swimming and picnicking at state beaches, boating/fishing in Great Bay, or skiing and hiking in the nearby White Mountains.

The importance of recreation to general health and quality of life in a community is widely accepted. Recreational opportunities including organized group sports and activities, as well as passive outdoor recreation contribute to individual enjoyment and education, and perhaps most importantly, to the sense of community in Stratham. As the residential population grows, the Town will need to enhance its commitment to recreation by maintaining the quality of and access to all its existing facilities and programs and by expanding them as needed to accommodate growth. This chapter will review existing recreational facilities and programs in Stratham, examine whether they meet the needs of the community, and make recommendations for improvements.

2.0 RECREATION COMMISSION

Stratham maintains a Recreation Commission and Recreation Department to oversee Town sponsored recreational activities and facilities. The Recreation Commission's mission is to provide "the residents of Stratham the opportunity to participate in varied activities including, but not limited to, team sports and individual athletics (i.e. aerobics, skiing), dances, special events, roller skating, etc." The Recreation Commission is dedicated to promoting fellowship, spirit, and good will in the Town of Stratham through the dedication of volunteers who organize events, scheduled on a year round basis and available to all ranges of age and ability.

Members of the Recreation Commission (5 regulars and 2 alternates) are appointed by the selectmen and serve on an unpaid, volunteer basis. Members usually include the heads of each of the different youth team sports leagues. The Commission overseas not only the organization of these leagues, but many other programs available to residents. In 1995 adult programs in basketball, volleyball, aerobics and exercise programs were offered. In addition, the Recreation Commission sponsors a summer camp program for elementary school children, senior citizen bus trips arranged through the Stratham 76ers Club, dance classes, monthly family roller-skating, an annual preschool/primary grades Easter egg hunt, a sixth grade graduation dance, as well as other varied activities (family ski trips, family swim nights, bus trips to the Portland SeaDogs Baseball game, etc.)

The Recreation Commission organizes a highly successful volunteer youth sports program. According to statistics recently compiled by the Commission, and shown below in **Table R-1**, there were more than 1200 participants in the youth sports programs in 1996. This represents about a 45% increase just since 1992-- a period when the Town's population grew by less than 10%.

As indicated, there has been a steady and significant increase in participation within Stratham recreational programs in the past 5 years.

While participation has increased, funding has also increased, as indicated in **Table R-2**, compiled from Annual Town Reports from 1986 to present. Funds for Parks and Recreation are used for maintenance of the Stratham Hill Park; the Recreation Commission budget pays for part time staff and up front costs associated

TABLE R-1

Levels of Participation in Youth Recreation Activities

Activity	Number of Participants				
	1992	1993	1994	1995	1996
Soccer - Girls and Boys (Ages 6-14 years)	365	388	400+	420	440
Basketball- Girls and Boys (Ages 7-12 years)	208	200+	200+	200+	200+
Basketball - Girls and Boys (7th and 8th Grade)	NA	NA	30+	30+	30+
Baseball - Girls and Boys (Ages 6-14 years)	290	321	350+	380	400+
T-Ball - Girls and Boys (Age 6 years)	NA	50	50+	50+	50+
Babe Ruth - Boys (Ages 13-15 years)	NA	30+	30+	35+	40+
Summer Program (Grades 1-7, Boys and Girls)	NA	80+	70+	75+	75+
Total Participation	**865**	**1069+**	**1130+**	**1190**	**1235+**
Source: Stratham Recreation Commission					

with the various volunteer recreation programs. As in many smaller communities, programs offered through Stratham's Recreation Department are largely a volunteer effort.

There are no permanent part or full-time employees, although there is some paid staff for the summer camp programs. Many of the volunteers have become involved due to the fact that their children have participated in the various school age programs which the Recreation Commission. The importance of this volunteer spirit to our residents' overall positive sense of community was strongly reaffirmed during the 1996 Community Stewardship Program.

Due to their volunteer makeup and self supporting structure, the recreation programs in Stratham are very flexible and able to respond to the changing interests and desires of the community. With guidance from the commission regarding appropriateness of the activity, residents can use the structure and support of the Recreation Department to create any new programs that they would like to see offered and time and space availability. Most programs are financially self sufficient with registration fees offsetting the costs of regular operations and equipment. Major facilities upkeep is an exception with these costs reflected the recreation budgets shown above. The issues of time and space availability of facilities are major responsibilities of the Recreation Commission. It coordinates access, meaning both scheduling and, in some cases, maintenance (i.e. mowing and irrigation), for our residents to in-town facilities which are owned by at least three different bodies - The State, the Town and the School Department. To accomplish this, the Recreation Department maintains close interrelationships with the selectmen and Highway Department, the School Board, Stratham Hill Park Association, the NH Technical College, and many other related organizations.

TABLE R-2
Annual Budgets for Town Recreation Activities

Fiscal Year	Parks and Recreation (Stratham Hill Park)	Recreation Commission
1986	$20,900	$14,800
1987	$20,200	$17,160
1988	$20,450	$17,836
1989	$21,360	$24,245
1990	$20,825	$24,140
1991	$23,060	$27,855
1992	$20,154	$28,650
1993	$24,860	$40,800
1994	$25,060	$30,100
1995	$25,210	$31,000
1996	$27,010	$27,000

Source: Town Reports; Recreation Commission

3.0 EXISTING RECREATIONAL FACILITIES

Stratham has a number of outstanding recreational facilities which accommodate activities as diverse as outdoor and indoor team sports, hiking, boating, picnicking, to name a few. The following is a description of the main facilities in the community that are used for recreational purposes. The list includes facilities owned and controlled by Stratham as well as others which the Town "hosts". A list of recreation land owned by the Town, School, State or other groups is provided on **Table R-3**. The location of each of the recreational facility sites is shown on **Map R-1 -- *Recreational Facilities Map*.**

Town-Owned Facilities

Stratham Hill Park

Stratham Hill Park is the centerpiece of all of Stratham's recreational facilities. Given to the Town in 1905 by Edward Tuck of Paris, France, for one dollar, the park originally contained 70 acres "more or less". (FN) The 1905 deed said in part:

> "The conditions of this conveyance are that the trees upon said land shall be preserved, with additions and renewals from time to time, and that the property be maintained in at least as good condition as in the past for the free use and enjoyment of the people of Stratham, Exeter, Portsmouth and other adjacent towns for all time, hat no part of said premises shall ever be leased to private individuals or to corporations and that said premises shall be a public park and pleasure ground forever. The said town of Stratham to have control of said land with the power to make all necessary by-laws in regulating the use of the same, but no by-law shall be enacted depriving law abiding citizens from the above towns from the free use, enjoyment and occupation thereof. (FN2)"

The park was expanded in 1968 when the Town purchased about 38 acres from David C. And Elizabeth Noyes. The Noyes parcel came without any deed restrictions, and thus the use of that land can be limited to Stratham residents. The developed part of the 108 acre park contains numerous facilities, as listed below. Some are shown on **Figure R-1**, a recent site plan of the Park.

Park Facilities

- three ball field diamonds (60' base paths);
- space for two large soccer fields when baseball outfield areas are included (or potentially five junior soccer fields for primary grade use);
- one paved basketball court; a concert shell; a lighted, outdoor skating rink area;
- three pavilions with picnic tables, including one large pavilion with toilet facilities and nearby children's play equipment, and a second pavilion with another playground area including swings and a slide,
- three concession/storage buildings;
- a horse pulling area;
- a natural amphitheater;
- two garage/storage buildings (a one bay and a two bay structure);
- three 4-H buildings (two open stall animal pavilions and one large enclosed exhibition hall;
- a fenced corral near the middle of the 4-H buildings;
- a caretaker's residence;
- seasonal toilet facilities, and
- a large parking lot.

TABLE R-3
Stratham Recreation Land Map Index

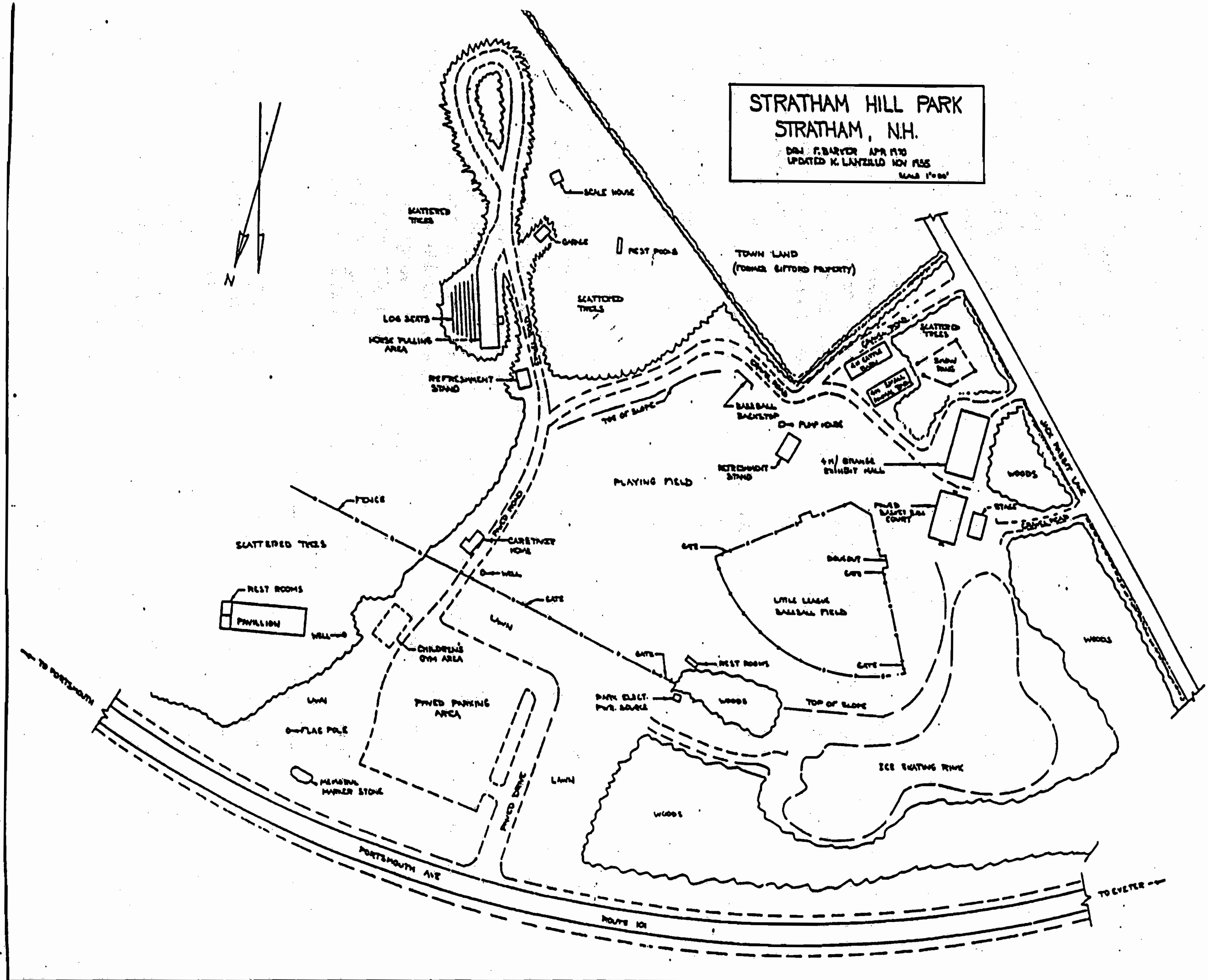
Index #	Facility	Owner	Acres
1	Stratham Hill Park (Tuck and Noyes land combined.)	Town	108
2	Stratham Municipal Complex	Town	9
3	Gifford Farm	Town	126.2
4	Stratham Elementary School	Town/School District	38.7
5	Town Landing (River Road)	Town	1.5
6	Chapman's Landing (College Rd.)	State of New Hampshire	4
7	N.H. Technical College — playing fields	New Hampshire Vocational Technical College	91
8	Sandy Point Discovery Center	State of New Hampshire (GBNERR)	50

A full-time caretaker no longer lives on the grounds but continues to maintain the facilities.

The paved roadway winds through the Park accessing many of the buildings. A gravel roadway leads to the summit of Stratham Hill. The forested part of this part of the park contains Stratham Hill. For 40 years it was used by the State as a Forest Fire Lookout Station. The Fire Tower still remains and is an exciting and steep climb for many Park visitors. There is a coast and geodetic triangulation point at the tower and a table describing the view. Since the park contains the second highest hill in Stratham (elevation 286 feet), there are particularly scenic views of Great Bay and the surrounding communities.

The park is widely used as a recreation facility. Groups use the playing fields for youth and adult baseball, softball and soccer. Scheduling for the fields' use during prime sports seasons is handled by the Recreation Department. Numerous organizations and local companies use the whole facility for picnics, and recreation field days. Additionally, Stratham Hill Park has been used for wedding receptions, business outings, Cub Scout camp overnights, family reunions, birthday parties and a variety of other functions. Reservations for the free use of Stratham Hill Park are made through the Town Clerk's office, with functions often scheduled a year in advance. The number and variety of uses indicates that this facility provides regional recreational opportunities for area residents and is in keeping with the original intention of the Tuck gift. The park is well known for the three day Stratham Fair, which has been held annually, in July, since 1968. Proceeds from the Fair benefit of the Stratham Volunteer Fire Department, Stratham Hill Park and many other community groups.

The park is managed by the Stratham Hill Park Association, formed as an advisory group to the Board of Selectmen and incorporated with the State of New Hampshire in 1957. Any resident with an interest in the Park can become a member of the Association. This association oversees funds that have been donated to the Park Association for specific repairs and improvements and raises funds, through proceeds from the Stratham Fair and other events. Additional funds, such as those provided by the Federal Emergency Management Agency (FEMA), were used in August of 1991, when Stratham Hill Park was heavily damaged by a freak wind storm. Volunteer efforts, federal funds and other monetary and time contributions were made to rebuild pavilions, restrooms, and other areas damaged by the storm.


STRATHAM HILL PARK
STRATHAM, N.H.
TOWN LAND
PLAYING FIELD
LITTLE LEAGUE BASEBALL FIELD
ICE SKATING RINK
WOODS
LAWN
PAVED PARKING AREA
PAVED DRIVE
PAVED ROAD
PAVILLION
REST ROOMS
SCATTERED TREES
LOG SEATS
REFRESHMENT STAND
SCALE HOUSE
CARETAKER HOME
CHILDREN'S GYM AREA
FLAG POLE
MEMORIAL MARKER STONE
FENCE
GATE
WELL
TOP OF SLOPE
BASEBALL BACKSTOP
PUMP HOUSE
4-H/ GRANGE EXHIBIT HALL
DUGOUT
STAGE
PARK ELECT. PWR. SOURCE
TO PORTSMOUTH
TO EXETER
ROUTE 101
PORTSMOUTH AVE
JACK RABBIT LANE
N

Gifford Farm Property

In 1985 the Town of Stratham voted to acquire the Gifford Farm, a 164.9 acre parcel, including a large farmhouse, barn and open agricultural land. The property abuts Stratham Hill Park and is located between Gifford Farm Road and Route 33/Portsmouth Avenue in Stratham. A portion of this property, 38.7 acres, was later transferred to the School Department in March of 1987 for the construction of Stratham's elementary school.

A trail system exists that connects the Gifford Farm parcel with trails through Stratham Hill Park and Stratham Memorial School. With approximately 125 acres of the original Gifford Farm land acquisition remaining, there is ample opportunity for new development of nature trails, and other active and passive recreational facilities and/or uses. Since the Town's acquisition of this site, the parcel's agricultural land is, when possible, leased for farming. A Town Forest, consisting of approximately 82+/- acres of the site was created by Town Meeting Action in 1994. The forest is managed by the Conservation Commission. See the "Gifford Farm" section in Chapter 5, Community Facilities for more information.

Stratham Memorial School

In September 1989 Stratham opened the doors to a new elementary school, converting the old school to house the current Municipal Center and the Wiggin Library. In addition to the construction of the elementary school classrooms and office areas, the building includes a large gymnasium with a full size basketball court and bleachers. The gym can also be divided by a curtain to provide two smaller basketball courts. Adjoining the gym is a large storage room and bathroom facilities, both of which also exit to the outside field areas allowing these two areas to be available on weekends, without opening the gym or the school, when the outdoor fields are being used. The gym is heavily used throughout the school year with physical education classes during the day, the S.A.F.E. after school day care program in the afternoons, and Recreation Department programs each weekday evening and all weekend long. Other indoor facilities in the school include a large cafeteria and stage. The stage is handicapped accessible and opens in the back to a multi-tiered music room which can serve as a back stage area for performances. Adjacent to the cafeteria is a large industrial kitchen. There is also an art room with a large kiln facility.

The outdoor field areas were built as multi-use fields. Included are two defined ball field diamonds (60' base paths) with backstops. The remaining field area has the ability to support at least one full size soccer field or up to 4 junior fields when outfield space is included. These field areas are heavily used throughout the year for physical education classes, recess space and Recreation Department sports programs taking place on weekday evenings and weekends. Due to this heavy use, a new well and irrigation system were recently added.

> The outdoor complex also includes an outdoor basketball court, a physical fitness course of chin-up stations, overhead ladders, etc., and a large playground area, which was built entirely with volunteer efforts. The playground includes an extensive tire playground area with swings, climbing sections and rings and is widely used in the summer and after school for recreation.

Municipal Center

Converted to municipal offices in 1989, this former elementary school is located on a nine acre parcel close to the intersection of Bunker Hill Road and Route 108. In 1991 the Recreation Department, largely throu gh volunteer efforts, developed a regulation League sized softball field behind the municipal center. The field, named for Gail Binette, the former chairperson of the Recreation Committee, is heavily used by softball teams throughout the Spring and Summer and also accommodates junior soccer play in the Fall. A tire playground area built for the original school completes the site and is still widely used.

The Stratham Municipal Complex also contains a cafetorium with a stage and kitchen. Smaller in size than the school's, this area is a popular site used frequently by the Grange, the 76ers Club, the Boy Scouts, Recreation Department aerobic classes, as well as family anniversary parties and other functions and meetings. The annual Town Meeting and elections are also held in this room.

Town Landing

The Town of Stratham owns a 1.5 acre parcel of land known as the Town Landing located at the end of River Road and abutting the Squamscott River. The site provides Stratham residents with public access to the river and parking for several trailers and vehicles and an unpaved boat launching facility. In addition to water access, the site is a popular entry point to the river for ice fishing in winter. Since the area is tidal, access and use are limited. The area was substantially improved in 1994 with assistance from the Boy Scouts by expanding the cleared area, and installing picnic tables and signs. The Town maintains the site.

Conservation Commission Land

The Conservation Commission oversees many acres of land, which are used for passive recreation, such as hiking, walking, bird-watching, and picnicking. The Stratham Conservation Commission either owns outright a number of these parcels of land which are open for public use or oversees conservation restrictions or easements for land protection on other properties.

Non-Town Facilities

New Hampshire Vocational Technical College

Located on Portsmouth Avenue, the state-owned New Hampshire Vocational Technical College has several ball fields and soccer fields that it allows the Stratham Recreation Committee to use for its programs. The fields, located behind the school, include a hardball field (90' base paths), two softball fields (60' base paths) and two soccer fields. One soccer field overlaps with the softball fields, so all fields can not be used simultaneously. Also available in this location are several picnic tables and an outdoor fireplace near the college buildings. There is no inside recreation facility at the College. There are also no bathroom facilities. Although the fields are state owned, the Recreation Department controls the scheduling of the fields and arranges for their maintenance.

Chapman's Landing

Chapman's Landing is located on the Stratham side of the Route 108 bridge across the Squamscott River. It was originally acquired in 1984 by the State through funding from the U.S. Fish and Wildlife Service to provide a public access site for the river. The seven acre site was substantially upgraded in 1990 included a paved parking area, concrete boat launch ramp, and chemical toilet facility. A private residence adjacent to the parking area is currently held in a life trust and will one day become part of the public holding at the site.

Sandy Point Discovery Center

The Sandy Point Discovery Center, which opened in 1994, is an interpretative educational center occupying a 50 acre site along the Squamscott River on Depot Road. Designed as an educational resource for the Seacoast area, the Center consists of a building which houses displays and exhibits about the Great Bay and its ecology, a lab and training classroom, a car-top boat launch, as well as a self-interpretative trail and boardwalk crossing freshwater wetlands and salt marsh along the river. The site straddles the Stratham/Greenland town line, with the Discovery Center building located in Greenland, and most of the shoreland property in Stratham. The site was acquired with funds from the NH Land Conservation Investment Program (LCIP) and developed with support of the NH Coastal Program and Great Bay National Estuarine Research Reserve (GBNERR). The GBNERR staffs and runs the facility; it is open to the public and used extensively by local schools and organizations for environmental education.

Other Public/Private Facilities and Programs

Stratham residents have been able to use other area recreational facilities. In past years the Stratham Recreation Committee has offered tennis through Great Bay Tennis and Fitness Club, a private indoor facility located on Route 108 in Newmarket. The Committee has also offered swimming lessons at the indoor swimming facility at Phillips Exeter Academy, a private preparatory school located in Exeter. Other facilities at Phillips Exeter Academy such as the ice skating rink have been used as well.

Another recreational facility in Exeter used by Stratham residents and other members of Supervisory Union #16 is the Exeter recreation park located near the former County Courthouse building on Hampton Road. This

facility, which the was built with federal funds, includes six tennis courts, a basketball court, three baseball/soccer fields and an outdoor swimming pool.

Programs offered through the Exeter Recreation Department are also often available to Stratham residents on a space available basis. Exeter residents are often allowed an earlier sign up period and non-residents usually pay an increased program fee.

There are also a number of area recreational facilities such as the Portsmouth YMCA that offer recreational programs and facilities on a regional basis. Individual and family passes are available for reasonable fees at facilities such as Phillips Exeter Academy, the Portsmouth 'Y', and numerous fitness clubs.

In past years the Boy Scouts and Girl Scouts have offered traditional programs, which have included nature and sailing programs. The 4-H club has also been available to those youngsters interested in a diverse number of activities, including but not limited to agriculture and farming.

TABLE R-4
Selected Standards for Outdoor Recreation Facilities

Facility	Standard per 1000 Population	Standard Applied to Stratham		Current Facilities
		1996	2015*	
baseball diamonds	1.1	6	10	9
basketball courts	0.8	4	7	3
boat/fishing access	1.8	10	16	3
golf courses (18 holes)	0.04	0	0	0
gymnasiums	0.25	1 to 2	2	1
ice skating area	0.14	1	1	1
open space/natural areas(ac.)	51	275	453	>275
picnic tables	8	43	71	50+
parks, community (acres)	6	32	53	108
playgrounds (town & school)	0.5	3	4	3
playgrounds (acres)	2.1	11	19	>11
skiing (x-country areas)	0.1	1	1	1+
soccer fields	0.16	1	1	5+
swimming beach	0.5	3	4	0
tennis courts	0.95	5	8	0
trails, hiking (miles)	2.2	11	20	unknown

* Based on Preliminary 1997 OSP Population Projection for Stratham of 8963 in 2015

4.0 ANALYSIS OF NEEDS

State Recreational Standards

The N.H. Office of State Planning has developed guidelines to assist communities in planning for their recreational needs. **Table R-4** below lists recreational facility standards as they appear in OSP's 1989 State Comprehensive Outdoor Recreation Plan. These standards were applied to Stratham based on a 1994 OSP population estimate of 5393.

While these standards can be useful in understanding facility needs in an "average" community of a certain size, they are not meant to prescribe specific needs in a specific community. These standards, for example, may point to a facility need where, due to changing local recreation interests, no such need exists, and vice-versa. Nonetheless, a reasoned review of Stratham's existing recreation facilities compared to these standards does tend to support several facility needs that the Recreation Commission has previously recognized.

It appears that for most of the applicable facility types, Stratham meets or exceeds the published standard. The exceptions are: basketball court; boat/fishing access; swimming beach/pool, and tennis courts. The Recreation Commission has indicated that existing for the use of baseball & softball diamonds does not always meet demand. This is also true of basketball facilities. Boat and fishing access appear adequate for the boating and fishing opportunities that exist within the Town. Regarding swimming beaches, there is no open water in Stratham with public access that would lend itself to such a facility. On the other hand, public beaches abound in the neighboring Towns of Rye, No. Hampton and Hampton and residents may also use the outdoor pool in Exeter. Regarding tennis courts, the need or desire for courts has been discussed locally but no conclusion has been reached. Although there appear to be ample courts available in Exeter and surrounding towns, the ebbs and flows in the popularity of tennis may leave Stratham without good access to public courts in the future. Recently there has been increased demand for the Recreation Committee to offer tennis lessons to adults and children interested in learning to play or reviving their skills. With no municipal tennis courts located within Stratham, it has been difficult to respond to this interest.

The volunteer Recreation Committee has seen a significant increase in participation in its programs in the last ten years. While the Town has made some effort to provide additional facilities to accommodate this increase in recreational users, the Recreation Committee has often been challenged by lack of field space and/or volunteers to run existing programs or to expand to programs requested by the Stratham community. As the residential population grows, these challenges will become greater and the need to expand recreational programs, facilities and support can be expected to increase.

5.0 RECOMMENDATIONS

Based on the existing number and types of facilities and the number of volunteers participating in the creation of the recreational programs, as well as expected further growth in the residential population, the following objectives and actions are recommended: (unless otherwise noted, these recommendations should be carried out by the Recreation Commission)

1. Parks & Recreation Department and Recreation Commission

- Continue the Town's current approach of meeting recreational activity needs with self-supporting, volunteer-oriented programs.
- Closely monitor the adequacy of existing staffing levels of the Recreation Department to fulfill the Town's needs and respond when necessary by hiring part-time clerical and/or maintenance staff and by enhancing the volunteer program.
- Consider re-establishing recreational opportunities with the Portsmouth YMCA, the Phillips Exeter Academy facilities, Great Bay Tennis facility and other applicable facilities.
- Improve public awareness of the recreational programs offered in Stratham through publication of an informational brochure and gain political support for the efforts of the volunteer Recreation Committee.

2. Facility Maintenance

- Work with municipal officials on developing a plan for coordinated maintenance of recreational facilities.
- Conduct a yearly assessment of the condition of each facility and include major improvements and upgrades in the Town's capital improvements program.
- Increase funding for maintenance of recreational facilities- particularly those facilities that are heavily used.
- Coordinate maintenance of existing facilities with various user groups.

3. New Facilities and Programs

- Periodically review the need to expand or alter existing programs based on demonstrated interest and the ability to gain support for the programs through user fee or other means.
- Conduct a facilities needs analysis to identify needs based on existing and anticipated recreational program of the Town. The needs analysis should specifically address the needs for a new softball field, tennis and basketball courts and swimming facility, among others.
- Develop a component of the Town's capital improvements program for developing new or expanded recreational facilities identified in the needs analysis.
- Work with the Stratham Board of Selectmen and other municipal officials to seek out funds, including grants, to acquire necessary facilities, or additional program support to carry out the objectives of the Stratham Recreation Committee ten year capital improvements plan and town capital improvements plan.
- Develop new facilities and improve existing facilities in accordance with ADA standards.
- If the Town is unsuccessful in selling the old town hall building, consider using it for an indoor recreational facility and Recreation Committee headquarters. Repair the gym floor as needed.
- Develop arrangement with the Exeter Region Cooperative School District to determine town use of middle school gym facilities and then reevaluate the arrangement in relation to the results of the facilities needs analysis.

4. Outdoor Recreation/Conservation

- Coordinate Recreation Department future needs with Conservation Commission plans wherever common objectives can be met. Develop a ten-year funding plan for improvements and acquisition of recreational open space in coordination with the Conservation Commission.
- Develop a master plan for the use of the Gifford Farm property which balances active and passive recreation as well as the conservation needs of the site. The property master plan could be a joint effort by the Recreation and Conservation Commissions.
- Coordinate scheduled recreational activities with the Conservation Commission and other environmental groups, such as the Sandy Point Education Center to offer recreational opportunities with an environmental/natural resources focus.
- Seek to establish a network of trails linking public conservation and recreation by interconnecting, through easements and other agreements with landowners. The Planning Board should seek to establish trail corridors when reviewing development proposals that include open space set-asides or conservation easements.
- Work with Conservation Commissions and Recreation Commissions from adjacent communities to develop an interconnected open space and trail network, and to pursue other recreational plans and programs on a regional basis as war-

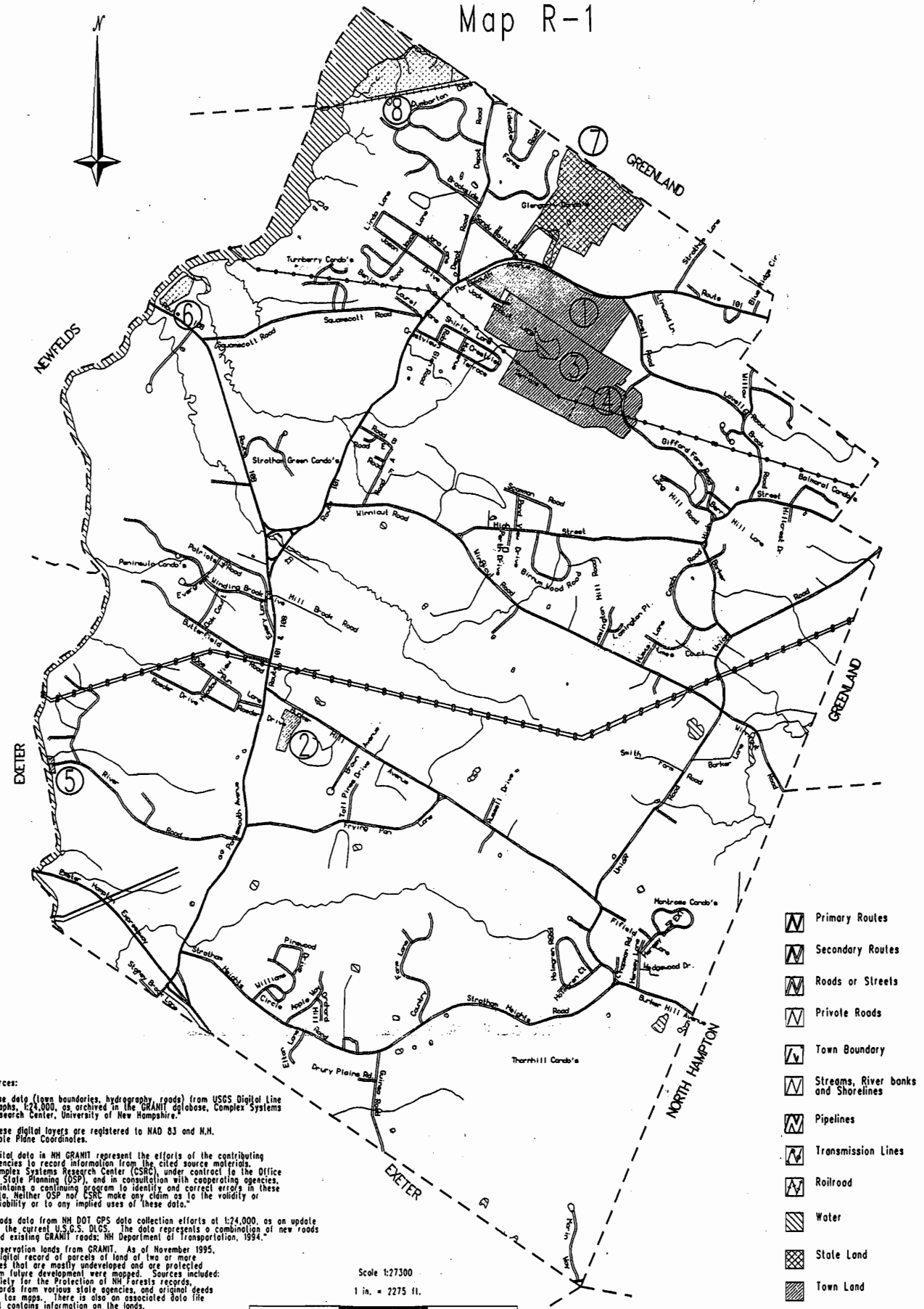
ranted.

- Conduct an inventory of possible recreation land sites that may become available for donation-/acquisition and target those that are most desirable for public acquisition.

- Encourage developers of large subdivisions to donate a portion of their parcels for use by the residents of the Town.

- Increase funding for open space acquisition, enhancement and protection.

Stratham, N.H.
Recreation Facilities
Map R-1



Sources:

"Base data (town boundaries, hydrography, roads) from USGS Digital Line Graphs, 1:24,000, as archived in the GRANIT database, Complex Systems Research Center, University of New Hampshire."

These digital layers are registered to NAD 83 and N.H. State Plane Coordinates.

"Digital data in NH GRANIT represent the efforts of the contributing agencies to record information from the cited source materials. Complex Systems Research Center (CSRC), under contract to the Office of State Planning (OSP), and in consultation with cooperating agencies, maintains a continuing program to identify and correct errors in these data. Neither OSP nor CSRC make any claim as to the validity or reliability or to any implied uses of these data."

"Roads data from NH DOT GPS data collection efforts at 1:24,000, as an update to the current U.S.G.S. DLGS. The data represents a combination of new roads and existing GRANIT roads; NH Department of Transportation, 1994."

Conservation lands from GRANIT. As of November 1995, a digital record of parcels of land of two or more acres that are mostly undeveloped and are protected from future development were mapped. Sources included: Society for the Protection of NH Forests records, records from various state agencies, and original deeds and tax maps. There is also an associated data file that contains information on the lands.

Scale 1:27300

1 in. = 2275 ft.

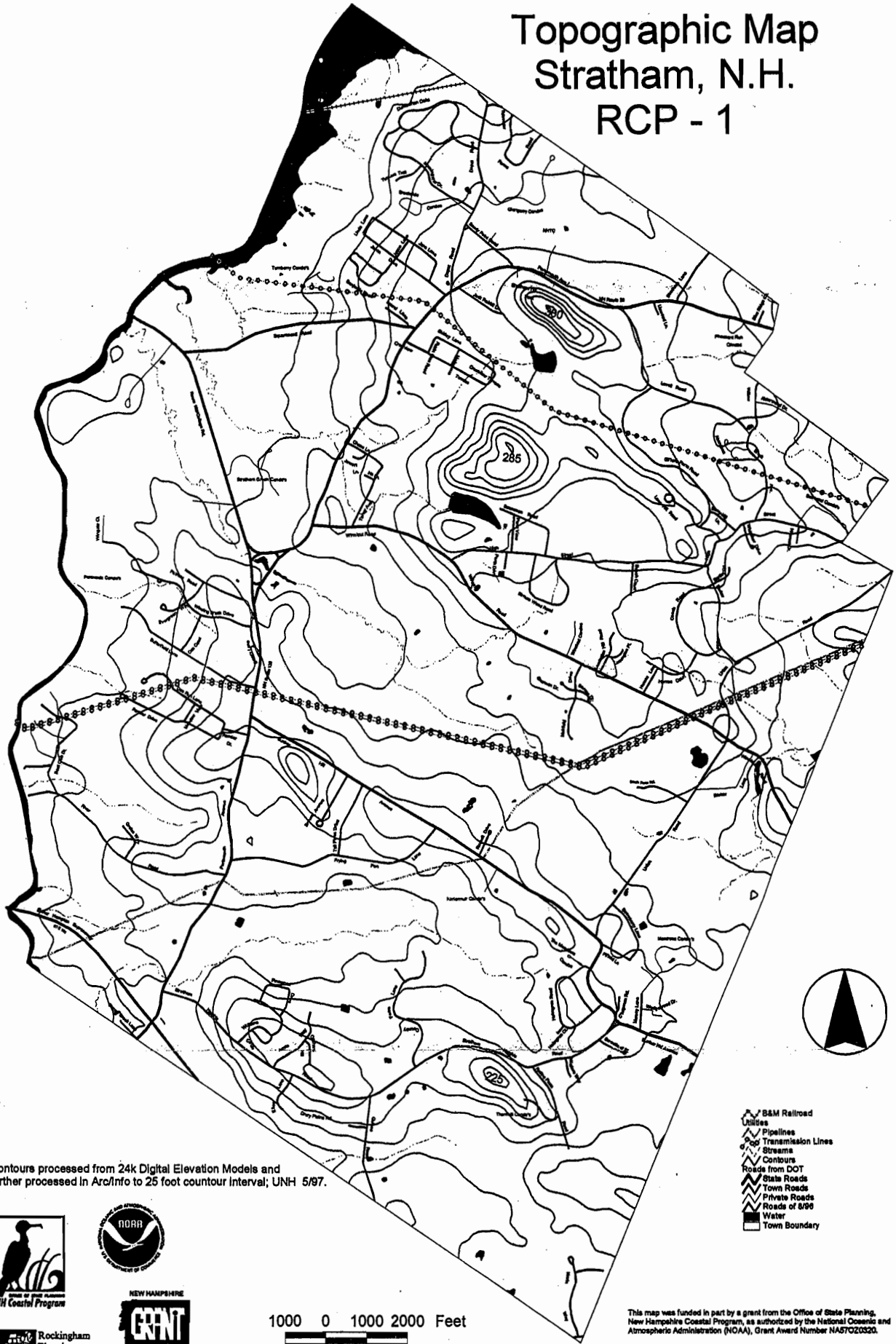
0 feet 2275 4550 6825

NEW HAMPSHIRE GRANIT

This map was funded in part by a grant from the Office of State Planning, New Hampshire Coastal Program, as authorized by the National Oceanic and Atmospheric Administration (NOAA), Grant Award Number NA57020320.

Prepared by the

Topographic Map
Stratham, N.H.
RCP - 1



Contours processed from 24k Digital Elevation Models and further processed in Arc/Info to 25 foot countour interval; UNH 5/97.

1000 0 1000 2000 Feet

This map was funded in part by a grant from the Office of State Planning, New Hampshire Coastal Program, as authorized by the National Oceanic and Atmospheric Administration (NOAA), Grant Award Number NA57OZ0320.

GIS- c:\towns\stratax\stratmp.apr; MP- contour map

RESOURCE CONSERVATION AND PRESERVATION

1.0 INTRODUCTION

Stratham's natural environment is characterized by a rich legacy of forests, agricultural lands, rivers and streams, undeveloped shorelands and wetlands. Historically, these resources have provided Stratham with a high quality environment and contribute importantly to the high quality of life in the community. Although Stratham's natural features still exist in abundance, past development has inevitably resulted in the loss of some resources, especially open spaces and active agricultural lands. Careful attention must be given to future development so that further losses to both the natural and cultural environment are minimized and that the essential qualities that make Stratham the community it is remain intact.

This major section of the Master Plan will inventory the existing natural and built features of Stratham and examine existing conditions and future needs for protecting the more than 10,000 years ago. Within Stratham, there are four types of surficial materials: till, contact deposits, marine deposits and outwash/shore de posits . These materials are described in more detail below.
Town's land, water and historic resources. In part, it will do so by integrating and updating information from several important planning documents prepared by the Town over the past decade, including the 1985 Stratham Master Plan, the Open Space and Recreation Plan (1989), the Water Resources Management and Protection Plan (1993), the Wellhead Protection Program Report (1993) and the Stratham Community Stewardship Project report (1996). The chapter concludes with general and specific recommendations regarding steps the community should take to protect and conserve the essential resources of the Town.

2.0 NATURAL RESOURCES INVENTORY

In order to determine the existing conditions and future needs of the town's resources, it is necessary to review the extensive inventory information that exists about the Town's geology, topography, soils, water resources, wildlife, agriculture lands, and forest lands. For the purpose of compliance with RSA 674:2 VIII-a, an inventory of potential construction materials (sand and gravel resources) is also included. Later sections of this chapter will include inventories of open space and conservation lands and of historic and archeological sites.

2.1 GEOLOGY

Bedrock Geology

The bedrock in Stratham, as in all of southeastern New Hampshire, was formed from layers of sea bottom sediments deposited and compacted over millions of years into formations of sedimentary rock. These formations were transformed through uplifting, folding, and tremendous heat and pressure into metamorphic rock. According to the "Geological Map of New Hampshire," prepared by the US Geological Survey and the NH State Geologist in 1986, there are two major bedrock types in Stratham: the *Eliot formation* running in a north/south direction through the central part of town and the *Kittery formation* running in bands along the westerly and easterly boundaries. Two small inclusions of the *Exeter formation*, also metamorphic, are located east of Guinea Rd. and east of Hillcrest Drive. In addition to these metamorphic formations, small traces of an igneous formation are found on the Greenland border near where the Winniconic Brook leaves the Town. All of the types of bedrock found in Stratham have excellent bearing capacities and pose few, if any development constraints. A map included in the 1993 Stratham Water Resources and Management Plan (Map 4) shows the location of these formations within the Town.

Surficial Geology

The upper layers of geologic materials above the bedrock formations are known as surficial deposits, and largely determine the shape topography of the Town. In southeastern New Hampshire, these geologic materials were deposited by a glacier more than 10,000 years ago. Within Stratham, there are four types of surficial materials: till, contact deposits, marine deposits and outwash/shore deposits. These materials are described in more detail below.

Till-- As the mile thick glacier advanced from the northwest, it deposited layers of debris made of sand, silt, clay, and gravel, which is collectively known as *till*. Stratham's till areas, which make up roughly one-third (33%) of the Town's area, are found primarily on the hills and ridges of the central portion of Town. Till usually provides adequate loading capacity for building foundations, thus indicating that till areas are suited for general development purposes. However, if hardpan (an impermeable layer) is located within 18 to 24 inches below the surface, conditions may not be adequate for the placement of on-site septic systems.

Contact Deposits-- As the glacier melted and retreated, sediments were released forming layers of sand and gravel called ice contact deposits. These deposits have good drainage and permeability characteristics with a high water bearing capacity. These deposits, which include the Town's stratified drift aquifers, usually contain large quantities of groundwater, thus making them potentially suitable sources for public water supplies. A band of contact deposits crosses central Stratham from north to south, comprising about twenty percent (20%) of the town's total land area. These areas are also easily excavated and have historically been the location of sand and gravel pits.

Marine Silt and Clay Deposits -- These deposits resulted from marine deposition during the period when the ocean inundated most of southeastern New Hampshire. Marine deposits were formed along the bottom of the ancient sea as well as its bays and estuaries. As the sea level retreated to its present position, the marine deposits were left in what are now upland areas. Marine silt and clay deposits cover less than half of the land area. These areas are found in the Town's low-lying areas along the Squamscott River and the drainage ways of Jewett Hill Brook, Mill Brook and Winniconic Brook. Generally, these materials are unsuitable or marginally suitable for development because of a high water table with poor drainage and unstable conditions. In some areas these limitations can be overcome with the provision of adequate drainage facilities and special engineering and design considerations.

Outwash and Shore Deposits -- The glacial melt waters carried away sands and fine gravels and deposited materials along the shorelines of ancient seas. A scattering of these deposits (10 %) is located along Route 108. Due to their good bearing capacity and moderate permeability, these materials are very suitable for development.

2.2 TOPOGRAPHY AND SLOPE

Stratham's terrain is predominately rolling with gentle slopes of 0-8 percent. The topography rises and falls from a low of slightly above mean sea level at the Squamscott River's edge to a high of 290 feet at Jewett Hill.

Map **RCP-1** ***Topography*** depicts the topography through elevation contour lines . Five hills above 200 feet elevation are located in Stratham, adding some variety to the landscape. Among these hills is the publicly owned Stratham Hill (noted for its scenic vistas of Great Bay) as well as Long Hill and Jewett Hill. Barker's Hill is also in this area. Bunker Hill and Rollins Hill form a crescent shaped ridge to the south. The summit of nearby Pine Hill is on the North Hampton border.

The valleys between the uplands consist of pockets of wetlands and small ponds and brooks on the eastern part of Town. To the west, the lowlands stretching to the river's edge are characterized by alluvial plains and tidal marshes. Due to the predominantly gentle terrain, there are relatively few areas in Stratham where steep slopes preclude development. Based on the NRCS (formerly SCS) Soil Survey conducted in 1979, the distribution of land area by slope class in Stratham is shown in Table RCP-1 on the following page.

The vast majority of Stratham falls within the gradual slope class. Most of these areas are suitable in slope for all types of development, however, within the 0-3% areas (near the river and streams) some very flat areas are susceptible to flooding and/or are poorly drained -- both conditions indicating poor development suitability. A small portion (2.6%) of the total land area of Stratham has slopes of 15% or greater. These extremely steep areas, including sections of Jewett, Long and Rollins and Bunker Hill pose severe development constraints.

Table RCP -1
Slope Classes of Land in Stratham, N.H.

Slope Class	Total Acres	% of Total
Gradual -- 0-8%	8476	92.4%
Steep -- 8-15%	439	5.0%
Steep -- 15-25%	128	1.4%
Severe -- 25+%	113	1.2%
Total	9155	100.0%

Source: NRCS Soil Survey for Stratham

2.3 SOILS

Soil information is critical in making sound land use decisions, particularly in Stratham where sewage disposal depends exclusively on the use of on-site septic systems. Knowledge regarding soil suitability can be used to direct development activity away from poorly suited areas and toward those with the capability to sustain it. For example, residential development should be located away from areas with unstable soil conditions, high water tables, and slow percolation rates which impose constraints on placement of building foundations and septic systems. Other soils are better suited for agricultural uses because of level topography, good drainage and lack of stoniness.

As indicated above, a soil survey for the Town of Stratham was conducted by the Natural Resources Conservation Service, USDA (formerly SCS) in 1979. A report was also prepared which describes Stratham's soils and their limitations for various uses including dwellings, septic systems, agriculture, forestry mining and road construction. This report was updated in 1994. The current Soil Survey for Rockingham County, which displays the soil type and slope classes for all mapped soil units in Stratham, is available at the NRCS and Rockingham County Conservation District offices and is incorporated by reference. Soil data is useful as a planning guide for making generalized land use determinations, however, they are not suitable for site-specific evaluations due to limitations in scale and accuracy. Since the mid 1980s, the Town has been using High Intensity Soil mapping (HIS) whenever site specific information is required for zoning enforcement purposes.

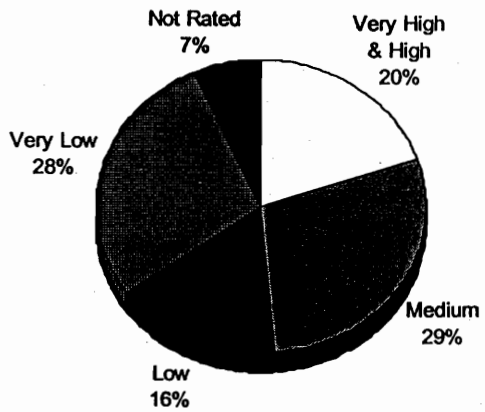
Soil Potential for Development

Since the latter 1970's when soil limitation data became more widely used in planning, refinements in the technical interpretation of soil suitability have yielded an updated approach to soils rating. A new system, described in Soil Potentials for Development (RCCD, 1987) replaces "soil limitation" ratings with "soil potential ratings." The rating system classifies soils on the basis of the relative ease or difficulty of placing a septic system (particularly the absorption field) on a given soil/slope complex. The key difference between the two approaches is that soil potential takes into account common engineering design and construction techniques typically used to overcome soil limitations. Soil potential ratings are not recommendations for soil use; however, they do provide a more realistic approach in determining land use and are particularly useful as a land use planning tool.

Figure RCP- 1 illustrates the distribution of soils in Stratham by development potential. Less than 20% of the Town's land has a rating of either high or very high. Land rated medium accounts for 29.1% of the area and land rated low and very low accounts for 16.3% and 28.4% respectively.

In Stratham, where all properties except for those in the Industrial Zone are reliant on on-site wastewater disposal, a map based on soil potential ratings serves as an excellent general indicator of development suitability. **Map RCP-2** ***Soil Potential for Development*** provides a "first-cut" indication of the areas in Stratham where additional development can be

Figure RCP-1
Soil Potential Ratings -- Stratham



best accommodated, assuming continued reliance on on-site septic systems.

2.4 WATER RESOURCES

This section of the Master Plan summarizes information contained in the 1993 report Water Resource Management and Protection Plan, Town of Stratham which is hereby incorporated by reference in its entirety.

That Plan addresses the requirements established by the New Hampshire Office of State Planning under the authority of RSA 4-C:20,I, for the preparation of local water resource management and protection plans. It is summarized here for continuity of the Master Plan and to update pertinent information.

SURFACE WATER

Surface water systems are any type of water resource located above ground on the earth's surface. Examples of surface water systems include: streams, rivers, marshes, ponds, bogs, lakes, wetlands, etc. Surface water systems are more dynamic than groundwater, in that they are influenced by the effects of wind, rain, and temperature. They are also subject to varying rates of flow, such as the difference between the flow rate of a river as opposed to that of a pond.

Surface water resources function as holding areas for flood waters and seasonal high waters. In addition, they serve as recharge areas and discharge points for groundwater resources. The point of discharge is where the surface water and groundwater are hydrologically connected. Most commonly, surface water resources will act as a discharge point for groundwater. However, during the spring months surface waters help to recharge groundwater resources, which in turn replenish shallow domestic water wells. It should be noted that prolonged dry periods can result in an overall lowering of the water table.

2.4.1 Watersheds Within Stratham

The watershed is the principal focus in describing a surface water system. It is the land area within a series of connecting higher ridges that drain surface water to the lowest point, which is where a stream or river flows out of the watershed. The network formed by rivers, streams, lakes, and ponds is known as the drainage system of the watershed.

Stratham forms a portion of three regional watersheds: the Great Bay, the tidal Squamscott River, and the Coastal Watershed. The first two watersheds are part of the larger Piscataqua River Basin, while the Coastal Watershed is part of the larger Coastal River Basin. The accompanying **Map RCP-3** ***Watersheds and Surface Waters***, indicates the watershed divides located in Stratham.

In an effort to isolate meaningful drainage patterns in Stratham, two sub-watersheds were delineated. The first is the Dearborn Brook Sub-Watershed which forms a portion of the Squamscott River Watershed. The second is the Winnicutt River Sub-Watershed which forms a portion of the Great Bay Watershed. The Watersheds and Surface Waters map (RCP-3) depicts the watershed divides within Stratham (both regional and sub-watersheds), plus the Town's perennial waterbodies and watercourses. For additional description of the watershed and sub-watersheds in Stratham, please refer to the *Water Resources Management and Protection Plan.*

2.4.2 Waterbodies in Stratham

There are eight significant waterbodies within Stratham: Mill Pond, the Winnicutt Mill Pond, and six ponds which do not have names. The unnamed ponds are depicted on Map 2 as Ponds #1 through #6. In addition, there are a number of tiny ponds (one acre or less) scattered throughout Town. The vital statistics of Stratham's significant waterbodies (including surface area, elevation, watershed location, and whether free flowing or impounded) are presented in **Table RCP-2** on the following page.

In terms of perennial streams, Stratham contains 14 named streams and 11 unnamed streams for a total of 25 watercourses. The Town's watercourses are shown on Map 3. The unnamed streams are shown on the map as Unnamed Streams A through K. The vital statistics of the

Town's perennial streams are presented in **Table RCP-3.**

2.4.3 Surface Water Quality

In New Hampshire, each surface waterbody and watercourse has been given a legislative water quality classification of A, B, or C, as identified in RSA 149:3. The classifications are defined below.

- *Class A Waters* - Of the highest quality and potentially acceptable as public water supply sources after disinfection. No sewage or wastes shall be discharged into these waters.

- *Class B Waters* - Of the second highest quality and no objectionable physical characteristics. No sewage or waste shall be discharged into these waters unless they have been adequately treated. Acceptable for bathing and other recreational purposes and, after treatment, for use as public water supplies.

- *Class C Waters* - Acceptable for boating, fishing, or for industrial water supply, either with or without treatment. These waters cannot be used as a public water supply source.

Currently, all of Stratham's surface water resources have received **Class B** status from the New Hampshire State legislature. The only exception is the Dearborn Brook Sub-Watershed which is considered a Class A water source due to the use of the Exeter Reservoir as a municipal water supply source for Exeter. It should be noted that legislative classification does not mean that the water always meets this established standard.

Although Stratham does not actively monitor the quality of its surface waters, there are several organizations involved in monitoring the Squamscott River and its tributaries. These organizations and their efforts are described below.

TABLE RCP-2
STRATHAM WATERBODIES

Waterbody	Surface Area (acres)	Elevation (ft.)	Watershed Location	Impounded or Free flowing
Mill Pond	3.0	30	Squamscott River	Impounded
Winnicutt Mill	3.0	40	Great Bay	Impounded
Unnamed Pond #1	3.0	75	Great Bay	Impounded
Unnamed Pond #2	2.0	40	Great Bay	Free flowing
Peat Pond (labeled Unnamed Pond #3)	12.0	150	Squamscott River	Free flowing
Unnamed Pond #4	6.0	150	Squamscott River	Free flowing
Unnamed Pond #5	3.0	150	Squamscott River	Free flowing
Unnamed Pond #6	2.0	45	Squamscott River	Free flowing

Sources: United States Geological Survey (USGS) topographic maps, Water Resource Division (WRD) dam records, and RPC analysis.

TABLE RCP-3
STRATHAM WATERCOURSES

Watercourse	Length (miles)	Elevation (feet)	Watershed Location	Impounded or Free flowing
Squamscott River	5.2	10	Squamscott River	Free flowing
Winnicutt River	1.0	70	Winnicutt River	Impounded
Foss Brook	0.2	70	Great Bay	Free flowing
Jewett Hill Brook	2.2	150	Squamscott River	Free flowing
Wheelwright Creek	0.1	10	Squamscott River	Free flowing
Mill Brook	3.6	130	Squamscott River	Impounded
Parkman Brook	2.2	90	Squamscott River	Free flowing
Dearborn Brook	0.5	90	Dearborn Brook	Impounded
Winding Brook	0.9	80	Squamscott River	Impounded
Thompson Brook	0.6	160	Winnicutt River	Free flowing
Willowbrook	0.7	90	Winnicutt River	Free flowing
Winniconic Brook	0.4	35	Winnicutt River	Free flowing
Marsh Brook	0.8	60	Winnicutt River	Free flowing
Brackett Brook	0.1	90	Great Bay	Free flowing
Stream A	0.3	50	Squamscott River	Free flowing
Stream B	0.9	60	Squamscott River	Free flowing
Stream C	0.9	40	Squamscott River	Free flowing
Stream D	0.5	40	Squamscott River	Free flowing
Stream E	1.0	70	Squamscott River	Free flowing
Stream F	0.5	20	Squamscott River	Free flowing
Stream G	0.5	40	Squamscott River	Free flowing
Stream H	1.1	150	Squamscott River	Free flowing
Stream I	0.8	75	Winnicutt River	Free flowing
Stream J	0.7	55	Winnicutt River	Free flowing
Stream K	0.6	70	Winnicutt River	Free flowing

Sources: USGS topographic maps, WRD dam records, and RPC analysis.

Municipal Monitoring: The Exeter Public Works Department monitors daily water quality at the municipal wastewater treatment plant's point of discharge along the Squamscott River. The Department also conducts toxicity tests on a quarterly basis. As mentioned previously, the river is a tributary to the Great Bay. All of the bay's tributaries are currently closed to shell-fish harvesting because of the problems associated with improperly treated sewage. Exeter has recently upgraded its sewer system and treatment plant to separate stormwater from wastewater. Prior to the project's completion, storm events would often overflow the Town's sewage lagoons, thus resulting in untreated sewage being discharged into the river. It is expected that the stormwater separation project will eventually enhance the river's water quality as well as the bay's.

305(b) Water Quality Report: A comprehensive source of regional water quality information can be found in the 1992 publication NH Water Quality Report to Congress 305 (b), prepared by the Water Supply and Pollution Control Division of the NH Department of Environmental Services. The report describes broad water quality parameters for the major river basins in the State, including the Piscataqua and Coastal basins. The report identifies surface waters which do not meet the standards for their legislative classification.

Within Stratham, only the Squamscott River was designated as "not supporting" its Class B rating for reasons of high bacteria counts. Water quality sampling conducted in the Exeter and Squamscott Rivers in 1995 revealed high levels of Fecal and E. coli bacteria which exceed Class B standards. The Squamscott River closest to Stratham -- at the mouth of Cobby Brook in Newfields-- showed the mean *E. coli* level over five samples to be 255 cts/100ml — about twice the Class B state limit of 126 cts/100ml (*Source: NH Office of State Planning, NH Coastal Program, 1995)*. According to an agreement between the NH Department of Environmental Services and the Division of Public Health Services, the Squamscott River will not be deemed as supporting its Class B designation until all of the shellfish beds are open to harvesting on a regular basis. Currently, only a few of the beds within the Great Bay proper are open to the taking of shellfish. It is hoped that the recent upgrade of Exeter's treatment plant and an increase in water sampling by the State will result in re-opening Great Bay to shellfish harvesting.

Great Bay National Estuarine Research Reserve: The entirety of the Squamscott River falls within the Great Bay National Estuarine Research Reserve which was designated by the United States Congress in 1989 as the nation's 18th National Estuarine Research Reserve under the federal Coastal Zone Management Act (CZMA). The CZMA created a federal-state partnership for the protection and management of coastal areas. New Hampshire's Coastal Program is administered by the NH Office of State Planning.

The Great Bay Reserve includes over 4,400 acres of tidal water areas representing the range of different environments around the estuary (saltmarsh areas, bluffs, rocky shores, woodlands, open fields, etc.). While the highest priority of the Reserve is to preserve the bay through an aggressive land acquisition program, there is also a strong emphasis on using the reserve for long-term research and education.

Great Bay Hydrologic Unit: This is a project sponsored by the US Department of Agriculture, and involves the following organizations: The Rockingham and Strafford County Conservation Districts, the Rockingham and Strafford County branches of the Natural Resource Conservation Service (NRCS), the Agricultural Conservation and Stabilization Services (ASCS), the UNH Cooperative Extension Service and the US Geological Survey. The project provides non-point pollution source education to the public for the watershed area covering the Great Bay. The education effort is geared towards providing best management education materials for potentially hazardous land uses.

2.4.4 Wetlands

Stratham's Zoning Ordinance defines the Town's

Wetlands Conservation District as follows: "Those areas of the Town that contain marshes, ponds, bogs, lakes, as well as soils that are defined as poorly or very poorly drained as defined by the National Cooperative Soil Survey conducted by the USDA Soil Conservation Service." The district also includes "the borders of tidal marshes of the Squamscott River and Great Bay. Said borders are hereby defined as those areas adjacent to the Squamscott River and Great Bay with elevations of eight (8) feet or less above mean sea level."

The Town's Subdivision Regulations and Site Plan Review Regulations further refine the district to include those areas consisting of poorly drained and very poorly drained soils as delineated through High Intensity Soil Surveys (HISS) prepared by a licensed soil scientist. In most cases, new development proposals must include HISS data as part of the application for regulatory review.

The Town's Wetland Map is included in this document as **Map RCP-4**. The map is taken from the GRANIT soils data coverage and is based on a digitized version of the Soil Survey of Rockingham County, New Hampshire (NRCS).

Table RCP-4 below shows the number of acres of wetland soils within the three regional watersheds. The table indicates that Stratham contains roughly 3,342 acres of wetlands, or roughly 36% of the Town's total land area.

TABLE RCP-4
Wetland Soils in Stratham

Watershed	Very Poorly Drained Soils (acres)	Poorly Drained Soils (acres)	Total Wetland Soils (acres)	% of Total Land Area
Great Bay Watershed	299	893	1,192	12.8%
Squamscott River Watershed	485	1,615	2,100	22.6%
Coastal Watershed	0	50	50	<1.0%
Total Wetland Acres (determined by soil type)	784	2,558	3,342	35.9%

Source: Soil Survey for Rockingham County, New Hampshire, as prepared by the Natural Resource Conservation Service (NRCS) of the US Department of Agriculture. (Areas computed by RPC personnel using manual planimeter.)

2.4.5 Floodplains

A Flood Hazard Boundary Map was prepared for Stratham by the Federal Insurance Administration in 1975, and a more detailed Flood Insurance Rate Map (FIRM) was prepared by the Federal Emergency Management Agency (FEMA) in 1989. The preparation of these maps, plus the adoption of a special ordinance dealing with floodplain development, enables a town to participate in the National Flood Insurance Program (NFIP). The NFIP allows residents living in flood hazard areas to purchase flood insurance at low cost; however, insurance is only made available to communities which participate in the program. Stratham officially entered the NFIP program in 1989 when the Town adopted its Floodplain Management District. As of 1996, Stratham is a member of good standing in the NFIP.

Table RCP-5 on the following page indicates the acres of flood hazard areas within Stratham, broken down by regional watersheds. The flood hazard areas within the two sub-watersheds are included as part of the regional watershed flood hazard area totals.

TABLE RCP-5
Flood Hazard Areas

Watershed	Wetland Soils	% of Total Land Area
Great Bay Watershed	115	1.3%
Squamscott River Watershed	394	4.2%
Coastal Watershed	0	0%
Total Flood Hazard Acres	509	5.5%

Source: *Flood Insurance Rate Map (FIRM) for the Town of Stratham, New Hampshire, as prepared by the Federal Emergency Management Agency (FEMA) in 1989. (Areas computed by manual planimeter.)*

2.4.6 Potential Surface Water Supplies

With two exceptions, all of the Town's surface water resources currently maintain a Class B water quality status as defined by the State Legislature. The first exception is the Class A Dearborn Brook Sub-Watershed. As mentioned previously, Dearborn Brook is used to augment the Exeter municipal water system. The second exception is the tidal Squamscott River, which, as previously cited, does not support its Class B rating due to high bacteria counts.

Stratham does not use any portion of its surface water resources to meet water supply demands, and there are no plans to utilize these resources in the foreseeable future. The only surface water resource in town which has the requisite water delivery capability is the Squamscott River. However, this is an unlikely source due to the brackish nature of the river and its existing water quality problems. The remaining streams and rivers within Stratham have relatively small flows and are impractical to develop as water supplies.

Stratham's water supply demands are currently met by the Town's groundwater resources. In the future, if a need is demonstrated for a municipal water supply or additional public water supplies, the Town's groundwater resources would, in all probability, be the preferred option. These resources are described in the next section.

GROUNDWATER RESOURCES

Groundwater is a concentration of subsurface water, occurring in saturated soils and geological formations. It is re-supplied through precipitation and surface water discharge. The water infiltrates the ground through an aerated zone where impurities are filtered out. The water then moves to a saturated zone where the pore spaces between soil particles are filled by the water. It is very important that the earth's surface be able to transmit water so that a certain percentage can be stored underground as "groundwater". If excessive compaction or extensive covering of the earth's surface occurs, the amount of water that can reach the saturated zone and become groundwater is reduced.

Aquifers are found where land surfaces are permeable and the storage and transmission of water can take place. Aquifers having medium to high potential to yield groundwater occur in the New Hampshire seacoast area as alluvial deposits of sand and gravel (unconsolidated deposits) or in bedrock fractures (consolidated deposits). The major source of aquifer recharge in the seacoast region is through precipitation directly onto the aquifer's surface.

The unconsolidated deposits, also called stratified drift deposits, contain sorted layers of gravel, sand, silt and clay. They are found primarily along valley bottoms. These materials have abundant pore space to store water. Consequently, these stratified drift deposits of sand and gravel have become good sources of medium to high volume aquifers.

Bedrock fractures normally do not yield the same quantity of groundwater that stratified drift deposits do; however, they should not be overlooked in terms of contributing to a community's water supply needs. Bedrock fractures are more productive when they have a layer of sand and gravel over them. This allows recharge to occur directly from above. Bedrock fractures are usually adequate for low density domestic wells. In contrast, till aquifers usually have a lower yield, and therefore, are seldom used for water supplies. This is due to the compact nature of the deposit which is

typically composed of a mixture of clay, silt, gravel and boulders. The transmission and storage of water is greatly reduced in this type of aquifer.

2.4.7 Stratified Drift Aquifers in Stratham

The groundwater resources of southeastern New Hampshire have been investigated extensively through a number of major studies from the mid 1970s to the present. The most recent and most important was conducted in the U.S. Geological Survey in cooperation with the NH Water Resources Division of NHDES in 1991 and resulted in publication of detailed aquifer delineation maps which today form the most accurate basis of stratified drift groundwater information in Stratham. The various investigatory efforts are described in chronological order below.

1. US Geological Survey (USGS): In 1977, the USGS identified several medium yield and low yield aquifers underlying the Town's major rivers and wetland areas. (Source: Availability of Groundwater in the Lower Merrimack River Basin, Southern New Hampshire, USGS, 1977).

2. US Army Corps of Engineers (USACE): In 1980, the USACE identified the existence of an aquifer in Stratham's southeast corner, at the end of Bunker Hill Road. The aquifer lies wholly within Stratham and receives recharge from precipitation only. The study describes the aquifer as "a Kame plain surrounded by Marine deposits." Although the study noted large amounts of clay in the northwestern portion of the aquifer, it was estimated that the aquifer could deliver roughly 153,000 gallons per day. (Source: Groundwater Assessment Study for 50 Communities in Southeastern New Hampshire, USACE; September, 1980).

3. US Army Corps of Engineers (USACE): In 1982, the USACE made an assessment of the aquifer identified in the 1980 study cited above. The 1982 study estimated that 70% of Stratham's population would be served by a municipal water system by the year 2030. The estimate of the aquifer's water delivery capability was upgraded to 360,000 gallons per day, which was deemed sufficient for a municipal water system. (Source: Southern New Hampshire Water Resource Study, USACE; August, 1982).

4. US Geological Survey (USGS): In 1990, the USGS published the most thorough and accurate study of the region's groundwater conditions to date. These reports, entitled *Geohydrology and Water Quality of Stratified Drift Aquifers in the Exeter, Lamprey and Oyster River Basins, Southeastern New Hampshire* and *Geohydrologic Groundwater Quality, and Streamflow Data for the Stratified Drift Aquifers in the Lower Merrimack and Coastal River Basins, Southeastern New Hampshire*, identified five aquifers within Stratham. These studies form the basis for the Town's existing aquifer protection ordinance, as well as the Town's Wellhead Protection Program which is currently underway.

A brief description of the aquifers identified by these studies is presented below. The aquifers are labeled on **Map RCP-5 *Stratified Drift Aquifers*** as the *Stratham Hill Aquifer*, the *Bunker Hill Aquifer*, the *Winnicutt River Aquifer*, the *Skinner Springs Aquifer*, and the *Guinea Road Aquifer*. The various characteristics of the aquifers, as detailed in the above referenced studies, are provided in the accompanying **Table RCP-6**.

The Stratham Hill Aquifer

This is one of Stratham's two primary aquifers.It is located in the northeastern end of Town, with only a small portion falling within Greenland. The aquifer has a distinct "S" shape, hence its identification as the Stratham Aquifer. It begins along Stratham Lane and extends as far south as Winnicutt Road. The aquifer is approximately 743 acres in size and lies mostly within The aquifer's only sources of recharge are the wetlands which lie above its surface, and precipitation. Stratham, except for ten acres

TABLE RCP-6
Aquifer Characteristics

Aquifer	Size (acres)	Transmissivity	Saturated Thickness	Water Table Elevation (msl)	Direction of Flow
Stratham Hill	743	0-500 ft^2	0-20 ft.	140-110	southwest
Bunker Hill	873	0-2000 ft^2	0-20 ft.	110-70	varies
Winnicutt River	397	0-4000 ft^2	---	50	varies
Skinner Springs	35	>500 ft^2	---	---	---
Guinea Road.	35	>500 ft^2	---	---	---

Source: *Geohydrology and Water Quality of Stratified Drift Aquifers in the Exeter, Lamprey and Oyster River Basins, Southeastern New Hampshire, USGS, 1989,* and, *Geologic and Groundwater Quality Data for Stratified Drift Aquifers in the Exeter, Lamprey, and Oyster River Basins, Southeastern New Hampshire.*

extending into Greenland. The aquifer's saturated thickness contours range from a high of twenty (20) feet within the aquifer's center, to as little as a few feet along the outer edges. The aquifer's groundwater contours range from a high of 140 feet in the aquifer's center, to a low of 110 feet along the outer edges. Within the aquifer, groundwater flows in a southwesterly direction. The aquifer in its entirety has a transmissivity rate of less than 500 feet[1] per day.

- **The Bunker Hill Aquifer**

This is Stratham's other primary aquifer and is located wholly within Stratham. The aquifer spans the entire length of Bunker Hill Avenue. It begins along Patriot's Road, crosses Portsmouth Avenue, and extends as far south as Rollins Farm Road. The aquifer is approximately 873 acres in size. The aquifer's only sources of recharge are the wetlands which lie above its surface, and precipitation.

The aquifer's saturated thickness contours range from a high of twenty (20) feet within the aquifer's center, to as little as a few feet along the outer edges. The entire aquifer has a transmissivity rate of less than 500 feet per day, except for a small strip within the aquifer's southern end which has a transmissivity rate of 1,000 - 2,000 $feet^2$ per day.

- **The Winnicutt River Aquifer**

This is a strip-shaped aquifer which begins in Stratham and extends south into Greenland and North Hampton. The majority of the aquifer falls within North Hampton, with only small portions extending into Stratham and Greenland. The aquifer's total size is roughly 397 acres, with Stratham's portion consisting of 50 acres. The aquifer receives recharge from three sources: the wetlands above its surface, the Winnicutt River, and precipitation. There are three water wells owned by the Hampton Water Works Company located above North Hampton's portion of the aquifer. These wells deliver roughly 1.42 million gallons of water per day. The majority of the aquifer has a transmissivity rate of 0 - 1,000 $feet^2$ per day, however, there are two places in Stratham where the rate is between 2000 - 4,000 $feet^2$ per day -- the highest rating.

- **The Skinner Springs Aquifer**

This is a small aquifer (less than 40 acres in size) that Stratham shares with Exeter. The majority of the aquifer falls within Stratham, however, at

[1] "transmissivity" refers to the rate at which water is transmitted through a unit width of aquifer under a unit hydraulic gradient, and is expressed in units of feet squared per day.

least ten acres are located in Exeter. The aquifer is located between Portsmouth Avenue (Route 108), Stratham Heights Road and Guinea Road. The aquifer is so small that the USGS did not identify any saturated thickness contours, water table contours or the groundwater's flow direction. The aquifer has a transmissivity rate of less than 500 feet^2 per day.

- **The Guinea Road Aquifer**
  This is a small aquifer (less than 40 acres in size) which Stratham shares with Exeter. It is located less than 2,000 feet southeast of the Skinner Springs Aquifer and just southeast of Guinea Road. The aquifer's mass is fairly evenly split between Stratham and Exeter. The aquifer is so small that the USGS did not identify any saturated thickness contours, water table contours or the groundwater's flow direction. The aquifer has a transmissivity rate of less than 500 feet^2 per day.

2.5 WILDLIFE AND PLANT HABITAT

All wildlife have three basic survival requirements: food, cover, and water. Fish, amphibians, and waterfowl require the presence of water for spawning and egg laying. Vegetation provides necessary cover to serve as nursery habitat. Water also serves as spawning grounds for insects which are a source of food for a variety of fish and animals. Fur-bearers such as muskrat, otter, and beaver utilize wetlands as habitat. Coastal and inland marshes serve not only as breeding grounds for waterfowl, but also as critical resting and feeding areas during spring and fall migration.

The value of an area as habitat depends on a number of factors including size, contiguity with similar areas, and the amount of edge. Edge is the transitional area between habitat types. It consists of understory plants and early successional types of vegetation which provide both forage and cover for numerous species of birds and mammals. Edge can be created by utility transmission rights-of-way, crop and pasture lands, regrown old fields, and similar types of clearings. The habitat value and edge effect of an area may be significantly reduced if adjacent land uses and encroachments create barriers or threaten the area's integrity.

It should be noted that Stratham 's portion of the tidal Squamscott River is hydrologically connected to the Great Bay which is a federally designated National Estuarine Research Reserve. On the State level, the estuary is managed by the NH Coastal Program which is responsible for managing New Hampshire's coastal resources. The estuary provides prime habitat for many wildlife species. More than 90,000 birds reside in the estuary (source: Inventory of the Natural Resources of the Great Bay Estuarine System; NH Fish and Game Department, 1981). Thousands of Canada geese and black ducks rest and feed within the area during autumn months. Osprey are common during the spring and fall migration cycles. There are three rare and endangered species which live in the estuary: the bald eagle, common tern, and common loon.

Terrestrial mammals which utilize the bay include raccoons, whitetail deer, red fox, woodchuck, muskrats, chipmunks, grey squirrels, cottontail rabbits, mink, otter, and beaver. A complete inventory of all animals (and plants) which reside in the Great Bay can be found in the NH Fish and Game inventory cited above, as well as in the Great Bay National Estuarine Research Reserve Management Plan (prepared by the NH Office of State Planning in 1989).

In addition to excellent coastal habitat, Stratham also has important inland habitat areas including wetlands, river and stream corridors, forests (coniferous, hardwood, and mixed woodlands), and open lands (meadows and fields). These habitat types support a wide range of animals including game species such as deer, coyotes, raccoons, rabbits, and turkeys. Stratham 's prime wildlife habitat areas include: the wetland areas located in the south western area of Town, the corridors of the Squamscott River, Winnicutt River, Mill River, and the forest lands, located in the central area and Stratham Park areas of Town. There is also quite a variety of wildlife and plant types located in wetland areas along the North Hampton border.

The Town's major watercourses are also the sites of fish stocking efforts by the NH Fish and Game Department. The Winnicutt River is stocked with brook trout, rainbow trout, and brown trout. The Squamscott River is stocked with herring, smelts, bluebacks, and American shad.

Natural plant communities in Stratham are typical of

coastal New Hampshire, with vegetative patterns reflecting soil and moisture conditions. However, according to the NH Natural Heritage Inventory (NHNHI), there are five (5) rare and endangered plant species and one (1) rare and endangered bird specie located in Town. Rare and endangered plant species in Stratham include the slender blue flag, climbing hempweed, robust knotweed, water-plantain spearwort, and stout bulrush. All of these plant species, with the exception of the water-plantain spearwort, are considered by the NHNHI as "imperilled in New Hampshire because of rarity." The water-plantain spearwort is considered "critically imperilled in state because of extreme rarity." The only rare and endangered animal species is the common moorhen. The common moorhen is also considered by the NHNHI to be "critically imperilled in the state because of extreme rarity."

2.6 AGRICULTURAL LANDS

Soil information is an important indicator of land and can be highly productive for agricultural use. Important agricultural soils include "prime farmland" and "farmland of statewide importance." As defined by the Natural Resource Conservation Service (NRCS), "prime farmland" has the soil quality and moisture content needed to produce sustained high yields when managed according to modern farming methods. Prime farmland can be farmed continuously or nearly continuously without degradation of the environment; produces the highest yield for the least amount of energy used; requires the least investment to remain productive; and is not susceptible to leaching from fertilizers or pesticides (Source: Soils of New Hampshire, Sid Pilgrim and N. Peterson, University of New Hampshire and the NRCS, 1979). "Farmland of statewide importance" has many of the same attributes of "prime farmland" but is generally of lesser quality. In the New England context, these lands are viable and important for use as agricultural land. **Map RCP-6 *Farmland Soils and Active Farms*** found in the 1993 Open Space and Recreation Plan indicates that nearly 60% of the soils in Stratham are suitable for agriculture. These areas are located along the banks of the Squamscott River, along both sides of Route 108, within the northwest corner of Town, and a large patch located in the center of Stratham.

Aside from its obvious importance for growing food, agricultural land has value as a scenic resource, as wildlife habitat, and as a groundwater recharge area. Farming also provides economic benefits, especially to the local and regional economy. The loss of farmland has a direct impact on the landscape as well as an indirect impact on the local tax rate. The indirect economic benefit of farming relates to the real estate value of the farmland itself compared to the cost of providing public services to residents once the land is converted to residences. As demonstrated in the Cost of Community Services study conducted by the UNH Cooperative Extension Service in 1995, residential subdivisions cost the town more in terms of providing municipal services than is received in increased property tax revenue, whereas farmland and other open land produce more in revenues than they consume in services -- even when enrolled in the Current Use program. While Stratham has lost a number of farms to residential development, it still retains a number of prominent working farms such as the Stuart Farm, Scammon Farm, Barker Farm, and others. There are eleven working farms in Stratham at the present time, as shown on **Table RCP-7** on the following page. This figure is well above the number of active farms still in operation in adjacent communities. Although far fewer in number than in the past, these remaining farms have a very significant impact on the scenic and rural qualities of the community. The locations of these farms are indicated by symbol on the **Farmland Soils and Active Farms Map.**

TABLE RCP-7
Principal Commercial Farms in Stratham

FARM NAME	MAP ID#	TYPE	ACREAGE
Scamman Farm	1	Dairy	210
Stuart Farm	2	Dairy	270
Gifford Farm	3	Hay crop	129
Mill Valley Farm	4	Hay, vegetable	100
Barker Farm	5	Vegetable, berries	100
Centerton Farm	6	Horse	30
French/Rauch Farm	7	Hay crop (non-commercial)	100
Berry Hill Farm	8	Berries, vegetables	NA
Salt Box Farm	9	Vegetables, misc.	130
Bunker Hill Orchards	10	Orchard	NA
Unnamed	11	Christmas trees	NA

Sources: *Rockingham County Cooperative Extension Office of the University of New Hampshire; Town tax records; RPC staff research.*

2.7 FOREST RESOURCES

Forest land is a major renewable resource, providing both commodities (e.g., wood products and maple syrup), and non-commodity benefits (e.g., water resource protection, air quality maintenance, energy conservation, wildlife habitat, recreation and scenic quality).

According to an inventory maintained by the Rockingham County branch of the UNH Cooperative Extension Service, there are five "tree farms" within Stratham. The term "tree farm" refers to the National Tree Farm Program sponsored by the American Forestry Association (AFA). In order for a woodland to receive tree farm certification, the owner must prepare a long-range forest management plan approved by a professional forester, and submit the plan to the AFA.

In 1940, the AFA established an inventory of very big or *"champion"* trees as part of its Big Tree Program. This program was designed to promote protection of the nation's oldest and tallest trees. The AFA publishes the National Register of Big Trees every four years, listing the vital statistics of all trees in the program. In New Hampshire, the Registry of Big Trees is cosponsored jointly by UNH Cooperative Extension Service, the Forest Society and the NH Division of Forests and Lands. The most recent published *N.H. Registry of Big Trees* (1994) includes no trees from Stratham. The Conservation Commission may wish to investigate whether or not any trees from Stratham should be included in the Registry in the future.

Stratham's active tree farms are depicted on Map 10 (Open Space Values) of the 1993 Open Space and Recreation Plan. This map also depicts the tax parcels

within the "Current Use" program. Many of these parcels contain prime forest and farmland. The State-sponsored Current Use Assessment Program, as authorized by RSA 79-A, provides reduced property assessments of field, farm, and forest lands of ten acres or more in size. The current use program plays an important role in maintaining open space in Stratham.

2.8 SAND AND GRAVEL RESOURCES

Beginning in 1989, state law has mandated that local master plans include a section which addresses construction materials. The amended statute, RSA 674:2 VIII-a, requires the following:

> "A construction materials section which summarizes known sources of construction materials which are available for future construction materials needs, including, at a minimum, the location and estimated extent of excavations which have been granted permits under RSA 155-E, as well as reports filed pursuant to RSA 155-E:2, I(d) with respect to non-permitted excavations."

Responding to this requirement, the intent of this section of the Master Plan is to (1) identify the general location of construction materials relevant to potential future construction needs of the community, (2) identify the status of existing gravel pit and other excavation sites, both active and abandoned, in the Town, and (3) describe local regulatory framework for mining and excavation operations.

2.8.1 Identification of Construction Materials

Soils Based Inventory

The Rockingham County Soil Survey conducted by the NRCS identifies roadfill, sand, gravel, and topsoil as potential construction materials. The NRCS rates the performance of each soil type based on its physical characteristics and test data conducted during the soil survey. For each intended use of the soil, a soil suitability rating is provided. The ratings of "good," "moderate," "fair," and "poor" are used for roadfill and topsoil. For sand and gravel, the soils are rated as "probable" or "improbable" as to the possibility of sand or gravel being present.

The construction material suitability ratings for soil types that are likely to contain any of the four construction materials and are found in Stratham are shown on **Map RCP-7 *Potential Construction Materials***[2] and listed in **Table RCP-8**. In the table, each soil number and name is provided, as well as the number of acres of that type of soil found in Stratham. Calculations of the number of acres for each soil type are based on the digitized soil map. For roadfill, if a soil has a rating of "good," it was included in the table. For sand and gravel, only the "probable" rating is listed. In the case of topsoil, there were no soils which had a "good" rating so only soil with a "moderate" rating was listed. (If a soil had a rating less than good or probable it was left blank to make the table easier to read.)

Total acreages for construction materials of the various types based on soil suitability data are as follows:

- Roadfill: RCP-8 shows that seventeen soils in Stratham, totaling about 2,500 acres, are rated as good for use as roadfill. The largest single soil type that is good for roadfill is the 510 A-D, Hoosic, which has about 1,600 acres in Stratham.

- Sand Sand is a very valuable material used in many kinds of construction. There are twenty soil types in Stratham that the NRCS have given a probable rating for the presence of sand. Since only one of the soils is part of a complex soil, this number is fairly accurate. Once again, the 510 A-D, Hoosic is the largest single soil type in this category, making up almost half of the total.

[2] The source for the soil information is the NRCS soil map as digitized by Complex Systems at UNH and provided to the Rockingham Planning Commission in digital format. Soil maps are intended for general townwide land use planning. Due to the mapping techniques used, different soil types may exist within a mapped area of another soil type. For these reasons, soil maps should not be used for site specific land use planning. The information is not intended to be used for definitive identification of construction materials.

TABLE RCP-8
Soil Potential Ratings for Construction Materials

Soil Symbol	Name	Description	Road	Sand	Gravel	Topsoil
26A	Windsor	loamy sand, 0-3% slopes	Good	Prob.	-	-
26B	Windsor	loamy sand, 3-8% slopes	Good	Prob.	-	-
26C	Windsor	loamy sand, 8-15% slopes	Good	Prob.	-	-
30A	Unadilla	very fine sand loam	Good	Prob.	Prob.	Moderate
42B	Canton	gravelly, fine sandy loam, 3-8% slopes	Good	-	-	-
42C	Canton	gravelly, fine sandy loam, 8-15% slopes	Good	-	-	-
43C	Canton	gravelly, fine sandy loam, 8-15% slopes	Good	-	-	-
62B	Charlton	fine sandy loam, 3-8% slopes	Good	-	-	-
63B	Charlton	fine sandy loam, very stony 3-8% slopes	Good	-	-	-
63C	Charlton	fine sandy loam, very stony 8-15% slopes	Good	-	-	-
66B	Paxton	fine sandy loam, 3-8% slopes	Good	-	-	-
66C	Paxton	fine sandy loam, 8-15% slopes	Good	-	-	-
67B	Paxton	fine sandy loam, very stony 3-8% slopes	Good	-	-	-
67C	Paxton	fine sandy loam, very stony, 8-15% slopes	Good	-	-	-
115	Scarboro	muck	-	Prob.	-	-
125	Scarboro	muck, very stony	-	Prob.	-	-
305	Lim- Pootatuck		-	Prob.	-	-
313A	Deerfield	fine sandy loam, 0-3% slopes	-	Prob.	-	-
313B	Deerfield	fine sandy loam, 3-8% slopes	-	Prob.	-	-
314A	Pipestone	0-5% slopes	-	Prob.	-	-
395	Chocorua	mucky peat	-	Prob.	-	-
497	Pawcatuck	mucky peat	-	Prob.	-	-
510A	Hoosic	gravelly fine sandy loam 0-3% slopes	Good	Prob.	Prob.	-
510B	Hoosic	gravelly fine sandy loam 3-8% slopes	Good	Prob.	Prob.	-
510C	Hoosic	gravelly fine sandy loam 8-15% slopes	-	Prob.	Prob.	-
510D	Hoosic	gravelly fine sandy loam 15-35% slopes	-	Prob.	Prob.	-
531B	Scio	very fine sand loam 0-5% slopes	-	Prob.	Prob.	-
546A	Walpole	very fine sand loam 0-5% slopes	-	Prob.	Prob.	-
547A	Walpole	very fine sand loam, very stony, 0-3% slopes	-	Prob.	Prob.	-
547B	Walpole	very fine sand loam, very stony, 3-8% slopes	-	Prob.	Prob.	-

- Gravel: Gravel is an important material for many types of construction activity. Due to the geology of Stratham and much of the coastal region, gravel deposits are not very plentiful. In Stratham, there are only nine soil types where finding gravel is rated as probable. These soils include an area of about 2,100 acres, over 75% of which are from one soil type - the 510 A-D, Hoosic.

- Topsoil: Topsoil deposits are the **smallest** of the four construction materials found in Stratham. None of the soils were rated good for topsoil and only one, the 30 A, Unadilla, was rated as moderate. Only 12.7 acres of the Unadilla soil are found in Stratham.

Identification of Stratified Drift Aquifers

As described in section 2.4.7 above and shown on Map RCP-5, there are a number of important stratified drift aquifers located in Stratham. When sand and gravel deposits are saturated with water, they form an aquifer. Since these aquifers consist mainly of stratified sand and gravel deposits, they are also a potential source of sand and gravel construction material. As expected, the aquifers match up fairly closely with the sand and gravel soils identified from the NRCS soils map. There are, however, many instances where glaciers deposited large amounts of sand and gravel on the top of hills or on hillsides; these are referred to as eskers or drumlins. These areas would not contain large amounts of grounwater and would not show up on the U.S.G.S. maps.

Although stratified drift aquifers will always contain sand and gravel deposits, they are not necessarily suited for excavation to recover construction materials. Excavation that occurs below or too close to the water table will expose the groundwater to potential contamination and also increase evaporation of the water supply. For these reasons, excavation in or near such aquifers which have a realistic potential use as future water supply sources should not be permitted.The total size of the potential sand producing soils is approximately 3,300 acres.

2.8.2 Existing Excavations

At present, there is one permitted excavation and several others which are not permitted or considered abandoned or grandfathered under RSA 155E. **Table RCP 9 – *Existing Sand and Gravel Excavations in Stratham*** contains information regarding these sites and their current status. A small backyard gravel pit on Bunker Hill Road is the only excavation that is shown on the most recent U.S.G.S. map and is the only pit that local officials recently permitted. The gravel pit is behind an existing house and only 5,000 cubic yards are slated to

TABLE RCP 9
Existing Sand and Gravel Excavations in Stratham

Excavation	Location	Approx. Size	Active	155-E Status
Bell & Flynn	Bunker Hill Ave. Map 10/Lot 25-1 Map 3/Lot 3	76 acres (20 open)	No (Court Injunction)	"Abandoned"; Reclamation plan filed 5/96
Bell & Flynn	Bunker Hill Ave. Map 4/Lot 10	12 acres (5 open)	Yes	"Abandoned"; no report filed per RSA 155-E
Sewall	Bunker Hill Ave.; Map 4 Lot 20	10 acres	Yes	Permitted 8/96

Source: Straham Code Enforcement Officer and RPC Planner

be removed from the site.

2.8.3 Excavation Regulations

In 1988, the Stratham Planning Board adopted new Excavation Regulations that were based on a model developed by the Rockingham Planning Commission. These regulations incorporated all of the required provisions from RSA 155-E. Excavations are permitted in Stratham if the Planning Board issues an excavation permit after obtaining the required excavation and restoration plans and holding a public hearing. With adequate enforcement and inventory of operations, the existing regulations should provide the right balance between allowing for excavation of needed construction material and protecting valuable groundwater resources.

3.0 WATER RESOURCES PROTECTION

Stratham does not have a municipal water system at this time and has no plans to develop one in the foreseeable future. Nonetheless, the protection of both surface and groundwater is a critical issue for the future. With the exception of numerous "public" water systems (defined as water systems with 15 or more service connection or used by 25 persons or more) scattered throughout the community, all of the Town's existing development relies on individual on-site wells. In a community with a municipal water system the municipality must, at a minimum, be concerned about the water quality of a limited number of production wells or surface water supplies. In Stratham essentially **all** of the groundwater must be protected since it is the universal supply of potable water.

As identified in Section 2.4 of this chapter, Stratham contains all or portions of three large stratified drift aquifers and two smaller ones. Together, these aquifers underlie over 2000 acres or nearly a quarter of the land area of the Town. While this apparent abundance of groundwater means there is adequate potential supply for the future, the Town must continue to protect these sources from contamination and over-exploitation.

This chapter, which in part incorporates information contained in the 1993 Stratham Water Resources Management and Protection Plan (WRMPP), presents information about existing water withdrawals and discharges, public water systems, existing and projects demands for water and potential threats to the Town's water supplies.

3.1 WATER WITHDRAWALS AND DISCHARGES

Information regarding withdrawal and discharge rates for major groundwater users is filed annually with the Water Resource Division (WRD) of the NH Department of Environmental Services in accordance with the provisions of the NH Code of Administrative Rules Wr 700. Major groundwater users are defined as those operations which use more than 20,000 gallons of water per day (gpd). For major groundwater users who are discharging to an aquifer, a Groundwater Discharge Permit must be obtained from the State. According to a recent review of WRD records, there is one major withdrawal taking place above the Town's stratified drift aquifers, and there are no holders of a Groundwater Discharge Permit above these resources. According to the 1993 Water Resources Management Plan, however, there are a number of additional major withdrawals and discharges not included in the NHDES records. These originate primarily from common wells and septic systems of residential cluster developments. In addition, a new major public water supply production well is currently under development by a private utility.

The current major withdrawals are described as follows:

Exeter Municipal Water System: The Exeter municipal water system maintains several wells along the Stratham-Exeter border which withdraw water from the **Skinner Springs Aquifer** . These wells are used to augment Exeter's municipal water system, which receives the majority of its water from the Exeter River. Currently, these wells contribute an average of roughly **80,000 gpd** to the municipal water system.

Thornhill Residential Development: consists of 70 two-bedroom, single family homes. The development is located in the southern end of Town, off of Rollins Farm Road. Using the septic system design standards of the Water Supply and Pollution Control Division (WSPCD), it is estimated this development withdraws roughly 21,000 gpd from the southern end of the Bunker

TABLE RCP 10
Active Public Water Supply Systems in Stratham

Community Water System	Non-Community Water System	Non-Community Transient Water System
(A) Aberdeen West	(Q) Acorn School	(CC) Little Italy
(B) Balmoral	(R) Bell & Flynn	(DD) The Commons
(C) Burnhaven	(S) Country Kids	(EE) Hodgies
(D) Glengarry Condos	(T) Cornerstone School	(FF) Community Church
(E) Jewett Hill	(U) King's Highway Plza	(GG) Stratham Hill Park
(F) Muirfield Cluster	(V) Market Basket	(HH) Sweet Dreams Bakery
(G) Montrose Condos		(W) NH Tech College
(H) Pheasant Run	(X) Piper's Landing	
(I) Salt River	(Y) Rockingham News	
(J) Turnberry Condos		(Z) Shaws
(K) Smith Farm	(AA) Town Offices	
(L) Stratham Green	(BB) Memorial School	
(M) Stratham Woods		
(N) Thornhill Condos		
(O) Winding Brook Condos		
(P) Lamington Hill Subdivision		

Hill Aquifer.

Salt River Condominiums: located off Brookside Drive, consists of 78 single family units , withdrawing and discharging approximately 23,400 gpd from the groundwater.

Glengarry Condominiums: located off Depot Road, consists of 114 single family units, withdrawing and discharging roughly 25,650 gpd from the groundwater.

Numerous community water systems which serve other condominiums also make groundwater withdrawals, however, to date they fall below the 20,000 gpd limit defining major groundwater users.

In addition to these current "major" withdrawals, the **Hampton Water Works Co.**, concurrent with the preparation the master plan, had installed a test well for a public water supply production well in the **Winnicutt River Aquifer** off Winnicutt Road near the North Hampton town line. If permitted by the Town, the PUC and the NHDES, the Company's intent is to withdraw up to 430,000 gpd to augment its water supply to serve its franchise area in Hampton, North Hampton and Jenness Beach (Rye). Information filed to support this proposal alleges that the well will drwater from an aquifer that is not hydrogeologically connected with the remainder of the Winnicutt River Aquifer. The Town of Stratham disputes this conclusion. If this production well is permitted it is possible that there will be impacts upon the wetlands and nearby Winnicutt River. Additionally, Hampton Water Works concedes that the operation of the well will render this aquifer unable to support any other withdrawal. It should be noted that the Winnicutt Aquifer has the highest transmissivity (roughly related to yield) of all the aquifers identified in Stratham. It appears that the NHDES intends to grant approval of this withdrawal conditioned on the satisfactory outcome of a six month monitoring of associated impacts.

Regarding surface waters, there are no major discharges or withdrawals taking place in Stratham. However, there are three discharges taking place outside of Stratham which impact on the Town's surface waters. These discharges include: the Exeter and Newfields municipal wastewater treatment plants which discharge to the Squamscott River, and the Newmarket wastewater treatment plant which discharges to the Lamprey River. Although the Lamprey River is not located within Stratham, it is part of the Great Bay estuarine system. Tidal waters from this system flow into Stratham during periods of high tide. The previously cited 1992 WSPCD 305(b) Water Quality Report identified the Squamscott River as "not supporting" its class B legislative classification due to high bacteria counts. Stratham should work with the other communities along the Squamscott River and the Great Bay to develop a coordinated and effective water quality enhancement strategy for these surface waters.

3.2 EXISTING PUBLIC WATER SUPPLIES

As mentioned previously, Stratham residents receive their water entirely from on-site water wells, and public water systems as defined by RSA 485:1. According to the RSA, there are three types of public water systems: community water systems, non-community water systems, and non-community, transient water systems. These systems are defined as follows:

> **Community Water System:** A public water system which serves at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents. Community water systems are usually associated with residential developments.
>
> **Non-Community Water System:** A public water system which serves the same 25 people, or more, over six months per year. Examples of this type of system include: schools, government buildings, and large industries.
>
> **Non-Community, Transient System:** A public water system which serves a transient population of 25 people, or more, over six months per year. Examples of this type of system include: restaurants, churches and parks.

According to the NH Department of Environmental Services records, there are 34 active public water systems located in Stratham. These systems are listed in **Table RCP 10 – *Public Water Supply Systems in Stratham***. In addition, **Map RCP-8 — *Wellhead Protection Areas and Public Water Supply Systems***, shows the location of the Town's various public water systems, on-site water wells, and USGS test wells. A full description of each of these systems can be found in the 1993 Stratham WRMPP and in the 1993 Stratham Wellhead Protection Program Report. The estimated current demand of the existing community water systems of 202,650 gpd, represents the demand as of 1993. At least six of these developments were not fully constructed at that time. When these developments reach build-out, the total estimated demand will rise by an additional 63,000 gpd to approximately 265,000 gpd. It is interesting to note that the 24 hour design capacity of these community wells, which is estimated at 1.3 million gpd, far exceeds the current or forecasted demand.

3.3 EXISTING AND PROJECTED DEMANDS

Table RCP-11 above provides an estimate of the Town's existing water demands. The number of people served by on-site water wells was derived by taking the Town's total population (1995, OSP estimate) and subtracting that portion served by the various community water systems. The water demand estimate for the population served by on-site wells is based on the WSPCD water demand estimate for three-bedroom units of 450 gal./day. This should yield relatively high water demand estimates because the design standards of the WSPCD tend to be higher than actual metered demands.

Also included in Table RCP-11 are the Town's major commercial, industrial and institutional water users. No attempt has been made to estimate agricultural demand.

To develop projected water demands the 1993 WRMPP used the available population projections developed by the NH Office of State Planning. These projections have since been updated for publication in the Fall of 1997. The revised projections show Stratham's population for the year 2000 to be 6,303, and for the year 2010, 7,826. In projecting the Town's future water demands, the following assumptions are made:

1. The various public water systems which are not fully built-out and have expansion plans (Winding Brook, Turnberry, King's Highway Plaza, etc.) will implement these plans by the year 2000. Thus, the water demand projections for these water systems will be based on the projects at full-build out with a residential population of approximately 2,100.

2. Although new public water systems may be established in the future, it is not feasible to predict how many or how large they will be. Therefore, these projections assume that no public water systems are developed within the projection horizon. This will not effect the total projected demand for water since that is based on the projected population and a standard per capita consumption estimate.

3. The number of people to be served by individual on-site water wells was derived by taking the

TABLE RCP-11
Existing and Projected Water Supply Demands

Type of Water Supply	Population Served (1995)	Estimated and Actual Water Demand (gpd)	Water Demand Projection - Year 2000 (gpd)	Water Demand Projection - Year 2010 (gpd)
On-Site Wells*	3,918	705,240 ^	757,080	1,030,680
Community Wells +	1,606	202,650 ^	265,500	265,500
Non-Community Wells#	2,625	55,644 ^	59,734	81,321
Non-Community, Transient Wells	transient population not determined	9,480 ^ at peak demand (<3000 avg. daily demand)	10,959	15,187
Total Demand	**8,149 (not incl. transient)**	**973,014**	1,095,273	1,394,699

* = Population estimate based on the 1995 OSP estimate, and unreleased population projections of 6,303 for the year 2000 and 7,826 for 2010. The population served by community wells is subtracted from these totals.

\+ = Population number provided by condominium association/well owner as of 1993; the full build-out population of existing development with community wells is assumed to be approx. 2,100, and reached by the year 2000.

\# = Estimate of students, staff and employees at facilities served by non-community wells; growth in demand is projected at a rate equal to population growth.

^ = Water demand estimate based on WSPCD design standards/water meters/well owner estimates. Usage rates are assumed to be 180 gal/day per person in single family homes and duplexes and 125 gal/day per person in condominium and multi-family units.

Town's population and subtracting the portion served by the various community water systems.

4. Water demand for individual water wells is computed based on the per capita water usage rate of 180 gal./per day. Demand for community-well based residential development is based on a per capita rate of approximately 125 gal./day.

5. Peak level demands of the various public water systems are used.

6. The projected demand includes the Town's existing major commercial, industrial and institutional water users but does not assume any additional major development not presently in the planning stages.

With the above assumptions in mind, it can be projected that Stratham's water demands for the years 2000 and 2010 will grow by nearly 45%, from about .975 million gallons per day (mgpd) in 1995 to 1.4 mgpd in 2010.

Based on the available aquifer information, there appears to be more than sufficient groundwater supplies in Stratham to meet current projected demand. Within the planning horizon of this document it is expected that the Town will continue to rely exclusively on its

groundwater resources to supply future water needs. This water will be provided through a mixture of individual on-site wells and common wells serving the various types of public systems that currently exist. Although no specific plans exist to develop a municipal water system, the possible future need for such a system has been discussed for supplying water to support additional commercial and industrial development in the community. In the event that such plans are pursued it is likely that either or both the Bunker Hill or Stratham Hill Aquifers would be identified as the sources of supply. To pursue the development of a municipal water system a detailed water supply study would have to be undertaken to address issues such as aquifer capacity, water quality, water storage, treatment and distribution facilities, wellhead protection, and financing of capital and maintenance costs. The secondary impacts of operating the production wells would have to be investigated as well, including effects on the water table, wetlands, stream flows and adjacent private and public water supply wells.

The concern at this stage is to preserve the Town's options for developing a municipal water supply system in the future. The development of the Hampton Water Works well within the Winnicutt Aquifer may preclude that aquifer from future availability for a municipal system. The Town should therefore endeavor to preserve these options for the Bunker Hill and Stratham Hill aquifers by limiting further commercial water extraction that will interfere with the Town's ability to develop a municipal water supply system in the future.

3.4 POTENTIAL POLLUTION THREATS

An essential part of protecting the Town's water supply is to prevent its contamination from pollution sources. To accomplish this it is necessary to understand the nature and extent of potential pollution threats in Stratham and then to determine what, if any, additional measures should be taken to eliminate or diminish those threats.

The State of New Hampshire has delineated two general types of pollution: **nonpoint sources** and **point sources**. **Nonpoint pollution**, which is of greater concern in Stratham, is defined as pollution sources which are diffuse in nature and discharge pollutants over a wide area into the environment. Typically, nonpoint sources of pollution include urban and rural runoff, leachates from land disposal of solid and liquid wastes, agricultural runoff, sediment from tilling, timber harvesting, construction activities and road salt applications. Nonpoint sources can be difficult to pinpoint since some are of a short-lived nature, induced by storm events or activities occurring over a brief period of time. Some nonpoint sources, such as leachate from landfills and failed septic systems, are more easily located.

Point pollution sources are defined as any discernible, confined or discrete conveyance from which pollutants are or may be discharged, including but not limited to: pipes, ditches, channels, tunnels, conduits, wells, containers, rolling stock, concentrated animal feeding operations or vessels.

3.4.1 Potential Nonpoint Pollution Sources

The 1993 WRMPP used information from local officials, and a previous inventory to identify the potential nonpoint pollution sources in Stratham. A brief description of these sources is presented below; refer to the WRMPP, page 24 for additional detail. Unless otherwise stated, the sources described do not have monitoring wells located on-site and no detailed water quality data is available. In Stratham, examples of existing nonpoint pollution sources include:

Salt Piles and Snow Dumps: There is one Town-owned salt pile located along Bunker Hill Avenue at the site of the Town Garage. This facility stores approximately 150 tons of road salt at any given time. The salt is stored in an enclosed area with a concrete floor underneath. Bell & Flynn Inc., also have a salt pile at their Bunker Hill Avenue facility. This facility stores as much as 30 tons of road salt at any given time. The salt is stored in an enclosed area with a concrete floor underneath. (Source: RPC Non-point Inventory and the Town Road Agent.)

Road Deicing (salt): All of the paved roads in Stratham receive some degree of salting during the winter months with the exception of Jack Rabbit Lane which is a dirt road. (Source: RPC Nonpoint Inventory and the Town Road Agent.) There are 13 well sites in Town which have been

contaminated by road salt. The majority of occurrences have taken place along Routes 101 and 108, however there are a few sites along Bunker Hill Avenue and Winnicutt Road. All of the wells have been replaced by the NH Department of Transportation. The locations of these sites are denoted by the symbol "S" on Map RCP 8. (Source: Records of the DES Waste Management Division and NH DOT.)

Municipal Landfill: The former municipal landfill is located along the western side of Union Road. Use of the landfill was discontinued in 1980, after thirty years of service. The landfill is unlined; however the site has been capped with clay, loamed and seeded. A landfill closure plan was submitted to the Waste Management Division of the NH Department of Environmental Services in January of 1992. The landfill closure was completed in 1995. There are four monitoring wells located on-site. After four rounds of well testing, no significant water quality problems have been detected. Two nearby streams have also been sampled without detecting any serious water quality problems. The landfill site currently serves as a transfer station where residents can dispose of bulky items, metals, brush and recyclables.

Excavation Operations and Maintenance of Excavation Equipment: There are three active excavation sites in Stratham, all located along Bunker Hill Avenue. One is permitted; two are not. See section 2.8 above for more information. Excavations can lead to contamination from fuel and oil spills and leakage from heavy equipment and from excavation operations below the water table.

Gas Stations, Engine Repair and Automotive Shops: There are ten such uses within Stratham, including: automotive service establishments (Stratham Tire, Sullivan Tire, Monroe Muffler, Undercar Specialist), car dealerships (Gil's Jeep/Eagle, Honda Barn, Hurlbert Toyota, Exeter Subaru, Hurlbert Nissan) and gasoline stations (Charter Gas and Stratham Village Market, and the C&E Mobil Station. All of these sites are located along Portsmouth Avenue. There are also two small engine repair shops in Town: Steele Engine Repair (Portsmouth Avenue), and a site located off of Bunker Hill Avenue. The locations of the establishments listed above are denoted by the symbol "A" on Map 8.

Pesticide Application Sites, Farms and Agricultural Uses: There are ten agricultural operations in Stratham which have used pesticides in the recent past. The locations of the pesticide application sites, nurseries, greenhouse and the Stratham Agway are denoted by the symbol "PA" on Map 8, while the horse and dairy farms are denoted by the symbol "F". For a detailed description of the pesticides used at each site, see Appendix C of the WRMPP. It should be noted that Stratham participates in the Seacoast Area Mosquito Control (SAMC) program. After flooding events, SAMC crews spray a biological pesticide ("BTI") on the wetlands along the Squamscott River, and, to a lesser extent, freshwater wetlands throughout Town. (Sources: NH Department of Agriculture and discussions with local officials.)

Urban Runoff and Storm Drains: In early 1992, the Rockingham Planning Commission conducted a partial field inventory of potential threats for the eastern half of the RPC region. Storm drains which handled runoff from paved areas of over one acre in size were included in the inventory. In Stratham, there are 13 such storm drains scattered throughout Town. The locations of these sites are denoted by the symbol "R" on Map 8.

Print Shops and Printing Presses: There are two such operations in Stratham. Rockingham County News and Squamscott Press are both located along Portsmouth Avenue. The locations of these sites are denoted by the symbol "P" on Map 8. Source: Town Business Records.

Commercial Operations: There are a number of commercial operations in Stratham which store, use and dispose of hazardous chemicals and/or substances. Along Portsmouth Avenue, these operations include: Stratham Fuels Inc. (fuel storage); the Antique Repair Co. (paints, thinners and furniture stripping); Stratham Hill Bicycle

(paints and cleaning solvents), and Eurocleaners (dry cleaning chemicals). There is also the B.R. Jones Roofing Company (metal work, asphalt and tar storage) located along Winnicutt Road. In addition, there is a woodworking shop located along Lovell Road and a taxidermy shop along College Road (Route 108). The locations of these sites are denoted by the symbol "C" on Map 8. Source: Town Business Records.

Beauty Salons: Beauty parlors often use chemicals which, if disposed of improperly, could pose a threat to groundwater resources. There are five such establishments in Stratham. Both the Stratham Plaza and the King's Highway Plaza contain such uses. Small-scale beauty shops are also located along Squamscott Road, Winnicutt Road and Portsmouth Avenue. The locations of these sites are denoted by the symbol "B" on Map 8. Source: Town Business Records.

Industries and Manufacturing Establishments: There are several industries in Stratham which use regulated substances as defined by the NH Groundwater Protection Act of 1991 (RSA 485-C). The Town's primary industrial area is the Stratham Industrial Park located in the southern corner of Town along Marin Way. Chief among the park's industries are: Hewlett - Packard (use of regulated chemicals); Complex Medical Products (use of regulated chemicals); and Lindt & Sprungli USA (food processing - chocolate). The locations of Stratham's industries and manufacturing operations are denoted by the symbol "I" on Map 8. Source: Town Business Records and discussions with various local officials.

Septic Systems and Leaching Fields: Generally speaking, septic systems are considered nonpoint pollution sources because of their discharge of effluent into the ground. The threat presented by such systems increases when a system fails and the wastewater is not treated sufficiently. There are several residential developments in Stratham that are served by large septic systems. The most significant septic system is the one for Turnberry Condominiums. This development holds a Groundwater Discharge Permit issued by the State. The permit allows the development's septic system to discharge as much as 30,000 gallons of wastewater per day into the ground. The other holder of a Ground-water Discharge Permit is Stratham Green Condominiums. Their permit allows the development's septic system to discharge as much as 18,000 gallons of waste-water per day into the ground. There are approximately 450 housing units served by community septic systems and 1600 housing units served by individual on-lot systems.

According to a recent review of records maintained by the Code Enforcement Officer, instances of septic system failure have been scattered throughout Town, with the majority of cases being those systems located in close proximity to the major rivers and streams, as well as in areas containing high water tables. Many of the failed systems were installed before the NH Water Supply and Pollution Control Division established rules regarding septic system placement.

Much of the remaining undeveloped areas of Stratham have a high percentage of soils which contain moderate to severe limitations for the placement of on-site septic systems. (See *RCP Map 2 -- Soil Potential for Development*) This does not mean that areas shown with very low or low potential cannot be utilized at all for the placement of septic systems because some environmental constraints can be mitigated through corrective measures taken by the developer. The accuracy resolution of the soil maps may also mask smaller areas of greater potential that are within large areas of poor soils. It does indicate that a great deal of care must be exercised in developing in such areas to avoid pollution threats.

3.4.1 Potential Point Pollution Sources

Stratham is relatively free of point pollution sources, i.e., those sources confined to a specific, discernible location. There are no CERCLA (Superfund) sites in Town, nor are there any National Pollution Discharge Elimination System (NPDES) permit holders. Such permits are usually required for the discharge of treated

waters into a surface water resource.

3.5 EXISTING POLICIES FOR WATER RESOURCES PROTECTION

Over the years Stratham has put in place a number of policies, in the form of land zoning ordinances and land use regulations, that directly or indirectly act to protect the surface and groundwater resources of the Town. In many cases, Stratham has been at the forefront of such efforts in the RPC region. For example, the Town was the first community in the region to enact a shoreland protection ordinance and wellhead protection program. It was one of the first to enact wetlands and aquifer protection measures, and recently updated and adopted comprehensive erosion sedimentation and stormwater management measures in its site plan and subdivision regulations. Following is a brief description and rationale of the major policies in place which help protect the resource.

- **Aquifer Protection District**: adopted in 1992, this overlay district is key to protecting the five USGS-defined aquifers from land uses and site activities that are detrimental to the quality or quantity of the resource. The district boundaries are defined by the latest USGS aquifer delineation study (1991). Impervious lot coverage is limited to 20% to ensure groundwater recharge; land uses involving on-site disposal, storage or processing of hazardous materials, underground storage tanks, and a variety of high-risk commercial, industrial and utility uses are prohibited. Provisions of the town's land use regulations permit the town to require a developer to prepare a hydrogeological study of potential impacts of development, where warranted. The ordinance lacks adequate provisions for regulating the volume of water extracted for commercial purposes and should be reviewed and updated.

- **Wellhead Protection Program**: adopted by Stratham in 1993, this state established program is designed to help municipalities enhance their protection of groundwater supplies through improved education, monitoring and management of potentially harmful land use activities within the recharge areas of public water supply wells. As a result of this program, NHDES reclassified all of the groundwater in Stratham as "GA-1". This designation provides enhanced protection of the groundwater through implementation of "best management practices" on the part of landowners and through active compliance monitoring by the Town. Stratham was the first community in the RPC region to implement a wellhead protection program and the first in the state to address the need to protect public (non-municipal) water supply wellheads. **Map RCP-8 *Public Water Supply Systems and Wellhead Protection Areas***, depicts the water system and location of wellhead areas designated under the program and presently in effect.

- **Wetlands Conservation District**: Adopted in 1984, this overlay ordinance severely and properly limits the type and extent of development activity in and near wetlands. The intent of the district is to protect important wetlands and preserve their valuable natural functions of flood storage, pollution assimilation and wildlife habitat, among others. The district is defined by the presence of hydric A and B soils. The ordinance should be updated to make the definition of wetlands consistent with that of the State Wetlands Council.

- **Shoreland Protection District**: Adopted in 1985, this overlay ordinance, which was the first of its kind in the RPC region, limits the type and extent of development within 150 feet of tidal waters and within 100 feet of perennial streams. The intent is to protect environmentally sensitive shorelands. The buffer of undisturbed land that results helps protect the surface water by filtering runoff and provides critical habitat for many species that live in tidal marshes and nearby shoreland environments. It also helps maintain the scenic quality of the Squamscott River and its tributaries.

- **Floodplain Management District**: This overlay district, required for the Town's participation in the Federal Flood Insurance Program, ensures that septic systems are not sited in flood prone areas and that any structures constructed in the District are adequately flood proofed and will not cause an increase in flood hazards downstream.

- **Cluster Development**: Stratham allows and encourages cluster development as an alternative to standard residential subdivision practice. Cluster Development indirectly protects water resources by encouraging the placement of buildings, roads and septic systems where they are best suited to the land. It also can help protect large useable areas of open space in exchange for higher lot densities. The actual implementation of cluster development has not always met these objectives and has sometimes lead to higher densities and less useable open space than intended. The Cluster provisions of the ordinance should be reviewed and revised to increase the planning board's discretion in approving cluster development design to improve the outcome of these developments.

- **Soil Based Lot Sizing**: Incorporated in the Town's subdivision and site plan regulations, soil-based lot sizing is the accepted standard in Rockingham County as the best method for determining the density of development in areas served by on-site septic systems. By tying development density to the soil's capacity to assimilate waste effluent, soil-based lot sizing ensures that groundwater will not be degraded by recharge from septic systems.

- **Erosion Control/Stormwater Management**: Stratham's subdivision and Site Plan Review regulations require erosion control plans to be prepared whenever an area greater than 20,000 sq. ft. will be disturbed or when the construction of a road will be involved. This ensures that sedimentation and sediment-borne pollutants will be blocked from reaching surface waters. Likewise, stormwater management plans are required when warranted to ensure that runoff from developed areas will not cause erosion, and will be treated to remove sediment and some pollutants before being conducted to natural water courses.

- **Excavation Regulations**: Stratham regulated excavations under the provisions of RSA 155-E. The town has designated the Planning Board as the regulator. The ordinance requires the reclamation of excavation sites, requires buffers strips around excavation sites, and prohibits excavations that would damage a known aquifer. (The Aquifer Protection District also prohibits excavation closer than 6 feet from the seasonal high water table above the identified aquifer.) The current regulations should be revised to become consistent with 155-E regarding the handling of grandfathered and abandoned gravel pits.

The policies, regulations and ordinances described here are necessary and important for the protection of the Town's water resources. They are generally up-to-date and, taken together, provide the tools necessary to protect the resource. As with all such policies and regulations they require vigilance in enforcement and should be periodically reviewed to ensure they are effective, fair and reasonable.

4.0 Open Space and Land Conservation

One of the most important and defining elements of Stratham as a community and as a place are its open spaces. These areas, which include forested lands, active agricultural lands, pastures and old fields, as well as wetlands and undeveloped shorelands are very important both to the community and to the natural environment for a variety of reasons as briefly described below.

- Recreation and Scenic Quality: Open space lands help define the scenic and rural quality of the community. Farmland, in particular its wide open fields and pastures, are critical scenic elements. Open space is also important for many forms of outdoor recreation including hunting, cross-country skiing, hiking, mountain biking and nature observation.

- Water Resource Protection: Open spaces are critical to maintaining the quality and quantity of surface and groundwater. They provide unpolluted recharge to the town's aquifers, help assimilate pollution from various land use activities before they reach water sources, and help reduce stormwater, erosion and flood damage that would result from major storm

events.

- Wildlife Habitat: Expanses of open space area are vital to wildlife. Each of the major forms of open space in Stratham (agricultural/open fields and pastures, old fields, forested areas, wetlands and undeveloped shorelands) provide habitat to difference important species. In addition, stream shorelines, continuous strips of undeveloped land and even utility corridors are vital to wildlife as corridors links important habitat areas.

- Economics: Agriculture and forestry, particularly the former, have been an important part of Stratham's economy since the Town's settlement. While this is much less true today, these lands continue to contribute to the Town's economic well-being both directly and indirectly. Aside from the direct economic activity they represent, they also help reduce the cost of community services that would arise if these open spaces were replaced with residential development. This has been well documented for Stratham and several other New Hampshire Communities in the Cooperative Extension Report *Does Open Space Pay?* (UNH Cooperative Extension, 1995).

- Education: Operating farms are the training grounds for the next generation of farmers in the community; they can also help educate non-farmers about the importance of our agricultural resources; wetlands and other wildlife habitats can be used for ecological research and environmental education for students of all ages.

Although Stratham has sizable amounts of open space of all varieties remaining, more is lost every year. It is increasingly important for the community to understand what is has left and take decisive steps to protect the most important parcels for the future. The following section identifies the major conservation and protected lands in the Town.

4.1 PROTECTED OPEN SPACE AND CONSERVATION LANDS

This section briefly describes the most sizeable publicly-owned and protected lands in Stratham. These parcels, as well as other incidental parcels, are depicted on **RCP Map 9 - "Protected Open Space and Conservation Lands."** It should be noted that even though a parcel is publicly-owned, it is not necessarily protected forever. The Conservation Commission should encourage the Board of Selectmen to put covenants (land restrictions) on critical Town-owned open spaces. This concept applies to State-owned lands as well. If the State is not interested in any permanent means of protection, the Commission should pursue an option of right of first refusal for the land. The following is an inventory and description of public and protected lands in Stratham.

Public Land

Town-owned

The Town of Stratham owns a significant amount of open space, most of which is located in the vicinity of Stratham Hill. The Town's major land holdings include: Stratham Hill Park (108 acres); the "Gifford" land adjacent to Stratham Hill Park (86 acres); the site of the new elementary school (37 acres); and the conservation land which lies between Lovell Road and Gophered Farm Road (13 acres).

State-owned

The State of New Hampshire owns two parcels in Town, both of which are locatedadjacent to the Squamscott River at Chapman's Landing. These sites have a total area of about seven acres, and are managed by the N.H. Fish and Game Department. The State also owns the land associated with the Sandy Point Learning Center near the Greenland town line along the Squamscott.

Quasi-Public

In Stratham, quasi-public lands include those which are owned by the Boston and Maine Railroad, and transmission-line easements owned by the Public Service Company of New Hampshire for electricity, and by Northern Utilities for gas. These corridors can provide important links to open space lands.

The 91-acre site of the New Hampshire Vocational Technical College is also included in this category. As discussed in the Recreation Chapter of the Master Plan, this tract contains several playing fields available for public use.

Private Protected Land

In Stratham, there are generally two types of mechanisms which have protected privately-owned open space lands: 1) conservation easements; and 2) cluster development.

Conservation Easements

a) Stuart Farm. This site is located in northwestern Stratham, and is bisected by Mill Brook. At 173 acres, this is the Town's largest tract of protected land. The conservation easement (development rights) is held by the N.H. Department of Agriculture. Public access is allowed by permission only.

b) Wiggin Conservation Land. This 37-acre parcel is located adjacent to Jewett Hill Brook. This land is ecologically important - containing rare and endangered plants, and comprising a portion of the tidal wetland system of the Squamscott River. The conservation easement is held by the State of New Hampshire. Public access for transitory recreational purposes is allowed.

c) Turnberry Open Space. This land is the open space portion of the Turnberry Condominium development. It is a 61-acre tract located next to the Wiggin parcel (described above), adjacent to the Squamscott River. It also contains a significant amount of tidal wetlands. The easement is held by the Society for Protection of New Hampshire Forests. Public access is allowed by permission only.

d) Salt River Open Space. This 51-acre tract is the open space portion of the Salt River Condominium development. Like the parcels described above, this land has ecological importance and contains tidal wetlands. The easement is held by the Rockingham County Conservation District, and public access is permitted.

e) Berry Hill Farm. A conservation easement was acquired in 1997 by the Rockingham Land Trust on this scenic 50 acre parcel. Currently in active agricultural use.

Cluster Development Open Space

In 1983, the Town of Stratham adopted a cluster development provision in its Zoning Ordinance. The cluster ordinance has led to many tracts of open space being protected, in perpetuity, especially along the Squamscott River. The following is a list of the cluster developments which have set aside significant tracts of open space to remain undeveloped, in perpetuity:

Glengarry	*The Meadows*
Pheasant Run	*Thornhill*
Aberdeen East	*Stratham Woods*
Aberdeen West	*Peninsula*
Balmoral	*Stratham Green*
Lamington	*Turnberry*
Muirfield	*Salt River*
Montrose	*Jewett Hill*

4.2 UN-PROTECTED OPEN SPACE

The Community Stewardship Process, which Stratham undertook with assistance from the RPC, NHOSP and the NH Coastal Program during development of the Master Plan Update, focused a great deal of discussion on protecting the remaining open space in the community. As the Town's 1989 Open Space and Recreation Plan had done, the Stewardship Process identified several areas where large contiguous blocks of open space remain which are important to protect as open.

Large tracts of such lands are important to consider when planning for the Town's future open space needs. In general, the larger tracts of open land are of greater value in terms of open space benefits, e.g., farming, forestry, recreation, wildlife habitat, aesthetics, etc. For this reason, the Town should endeavor to acquire and/or protect especially those large lots which are contiguous to publicly-owned or otherwise protected parcels and which have significant scenic value.

Significant concentrations of open space are located along the Squamscott River, between NH Route 101 and Jewett Hill, and in the central and southern parts of Town. As identified in the Stewardship Process these large continuous tracts of relatively undeveloped land, generally in the form of an "S" shape, extend from Stratham Hill Park south through the center sections of the Town. This is shown on **Map RCP-10, *Community Character Corridor Map***, which appears in the Community Stewardship report as the "Rural Character Corridor Map."

One of the recommendations arising from the Stewardship Process was that the Town, acting through the Conservation Commission, identify the most important of these properties to protect and then actively pursue the acquisition of conservation easements and development rights to preclude future development. This can best be accomplished by updating the 1989 Open Space & Recreation Plan and including a prioritized list of key parcels to protect and a specific implementation schedule to follow. If successful, this will be a vital step in protecting much of the most important open space remaining in Stratham and will do much to preserve that which defines the physical character of the community.

5.0 HISTORIC RESOURCES

5.1 A BRIEF HISTORY

Unlike its industrially-based neighbors of Newmarket and Exeter, Stratham was established primarily as an agriculturally based community located between the provincial capital of Exeter and the seacoast port of Portsmouth. The first settlement occurred in the vicinity of Sandy Point under Captain Thomas Wiggin in 1640. The Squamscott Patent contained the east side of the Squamscott River and Great Bay and was divided in 1656 into three shares by the authority of Massachusetts. Wiggin controlled the middle and southern sections which later became Stratham. Originally part of Hampton, the Squamscott Patent was assigned to Exeter in 1692. By 1703, the Town had 35 families. They petitioned to establish the Town of Stratham and indicated a willingness to maintain a minister and schoolmaster, a common requirement in the days before the separation of church and state. Thus, in 1716, the Town of Stratham was created, having 15.81 square miles or 10,124 acres in area. Two small parcels of land were ceded to Greenland in 1805 and 1847.

The first legal town meeting was on April 10, 1716. The first vote after the election of town officers was to appoint five individuals "to be a committey to take care to build a meeting house for the public worshipe of God in said Town." (FN) The first meeting house was built in 1718. It was replaced by a new meeting house in 1768, and again in 1837 by a third meeting house on the same site.

The agricultural land in Stratham was important to both the settlers and the native Americans who inhabited the area. The early settlement history shows a pattern of cooperation between the two groups. Significant agriculture-related industry developed along the arterial waterways. Sawmill Brook supported at least three mills: a sawmill, grist mill and cloth mill. In addition to the same type of mills along the Winnicutt River there was a starch mill. Until 1952 the Jewett family operated the "oldest operating grist mill in the State of New Hampshire."

Taverns flourished for both travelers and residents along the Kings Highway which linked Exeter and Portsmouth. At least three former taverns still exist: the Chase Tavern on Emery Lane, the Kenniston Tavern on Portsmouth Avenue and the corner of Depot Road and the Peabody House on Winnicutt Road. The Legards' house on College Road also may have once served as a tavern.

5.2 NATIONAL REGISTER OF HISTORIC PLACES DESIGNATION

The National Historic Preservation Act of 1966 authorizes the Secretary of the Interior to maintain a National Register of Historic Landmarks and Places. Within Stratham, there are no historic districts, however there are several buildings listed in the National Register of Historic Places. Most recently, on December 10, 1993, the Wiggin Memorial Library building was included on this register. The Wiggin Library joins the Samuel Lane House, located at the traffic circle, the Kenniston Tavern and the Tannery (Widow Sarah Wiggin House), both located at the corner of Portsmouth Avenue and Depot Road. **Table RCP-12**, lists over 80 notable historic sites in Stratham. It was prepared originally by the Stratham Historical Society in 1985

and updated for this Master Plan. These sites are depicted by reference number on **Map RCP-11.**

Research conducted by the Natural/Historical Resources Issues Group in connection with the Stewardship process identified a number of historical homes in the Union Road/Winnicutt Road area of Stratham. There are at least six homes which are eligible for listing on the National Historic Register. Of those eligible, three are over 200 years old and three are over 100 years old. The Town could begin a modest effort to protect some of its historic structures by establishing a historic district on Winnicutt Road from Union Road to the North Hampton line. Inquires made of homeowners by the Issues Group found little opposition to the idea of creating a historic district in this area. Prior to taking this step, the Town should undertake an inventory of the proposed district's structures by noting the historic and architectural significance of each.

5.3 ARCHEOLOGICAL SITES

In addition to historic structures New Hampshire contains a wide array of archeological sites worthy of protection. Such sites contain the unique record of human achievements spanning well over 10,000 years of history and are irreplaceable. This period spans the age from the first occupation after the retreat of the glaciers (at the end of the Ice Age) through the displacement of the Native American Indian culture by European explorers and colonialists. Archeological sites are the only sources of information about the Native American cultural tradition. For the historical period of the Euro-American cultural tradition, archeological sites provide an important dimension for the understanding of history. Archeological sites may balance, expand, corroborate, or contradict the written and oral record of history and, together with our architectural heritage, provide physical reminders of the past. In Stratham, two sites of particular value include the Town Landing at Sandy Point, which was the 1633 landing site of the first Colonial settlers, and the Thomas Wiggin gravesite, located about 500 yards west of the old Depot on the south side of the railroad tracks. Thomas Wiggin was the first European settler in Stratham.

Two preliminary excavations have been conducted at the Sandy Point site. A house foundation and colonial artifacts have been found at the contact site adjacent to the Thomas Wiggin gravesite and Wiggin Cemetery. The second dig on the far side of the railroad tracks showed evidence of early use by maritime archaic peoples.

Generally speaking, prehistoric sites are most likely found in areas with the following characteristics: proximity to water (both potable water, and waterways for travel); sandy and gravelly well-drained soils; level ground; exposure; proximity to raw material sources (especially suitable rock for the making of tools), and; proximity to food sources (such as estuarine environments for shellfish beds, falls and rapids for restricting the passage of anadromous fish, freshwater marshes and thickets for other shellfish and small game).

The primary investigators of Stratham 's archeological history are Gary Hume, NH State Archeologist, and the Stratham Historical Society. According to studies completed to date, there are at least 3 or 4 significant prehistoric sites which have been recorded in Stratham. One site is the one previously mentioned at Sandy Point;. A second is located in the vicinity of the confluence of Jewett Hill Brook and the Squamscott River, where a preliminary excavation is tentatively scheduled for the summer of 1997. Another identified site is near the confluence of Mill Brook and the Squamscott River. According to the State Archeologist, these sites were used as semi-permanent villages or seasonal camps by Native Americans and are probably about 1,000 years old. Any further archeological findings would likely be located in close proximity to the Town's waterways. It is also likely that the majority of identified sites are from the period before European settlement, however, there may be several sites which date back to prehistoric times. Items commonly found at the Town's various archeological sites include: fire hearths, tools, arrowheads, pottery, and old structural foundations.

6.0 RECOMMENDATIONS

It is a fundamental goal of the Town of Stratham to conserve and protect its natural resources, important agricultural land and other open spaces, as well as historic buildings and sites. To attain this goal both now and in the future, the following policies are established and recommendations made.

6.1 GENERAL

It is the policy of the Town of Stratham through both regulatory and non-regulatory means, to limit and control development in environmentally sensitive areas, including, wetlands, floodplains, aquifer recharge areas, steep slopes, and areas unable to support on-site sewage disposal.

1.1 The Planning Board should continue to review and carefully consider resource information pertaining to soil, slope, wetlands, floodplains, and other natural resource and historic resource information as part of its planning and development review.

1.2 The planning board should continue to require site specific research, analysis and mitigation of specific environmental concerns whenever a proposed development appears to impact environmentally sensitive areas.

1.3 The Conservation Commission should review, evaluate and provide recommendations regarding all development proposals or activities that appear to negatively affect the Town's natural resources and environmentally sensitive areas. They should communicate their concerns and recommendations to the Planning Board, Zoning Board of Adjustment, Board of Selectmen, N.H. Wetlands Council or other body as appropriate.

1.4 The Planning Board should amend the appropriate section of the subdivision and site plan review regulations to require applicants to meet with the Conservation Commission to review development proposals when such development is likely to have significant resource impacts. Further, the Planning Board should seek the advice of the Conservation Commission whenever such development proposals are reviewed.

1.5 The Planning Board should continue to periodically review and recommend changes, as needed, in the Zoning Ordinance, Subdivision Regulations and Site Plan Review Procedures to be consistent with this policy.

1.6 The Planning Board should review existing open space provisions of the Town's Cluster Development Ordinance to ensure that it creates useable, valuable and well planned open space in cluster developments.

1.7 The Conservation Commission should review and provide comments to the Planning Board on the proposed open space components of all cluster developments.

1.8 The Planning Board should consider ways to increase the amount of useable open space set aside in residential development

and make adjustments to zoning provisions as appropriate.

6.2 NATURAL RESOURCES

It is the policy of the Town of Stratham to protect its natural resources both for the health and enjoyment of the residents and for the health and well being of the environment.

2.1 The Town should maintain its commitment to protect saltmarshes, vernal pools, other important wetlands, ponds, streams, and any rare- and threatened-species habitats through the following means:

- -- Inventory, map and prioritize wetlands resources and pursue prime wetlands designation for critical wetlands important to wildlife and natural processes;
- -- Increase public holdings, easements and restrictions on wetlands by public and private entities, with specific concentration on the Sawmill Brook and Winnicutt and Squamscott River corridors;
- -- Work with federal, state and other applicable local and/or non-profit agencies to implement and enforce regulations relating to wetlands protection;
- -- Work with the Army Corps of Engineers and other applicable agencies in securing funding for salt marsh restoration along the Squamscott River;

-- Develop guidelines to ensure effective and timely communication and interaction among Town agencies and officials on wetlands issues

-- Review the Town zoning ordinance, including wetlands, floodplain and shoreland protection ordinances, for effectiveness and consistency with enabling legislation;

-- Develop public education programs on wetlands and critical habitats.

2.2 The Planning Board should establish reasonable limits on the cutting of timber on parcels being prepared for construction.

2.3 The Conservation Commission should work with the Stratham school teachers, administrators and school board members to assist in environmental education programs to increase awareness of environmental issues specific to Stratham.

6.3 WATER RESOURCES

It is the policy of the Town of Stratham to vigorously protect the quality and quantity of the Town's surface and groundwater resources to ensure present and future water supplies for the Town and to protect the health, safety and welfare of its residents. It is further the policy of the Town to seek to prevent all pollution of surface and groundwater and to enforce all ordinances pertaining to on-site water sources and sewage disposal systems.

3.1 The Town should continue to provide on-site inspections of all subsurface system siting and installation by qualified personnel.

3.2 The Planning Board should consider proposals incorporating new technology for limited private water and sewer systems in new developments or developments needing to address problems in keeping with New Hampshire WSPCD standards.

3.3 The Planning Board should research and implement appropriate amendments the Aquifer Protection District to limit and control the volume of water withdrawal for private commercial or utility purposes.

3.4 The Town should strictly enforce the sand and gravel excavation provisions of the Aquifer Protection District to prevent contamination of aquifers due to excavation site activity.

3.5 The Town should investigate and carry out the steps necessary for the Town to secure public water supply franchise rights within its jurisdiction.

3.6 The Town should acquire land or development rights to key parcels, if needed, to protect future town water supplies. Such acquisitions should be integrated with Townwide open space protection efforts.

3.7 The Town should pursue a long term agreement with the Town of Exeter regarding further access to the Exeter sewer system for future development in the Industrial, Office Research and General Commercial Zones.

3.8 The Town should seek to limit the amount and frequency of the use of salt for winter deicing of roads, especially within the aquifer protection district. The Town should work with the NHDOT District VI to implement this policy on State roads.

3.9 The Town should continue to participate in and actively promote regional household hazardous waste collections to encourage safe disposal of hazardous materials.

3.10 The Town should maintain its commitment to the Wellhead Protection program and support adequate ongoing site monitoring and landowner education efforts.

3.11 The Planning Board should periodically review and update the Water Resource Management and Protection Plan.

3.12 The Planning Board should review the requirements and standards of the Stratham Shoreland Protection District against those of the State Comprehensive Shoreland Protection Act (RSA 483-B) to assess consistency and eliminate

redundancy between the two regulations.

6.4 OPEN SPACE AND CONSERVATION LANDS

It is the policy of the Town of Stratham to protect Stratham's natural resources, agricultural land and other open spaces by securing the development rights to important open space and conservation lands.

4.1 The Town should continue to support current use assessment as a cost effective means of encouraging the private preservation of open space, forested and agricultural lands.

- -- the Town should take steps to inform landowners about the availability of the program;
- -- current use land conversion penalty fees should be set aside for future open space and conservation land protection.

4.2 The Conservation Commission should update and maintain the inventory of conservation and open space lands prepared for the 1989 Open Space Plan and further identify and prioritize critical lands in private ownership that should be protected from development.

- -- The Conservation Commission should take the lead in preparing an updated Open Space Plan which should include a prioritized list of open space parcels (including parcels within the "S" shaped area identified in the 1996 Community Stewardship process (see Map RCP 10). Open Space priorities should address sensitive environmental areas and habitats, shoreland areas, recreational trail networks, wildlife corridors, and scenic areas.
- -- The Conservation Commission should develop a specific land protection strategy and plan that will result in the acquisition of development rights for high priority conservation and open space lands. The Commission should seek assistance in this effort from the Rockingham Planning Commission, the Society for the Protection of NH Forests, the Trust for Public Lands, the Rockingham Land Trust or other groups.
- -- The Conservation Commission should actively pursue outside funding and acquisition options with which to acquire development rights to important open space lands, and should encourage the State Legislature to fund the Agriculture Land Protection Program.

4.3 The Town should fund a land stewardship program to purchase development rights for the highest priority open space and conservation lands identified in the updated Open Space Plan. Wherever feasible, the acquisition of development rights should be done with the objective of keeping existing forest and agricultural land in productive use.

4.4 The Conservation Commission should develop a landowner education program and provide information on conservation easements, estate planning and best management practices to educate property owners who hold large undeveloped parcels.

4.5 The Town should support and participate in regional efforts to identify and protect open space and trail networks and wildlife corridors, including efforts by the Great Bay Estuary Estuarine Research Reserve, SPNHF and the Rockingham Land Trust.

4.6 The Planning Board should encourage the use of cluster development techniques for future residential development by utilizing the single family cluster development provisions of the existing ordinance.

6.5 AGRICULTURAL RESOURCES

It is the policy of the Town of Stratham to protect Stratham's agricultural resources by securing development rights and by promoting conservation measures and best management practices.

5.1 The Town should support renewed funding of the State's program to preserve important agricultural land through the purchase of

agricultural development rights and seek support from other communities in the region.

5.2 The Town should consider funding and purchasing agricultural development rights for key agricultural lands as part of its open space protection efforts.

5.3 The Conservation Commission should contact all remaining farmers and agricultural property owners in the community to determine what actions the community could take to enhance the viability of agriculture in Stratham and make recommendations to the Town accordingly.

5.4 The Planning Board should review the Zoning Ordinance and possible alternatives to further protect important farmland either through a separate zone or specific site criteria and recommend changes, as appropriate.

5.5 The Town should promote and support the establishment of a farmer's market in Stratham in a commercially attractive location to help create new markets for locally grown agricultural products.

6.6 HISTORIC AND ARCHEOLOGICAL RESOURCES

The historic and archeological buildings and sites in Stratham contribute to the Town's unique heritage, and thus it is in the public interest to protect them. It is the policy of the Town of Stratham to protect these historic and archeological resources through both voluntary measures and regulatory powers.

6.1 The Historical Society should update and expand the 1985 map and inventory of all public and private landmarks including areas, sites, and existing buildings. The inventory should be expended to include (1) all known archeological sites, (2) an architectural survey of the community's historic structures, and (3) the identification of which buildings which may be eligible for inclusion on the National Register of Historic Places.

6.2 Following the update and expansion of the 1985 inventory, the Planning Board should pursue the recommendation made during the Community Stewardship process and propose an historic district overlay zone along Winnicutt Road from Union Road to the North Hampton town line.

6.3 The Town should take positive steps to ensure that known and undiscovered archeological sites are not accidentally disturbed or destroyed by site excavation for development. These steps should include:

-- The Historical Society should request information from the State Archeologist's office and become informed about the areas and sites where archeological sites are likely to exist. This information should be compiled and provided to the Planning Board for reference.

-- The Planning Board should develop provisions in the subdivision and site plan regulations applicable to developments proposed in known or suspected archeological sites. These provisions should include notification of the State Archeologist and permission to conduct a timely site reconnaissance of sites prior to excavation;

-- The Town should include rights for archeological investigations for any conservation easement it obtains on lands where there is reason to suspect the presence of an archeological site.

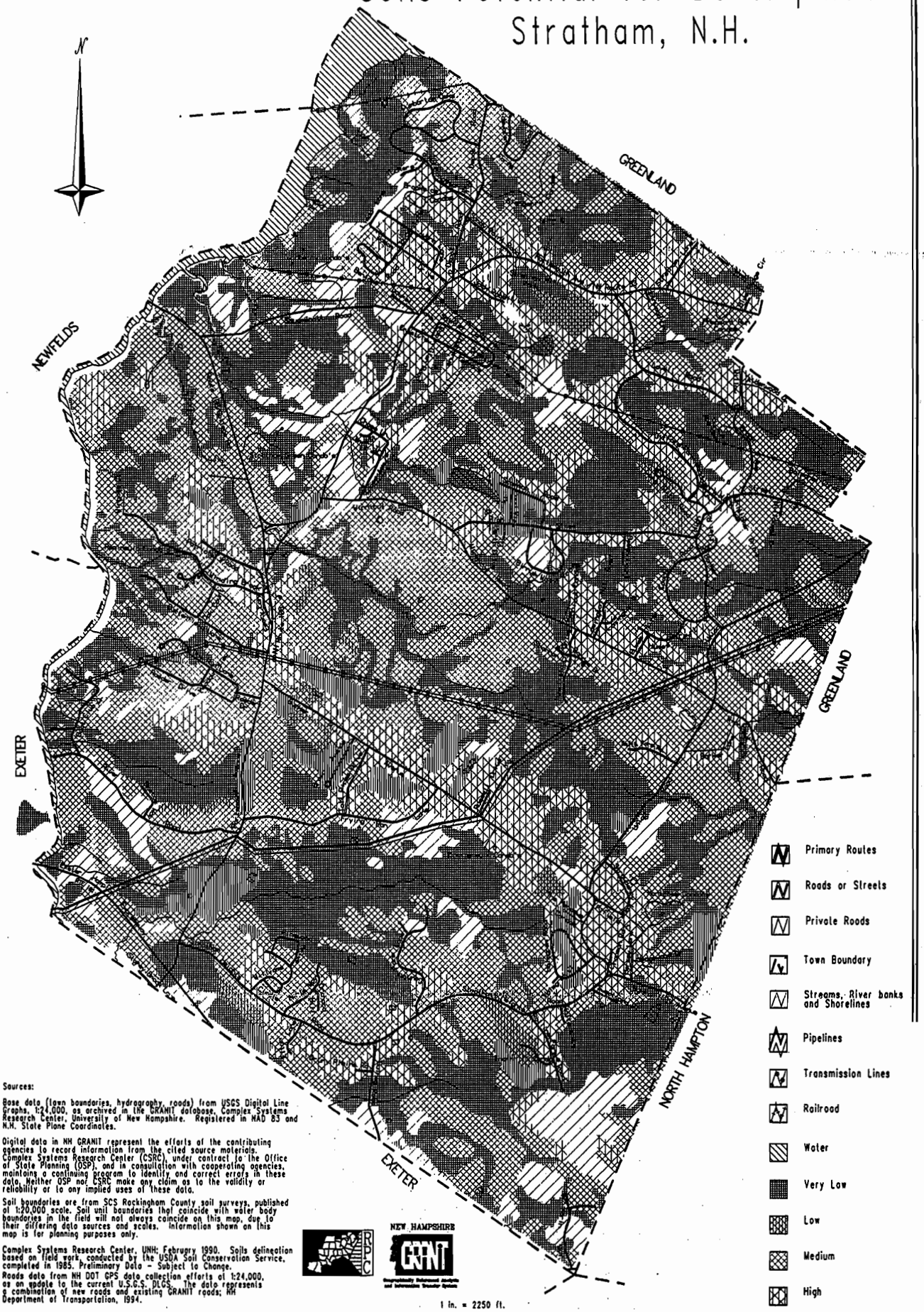
6.4 Stratham should foster an increased awareness and appreciation of the history of Stratham and its historic and archeological assets through public education.

-- The Historical Society should continue to offer periodic lectures and develop public displays;

-- The Historical Society should continue to develop school-oriented materials about Stratham's history and make those materials available to the school;

-- The Historical Society should update and republish the *Town History*.

Map RCP-2
Soils Potential for Development
Stratham, N.H.



Sources:

Base data (town boundaries, hydrography, roads) from USGS Digital Line Graphs, 1:24,000, as archived in the GRANIT database, Complex Systems Research Center, University of New Hampshire. Registered in NAD 83 and N.H. State Plane Coordinates.

Digital data in NH GRANIT represent the efforts of the contributing agencies to record information from the cited source materials. Complex Systems Research Center (CSRC), under contract to the Office of State Planning (OSP), and in consultation with cooperating agencies, maintains a continuing program to identify and correct errors in these data. Neither OSP nor CSRC make any claim as to the validity or reliability or to any implied uses of these data.

Soil boundaries are from SCS Rockingham County soil surveys, published at 1:20,000 scale. Soil unit boundaries that coincide with water body boundaries in the field will not always coincide on this map, due to their differing data sources and scales. Information shown on this map is for planning purposes only.

Complex Systems Research Center, UNH: February 1990. Soils delineation based on field work, conducted by the USDA Soil Conservation Service, completed in 1985. Preliminary Data - Subject to Change.

Roads data from NH DOT GPS data collection efforts at 1:24,000, as an update to the current U.S.G.S. DLGS. The data represents a combination of new roads and existing GRANIT roads; NH Department of Transportation, 1994.

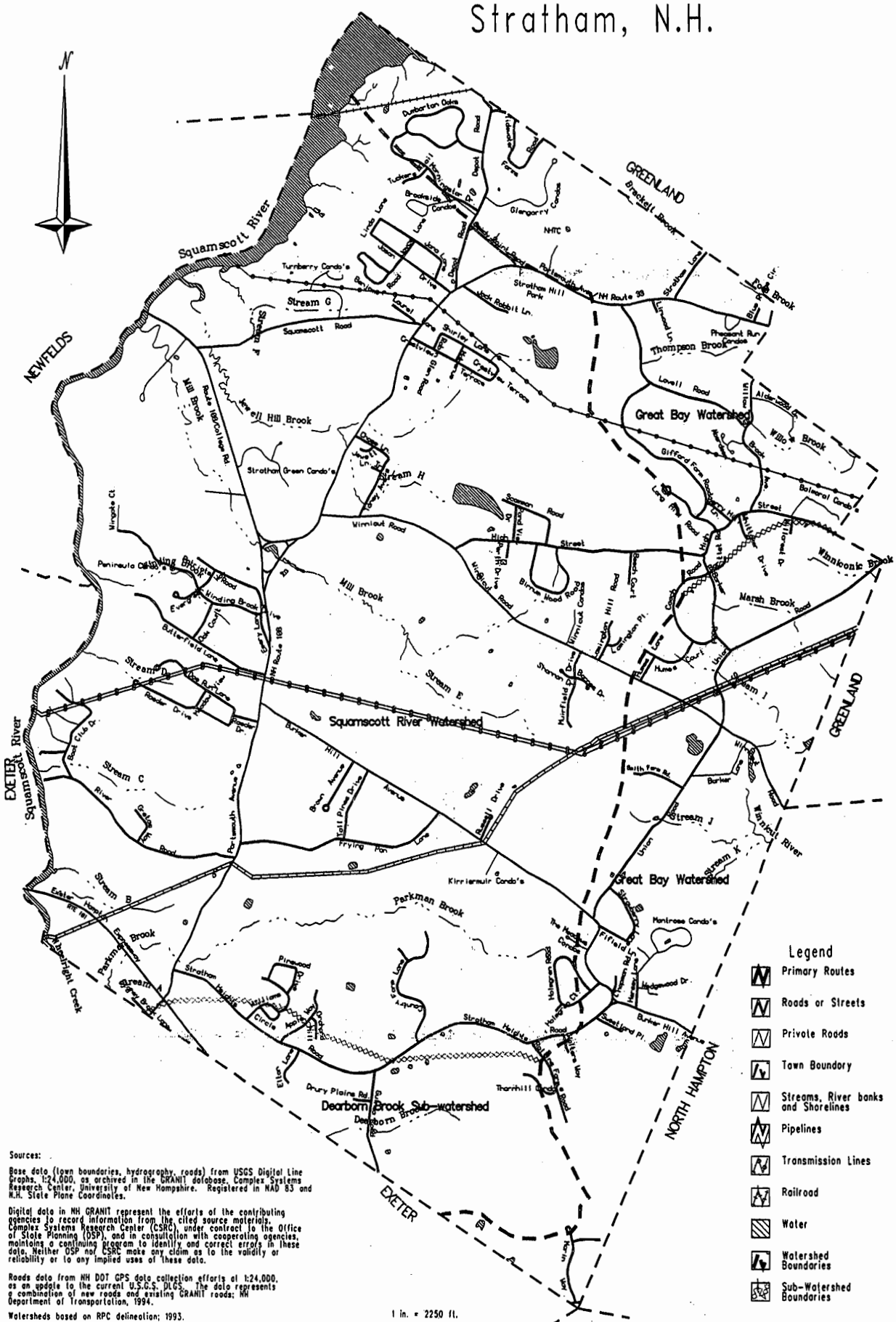
NEW HAMPSHIRE GRANIT

1 in. = 2250 ft.

Scale 1:27000

This map was funded in part by a grant from the Office of State Planning

Map RCP-3
Watersheds and Surface Waters
Stratham, N.H.



Sources:

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Roads data from NH DOT GPS data collection efforts at 1:24,000, as an update to the current U.S.G.S. DLGS. The data represents a combination of new roads and existing GRANIT roads; NH Department of Transportation, 1994.

Watersheds based on RPC delineation; 1993.

1 in. = 2250 ft.

Scale 1:27000

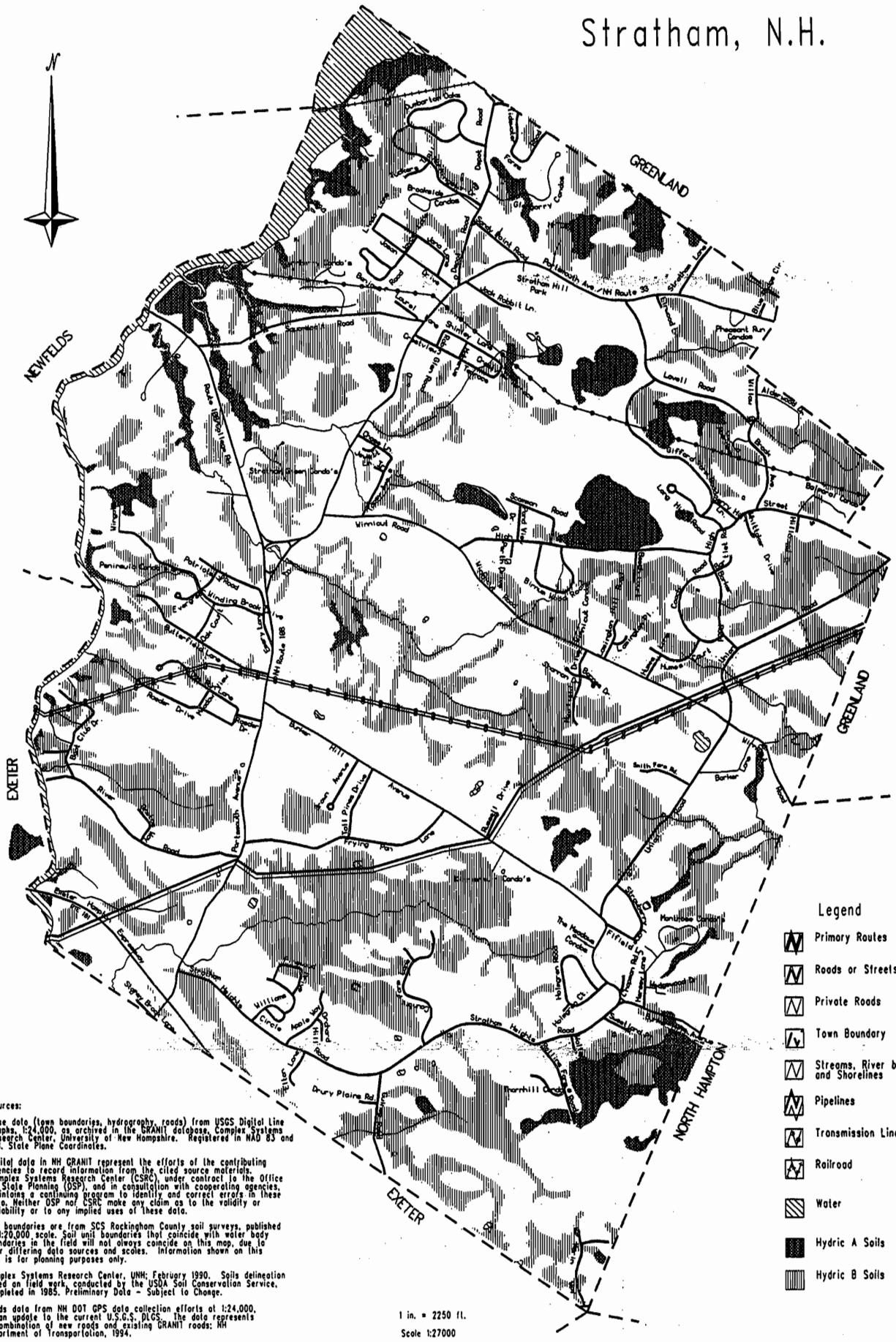
0 feet 2250 4500 6750

NEW HAMPSHIRE GRANIT

This map was funded in part by a grant from the Office of State Planning.

Prepared by the Rockingham Planning Commission

Map RCP-4
Wetlands
Stratham, N.H.



Sources:

Base data (town boundaries, hydrography, roads) from USGS Digital Line Graphs, 1:24,000, as archived in the GRANIT database, Complex Systems Research Center, University of New Hampshire. Registered in NAD 83 and N.H. State Plane Coordinates.

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Soil boundaries are from SCS Rockingham County soil surveys, published at 1:20,000 scale. Soil unit boundaries that coincide with water body boundaries in the field will not always coincide on this map, due to their differing data sources and scales. Information shown on this map is for planning purposes only.

Complex Systems Research Center, UNH; February 1990. Soils delineation based on field work, conducted by the USDA Soil Conservation Service, completed in 1985. Preliminary Data - Subject to Change.

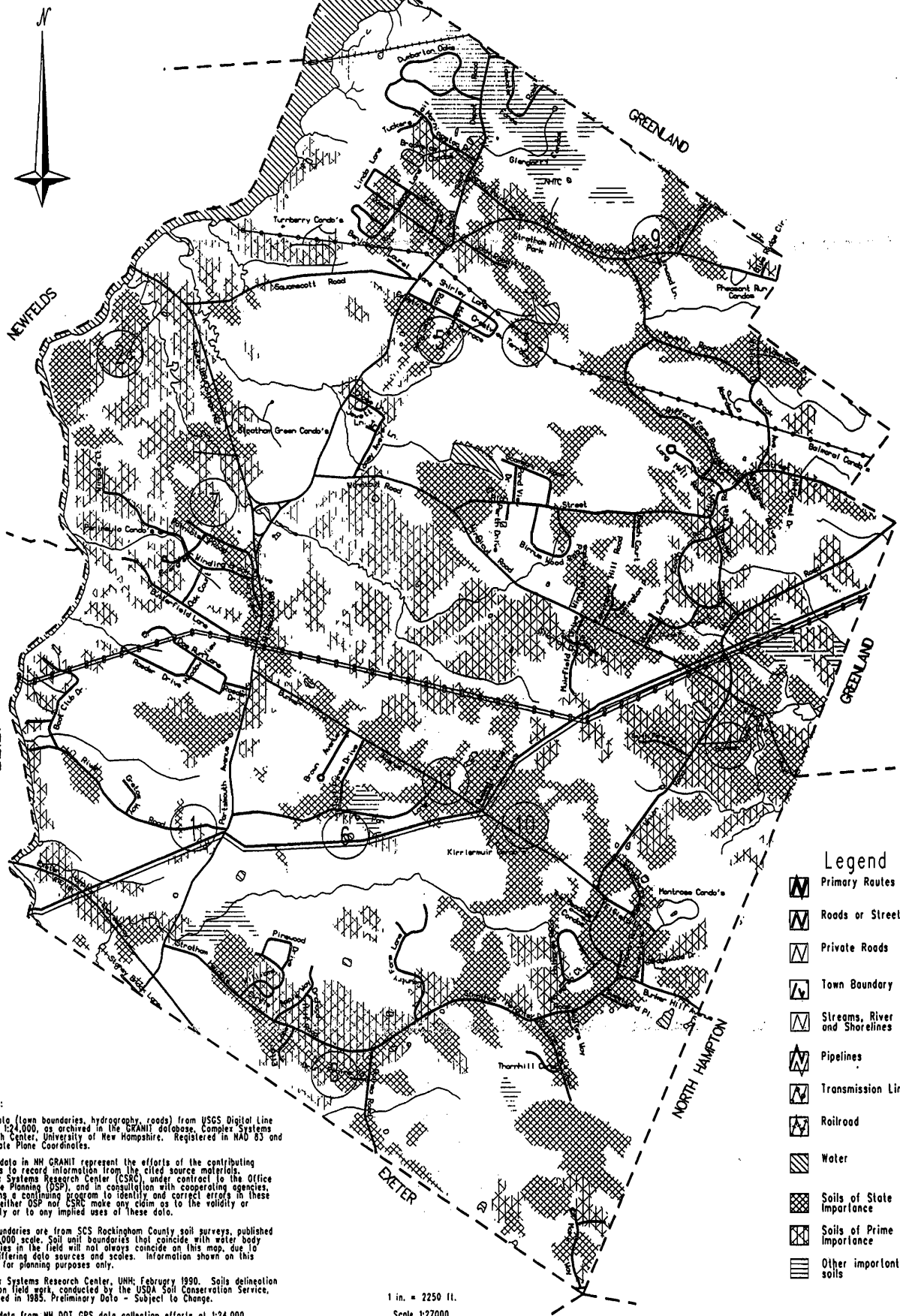
Roads data from NH DOT GPS data collection efforts at 1:24,000, as an update to the current U.S.G.S. DLGS. The data represents a combination of new roads and existing GRANIT roads: NH Department of Transportation, 1994.

This map was funded in part by a grant from the Office of State Planning, New Hampshire Coastal Program, as authorized by the National Oceanic and

Prepared by the Rockingham Planning Commission August 13, 1997 DRA

NEW HAMPSHIRE GRANIT

Map RCP-6
Farmlands Soils and Active Farms
Stratham, N.H.



Sources:

Base data (town boundaries, hydrography, roads) from USGS Digital Line Graphs, 1:24,000, as archived in the GRANIT database, Complex Systems Research Center, University of New Hampshire. Registered in NAD 83 and N.H. State Plane Coordinates.

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Complex Systems Research Center, UNH; February 1990. Soils delineation based on field work, conducted by the USDA Soil Conservation Service, completed in 1985. Preliminary Data - Subject to Change.

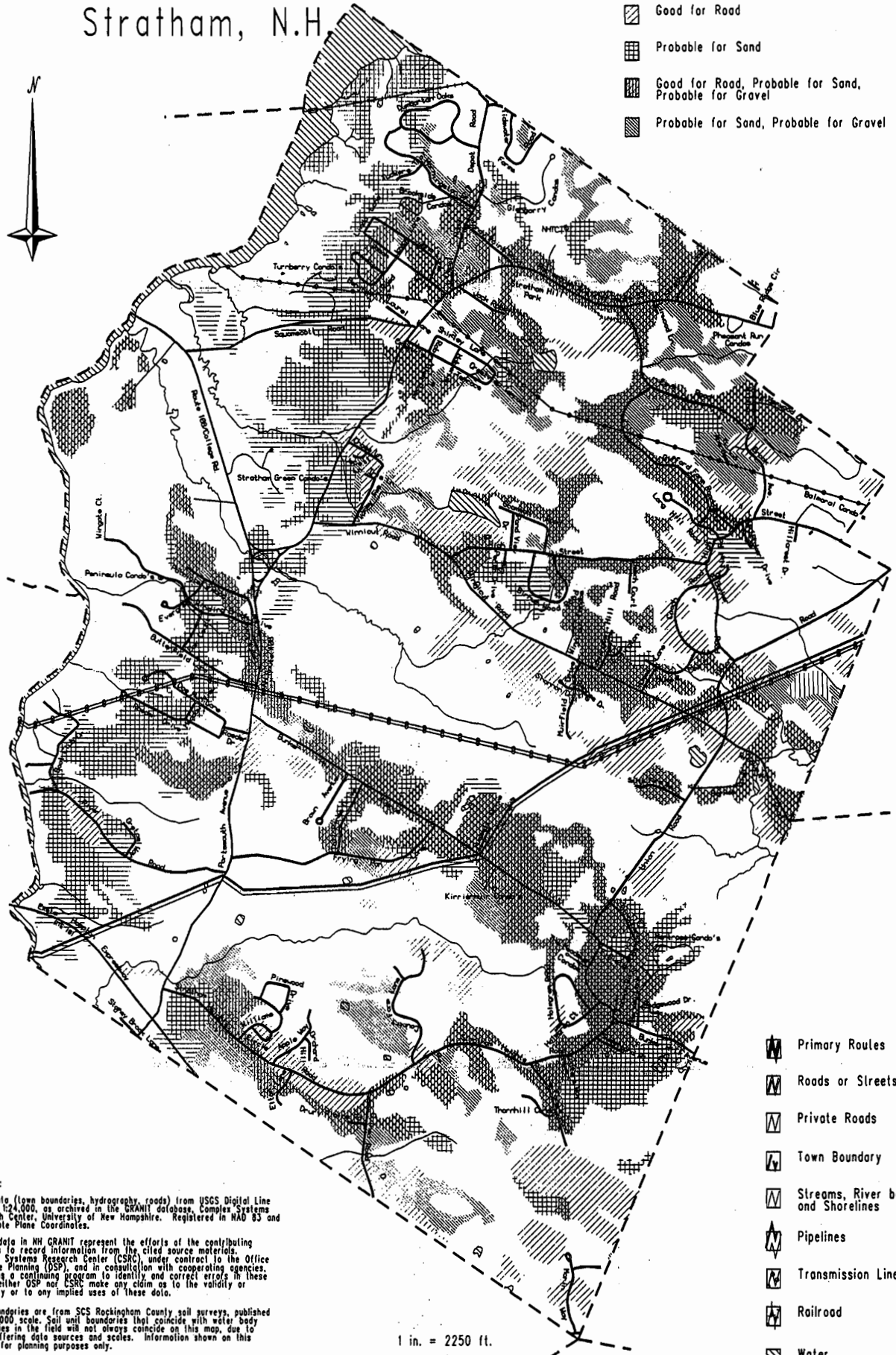
Roads data from NH DOT GPS data collection efforts at 1:24,000, as an update to the current U.S.G.S. DLGS. The data represents a combination of new roads and existing GRANIT roads; NH Department of Transportation, 1994.

Forms represent research by the Rockingham County Cooperative Extension; 1991.

This map was funded in part by a grant from the Office of State Planning, New Hampshire Coastal Program, as authorized by the National Oceanic and Atmospheric Administration (NOAA). Grant Award Number NA57OZ0370.

Prepared by the Rockingham Planning Commission
August 13, 1997
DRA

Potential Construction Materials
Stratham, N.H.



Sources:

Base data (town boundaries, hydrography, roads) from USGS Digital Line Graphs, 1:24,000, as archived in the GRANIT database, Complex Systems Research Center, University of New Hampshire. Registered in NAD 83 and N.H. State Plane Coordinates.

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Complex Systems Research Center, UNH; February 1990. Soils delineation based on field work, conducted by the USDA Soil Conservation Service, completed in 1985. Preliminary Data - Subject to Change.

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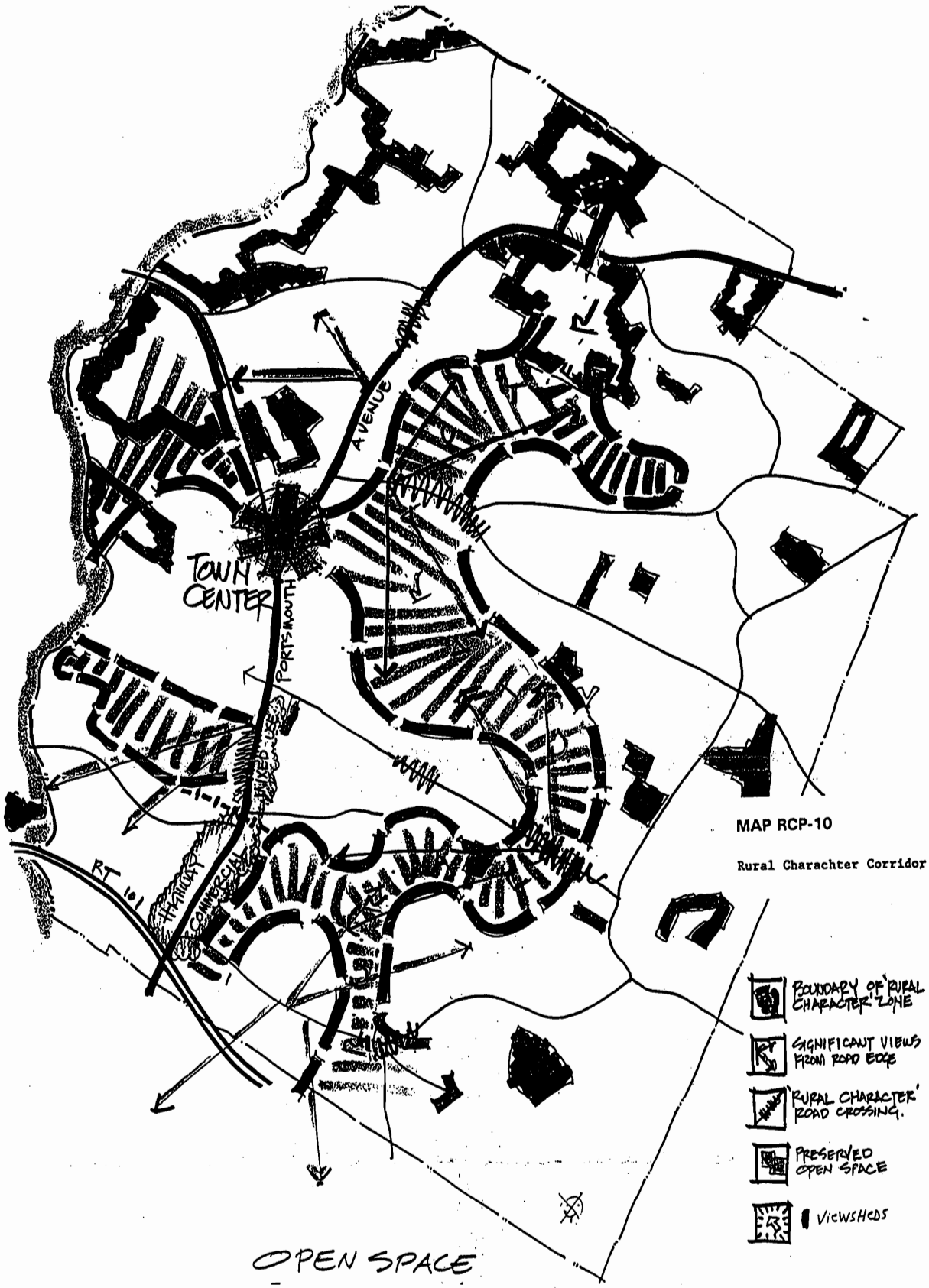
This map was funded in part by a grant from the Office of State Planning, New Hampshire Coastal Program, as authorized by the National Oceanic and

Prepared by the Rockingham Planning Commission

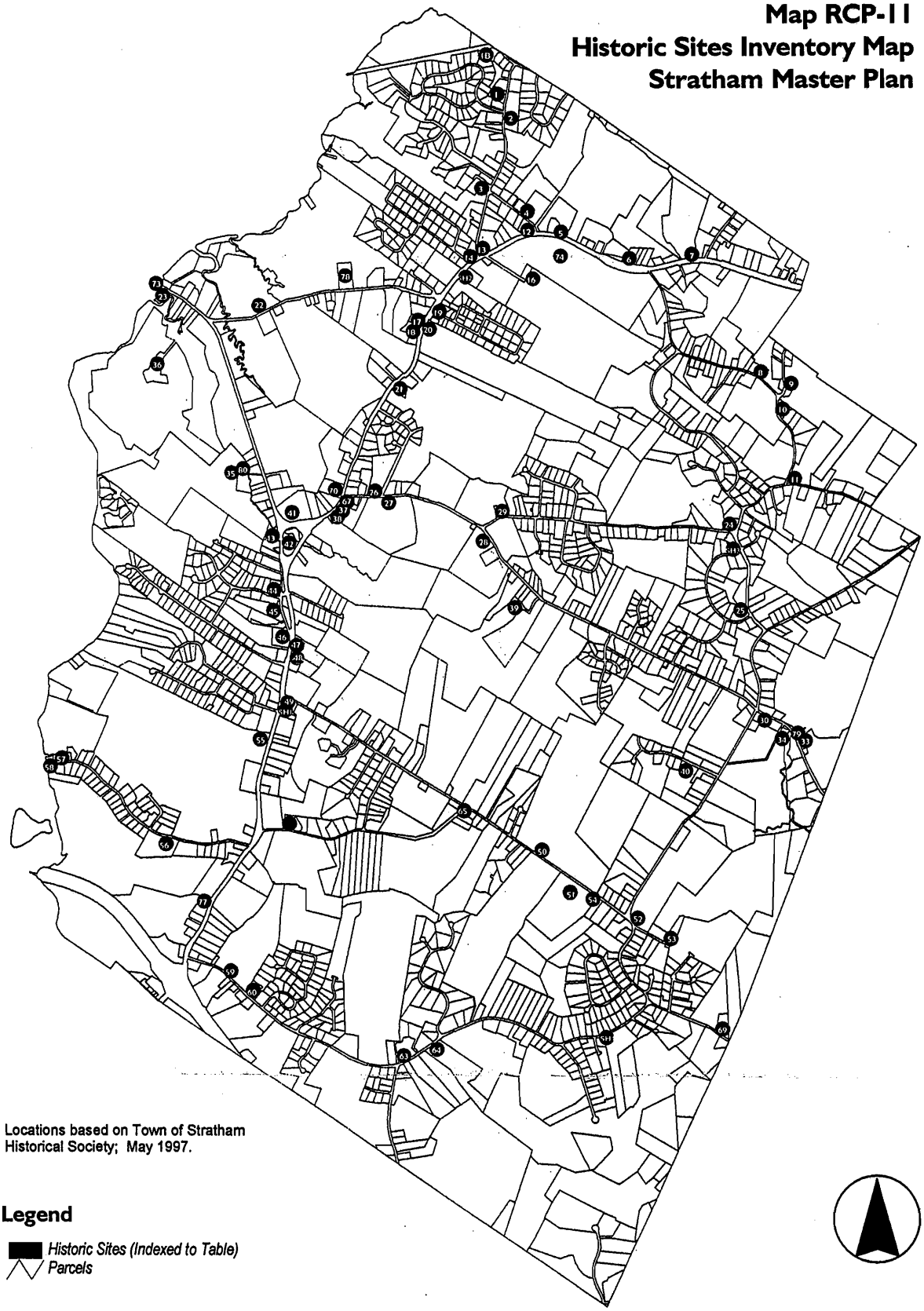
NEW HAMPSHIRE GRANIT



MAP RCP-10

Rural Charachter Corridor Map

Map RCP-11
Historic Sites Inventory Map
Stratham Master Plan



Locations based on Town of Stratham Historical Society; May 1997.

Legend

Historic Sites (Indexed to Table)
Parcels

2000 0 2000 4000 Feet

Rockingham Planning Commission

This map was funded in part by a grant from the Office of State Planning, New Hampshire Coastal Program, as authorized by the National Oceanic and Atmospheric Administration (NOAA), Grant Award Number NA57OZ0320.

Prepared by Rockingham Planning Commission
May 1997 DRA

EXISTING AND FUTURE LAND USE

1.0 INTRODUCTION

Land use is the result of our interaction with the physical environment. It defines the physical development of the community and therefore is among the most important subjects to consider in the master planning process. A central purpose of the master plan is to affect future land use to achieve the agreed-upon goals or "vision" for the Town's future. The first three sections of this chapter examine past and present land uses, analyze the connection between land use and Stratham's tax base, and review future development potential within the existing zoning districts. The final section considers the question of future land use and makes recommendations concerning changes to zoning districts and other land use regulations, the protection of open space, and maintaining a balance of land uses with which to enhance the tax base of the Town.

2.0 EXISTING LAND USE

2.1 Existing Conditions

As part of the Community Stewardship and Master Planning Process, an existing land use map (**Map L-1 *Existing Land Use, 1996)*** was prepared to serve as an inventory of the present day development patterns in Stratham. Given the nature of development, even the most accurate land use map becomes quickly outdated. The purpose of this map is to provide an understanding of the extent and distribution of the Town's current development and any development trends that are implied.

The Existing Land Use map was prepared using a combination of the 1990 Land Use Map prepared for the Open Space Plan, and 1992 U.S.G.S. aerial photography (1:4800 scale). The Master Plan Committee has reviewed this map to correct mistakes and update it to the present year (1996). It is important to note that the map is not a parcel-based land use map, but rather a land-cover based land use map. In other words, the land uses shown are not based on property boundaries, but rather on how the use appears on the landscape. For example, if a single family home was located on a 20 acre parcel, the land use map would show a 1-2 acre block around the home as "residential"; the remainder of the parcel would appear as "undeveloped/open." This is a more useful way to present land use information from the standpoint of the impact of the use on the land.

The land use information includes 20 separate land use classifications. For simplicity of discussion and analysis, these have been condensed into 9 categories described as follows:

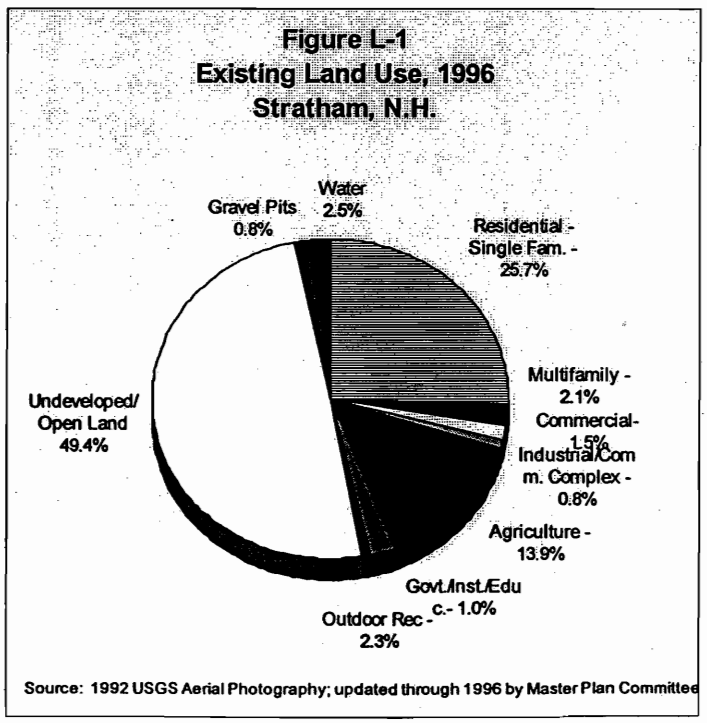
- **Single Family** residential land use includes all structures that contain one dwelling unit, including manufactured housing;
- **Multifamily** are all those with more than one dwelling unit per structure.
- **"Commercial"** uses encompasses all retail establishments (including shopping centers), service and professional offices;
- **Industrial/Comm. Complex** includes manufacturing and large warehousing facilities
- **Agricultural** uses include traditional farms and farm fields, as well as orchards, nurseries and stables;
- **Outdoor Recreation** includes parks, landings, nature centers regardless of ownership; it excludes recreation facilities associated with the school;
- **Govt.; Inst. Educ.** includes town and state owned facilities, schools and other institutional facilities;
- **Gravel Pits** gravel pits are shown based on their appearance and aerial photographs, not on their legal or operational status; water includes open ponds and the Squamscott River.
- **Undeveloped/Open Land** includes all land containing no structures are apparent active land uses.

Using the 1996 land use map, an estimate of the number acres that presently exist was calculated from the GIS system for each of these ten categories. The results are shown in the accompanying **Table L-1 and Figure L-1**

Existing Land Use, 1996. As is indicated, the largest single category of land use is "open and undeveloped" with nearly half the Town so classified. The second largest category is residential, with a combined total (single family and multi-family) of about 28% of the land area. "Agriculture" is next largest at about 14%. Commercial and industrial development in Stratham accounts for less than 2.5% of the land area of the Town -- coincidentally about the same number as is used for public "outdoor recreation."

Table L-1
Existing Land Use -- 1996
Stratham, N.H.

Category	*Acres*	*%*
Residential - Single Fam.	2544.0	25.7%
Residential - Multifamily	208.0	2.1%
Commercial	147.4	1.5%
Industrial/Comm. Complex	81.7	0.8%
Agriculture	1379.9	13.9%
Outdoor Rec	225.2	2.3%
Govt./Inst./Educ.	101.0	1.0%
Undeveloped/Open Land	4892.0	49.4%
Gravel Pits	75.6	0.8%
Water	246.3	2.5%
Total	**9901.1**	**100.0%**



The distribution of land uses, as depicted on the Existing Land Use map shows that commercial development is concentrated along Portsmouth Avenue and Stratham Circle, and that industrial uses occur exclusively at the Industrial Park, or near the NH108/NH101 interchange (Rockingham County News plant) -- both located near NH 101. Gravel Pits are located nearly exclusively along Bunker Hill Avenue, and the outdoor recreation uses are located along Squamscott River, except for the main site -- Stratham Hill Park. The remaining uses are generally well distributed throughout the Town

2.2 Land Use Trends

Stratham's population has grown rapidly over the past three decades, and with this growth has come the conversion of agricultural, open and other undeveloped land to residential and commercial uses. **Table L-2 Land Use Change, 1953-1996,** summarizes the broad change that has occurred in Stratham's land use patterns over that time period. The data presented comes from a variety of sources, some of which were collected using different methods, so the comparisons do not have a high degree of accuracy. However, the trends shown are very clear and useful to understanding the changes that have occurred and continue to occur in Stratham.

Since 1974 a net amount of slightly over 1800 acres has been converted from open land to developed land. Seventy percent of this transfer has come from land which was previously classified as agricultural, while the remaining 30% came from forested and other open land use categories. This change represents a 115% increase in the amount of developed land and

a 21% decrease in open space land during the 22 year period. These changes become even more dramatic when the change from 1953 is considered. The portion of Stratham's land that is "developed" increased from 4.2% in 1953, to 15.9% in 1974, to 34.1% in 1996.

Over the past 22 years, on the average, approximately 82 acres of open/undeveloped land has been converted to developed land each year in Stratham. If that pace continues the remaining acreage of unprotected and developable (non-wetland) land, which equals approximately 3700 acres, will be exhausted in 45 years.

2.3 Current Use Assessment

New Hampshire's Current Use law (RSA 79-A) allows qualifying land to be taxed according to its current, rather than its potential use. Without the Current Use program, all open land, regardless of the owner's intent for future use would be assessed and taxed at market value. In many cases this would have the effect of forcing landowners to sell their property to escape high property taxes. Inevitably this would mean losing much of this land to development -- probably in the form of residential subdivisions. The Current Use program "enables" those who wish to hold on to large parcels of land to do so and in doing so it helps preserve open space and conserve the accompanying agricultural, forest water and wildlife resources.

The Current Use program is utilized extensively in Stratham. According to the 1996 Town Report, over 3200 acres of land was enrolled in current use land or had a conservation restriction. When added to the deeded open space land in the cluster developments, this accounts for nearly 40% of the town's land area. The GIS parcel map and database indicates that there are some 84 parcels in the current use program itself, not including deeded conservation land and condominium common land. In addition there are a total of 19 parcels with conservation deed restriction or owned by the town, state or other entity for conservation purposes. These lands are depicted on **Map L-2 *Current Use Map.*** Summary parcel statistics are shown in **Table L-3.**

The current use program is an extremely important mechanism for keeping open land open in Stratham. It does not, however, provide any long term protection from the future development of this land. This is because current use land can be taken out of the program. If the land is converted to a non-qualifying use it is subject to a penalty tax equal to 10% of the land's full value assessment at the time of the change.

Table L-2
Land Use Change, 1953-1996 Stratham, N.H.

CATEGORY	1953	1974	1985	1996	Change: 1974-1996
Developed	415	1575	2452	3383	+1808 / 115%
Open Space	9486	8326	7449	6518	-1808 / -21%
Agriculture	3490	2650	1587	1379	-1271 / -48%
Undeveloped/Other	5996	5676	5862	5139	-537 / -9.4%
Total	9901	9901	9901	9901	0 / 0%

To accomplish permanent protection of open land, the development rights or the land itself must be acquired through purchase or donation. In 1994, the Current Use Law was amended to allow the current use penalty tax (land use change tax) to accrue to a special account that can be used for conservation purposes. To date Stratham has not elected to take advantage of this change in the law, but does appropriate funds each year for conservation land acquisition.

Table L-3
Current Use and Conservation Land Parcels
Stratham, N.H.

Open Land	No. Parcels	Acres	% of Town	Avg. Size
Current Use Land	84	2870.0	29.8%	34.2
Conservation Lands	10	459.7	4.8%	46.0
Condominium Common Open Space	9	452.5	4.7%	50.3
Total	**103**	**3782.2**	**39.3%**	**36.7**

3.0 TAX BASE ANALYSIS

Many of the objectives and goals set forth in this Master Plan require support with tax dollars to be achieved. Controlling the tax rate is not only a widely supported objective, but also protects the quality of life in the community.

A rising tax rate jeopardizes the future of quality education, the preservation of open space and agriculture, and the ability to have community facilities keep pace with growth. Because Stratham's tax base exerts a powerful force on the Town's future, it is important to analyze the current tax base, its history, and implications for the future.

The Stratham Cost of Community Services (COCS) Study provides valuable information. Based on fiscal year 1994, the study analyzes revenues derived from, and expenses attributed to, the components of our tax base. This analysis considers each of these components, and their relationship to each other from several perspectives.

Commercial and Industrial

Commercial/ Industrial and Residential properties are the two major sources of tax revenue. The COCS Study indicates that for every $1,000 in tax revenue from Commercial/ Industrial property, only $190 was required to cover the cost to the Town from these properties. That leaves $810 available to cover costs not incurred by the Industrial/ Commercial sector.

In contrast, for every $1,000 in tax revenue from Residential properties, services required cost $1,150. Thus an additional $150 was needed for every $1,000 in tax revenue to cover the cost of Town services attributed to Residential properties.

This means that in 1994, the $810 from $1,000 in Commercial and Industrial tax revenue not needed for its own cost of community services, was used to offset the shortage of $150 per $1,000 in Residential tax revenue.

Dividing $150 into $810 shows that $1,000 in Commercial/ Industrial tax revenue yielded sufficient excess to offset the shortage on $5,400 in Residential taxes. This ratio of 1:5.4 from the COCS Study is confirmed by 1994 valuations:

Com./Ind. Valuation	Resid. Valuation	Ratio
$57,147,100	$306,751,700	= 1:5.37

The past eight years show little variation in Table L-4. The positive contribution of Commercial and Industrial properties to the Town's tax base can be confirmed yet another way. In 1994 the net Town appropriation was $717,821 -- upon which the NH Department of Revenue Administration determined the Town tax rate of $1.96. That year the Commercial/ Industrial component paid $1,114,369 in Town and School District taxes.

Two-thirds of this revenue covered the entire net Town appropriation for the year, although only a very minor portion of this expense was attributed to the Commercial/ Industrial sector. The balance (1/3) was available to defray School District expenses, none of which were incurred by the Commercial/ Industrial component.

If the ratio of Commercial/ Industrial to Residential property were to rise some with future growth, it could make more funds available for implementing Master Plan recommendations. Conversely, should the ratio of Residential to Commercial/ Industrial property rise, the result could be a higher tax rate and/ or reduced services. This would have a negative impact on property owners' equity, and cause a contraction of the tax base, as has been experienced in other fast growing communities in Southern New Hampshire

Table L-4
Residential and Non-Residential Property Valuation in Stratham
1988 to 1995

Year	Com./Ind. Valuation	Residential. Valuation	Ratio	Town** Tax Rate
1988	$35,572,430	$238,969,687	1:6.72	15.78
1989	37,369,352	258,782,619	1:6.92	20.42
1990	41,434,883	268,738,219	1:6.48	19.90
1991	39,020,910	265,957,003	1:6.82	20.60
1992	39,455,290	254,793,885	1:6.20	21.51
1993	39,869,505	274,287,302	1:6.90	22.32
1994*	57,147,100	306,751,700	1:5.37	19.50
1995*	58,370,100	318,016,030	1:5.45	20.08

* In 1994 all property in the Town was professionally revalued, causing some change from preceding years.
** Town and school tax rate, excludes County tax.

Table L-5
School Population vs. Population & Housing — Selected Years
Stratham, NH

Year	School Population	Town Population	School % of Total	Dwelling Units	Pupils Per Unit	Population Per Unit
1980	537	2507	21%	844	.64	2.97
1985	564	3113	18%	NA	NA	NA
1990*	787	4955	16%	1917	.41	2.58
1994*	909	5393	17%	2173	.42	2.48

* In 1990 Stratham added Kindergarten to its public school. Kindergarten was excluded from these figures to give a true relationship to the preceding years. Total school population including kindergarten in 1990 was 869, for 18% of total population and .45 pupils per dwelling unit. In 1994 the total school population including kindergarten was 1,019, for 19% of total population, and .47 pupils per dwelling unit.

Source: Town Reports for selected years

Residential

Residential property constitutes by far the greatest source of tax revenue. However, as the COCS Study for 1994 indicates, the costs to the Town from Residential property far exceed Residential tax revenue. In fact, the total Residential tax income was insufficient to cover the total School District costs alone.

Of course not all residential properties incur school expenses. Units occupied by the elderly, mature families, singles, young starter families, and others

generally contribute little to the school population.

Table L-5 shows the recent history of school enrollment to Town population and dwelling unit numbers. This chart shows that while Stratham's population approximately doubled from 1980 to 1990, the school population increased only 48%, using comparable figures. Yet during this same period, the number of dwelling units increased more than 125%. The large number of one and two bedroom condominium units built in this decade could largely account for the significantly faster growth in dwelling units and total population, compared to school population growth.

While tax revenue produced by these units averages much less than that from the average single-family house, so does the average number of pupils in the public school system. Some condominiums in Stratham may break even when it comes to paying for their community services. Maintaining a balance in types of housing as the Town grows could well contribute to stabilizing the tax rate.

Current Use Land

Current Use lands represent a very, very small contribution to the Town's tax revenue. However, the cost of community services for Current Use (undeveloped) land is only 40% of the revenue produced.

The real significance of this component of the tax base lies in its potential to weaken the tax base if undeveloped land is converted to residential development. Well over 3,000 acres of open land are classified as Current Use in Stratham, and almost all of this undeveloped land is at present zoned Residential/ Agricultural. Conversion of this land to Residential use could prove costly to the Town tax base.

Protecting more Current Use land with conservation easements would protect the Town from the potentially costly impact of residential development of now open land. As previously discussed, the COCS Study shows much of the cost of easements can be covered by the savings realized from preventing residential development. In Stratham's case (based on the 1994 COCS Study data), every additional $1,000 in residential tax collected would bring a $150 net loss in cost of services. The precise figure could vary from year to year. But once converted to residential use, the loss can be considered an annual expense.

Conclusion

To protect the educational standards, community diversity, and heritage of open space and agriculture so valued by residents, Stratham can stabilize its tax base by encouraging a balance of residential, non-residential and open land.

- Maintaining the balance between residential and non-residential growth;
- Maintaining a balanced mix of housing types in the residential sector;
- Protecting more open land with conservation easements;
- Emphasizing the further expansion of the commercial/industrial development base of the Town.
- Establishing an Economic Development Committee to help promote selected industrial and commercial development.

4.0 Analysis of Existing Zoning Districts

In updating the Master Plan it is important to assess the adequacy of the existing zoning with three important questions in mind:

- Is development occurring in a way that is consistent with zoning?
- Are the existing zoning districts adequate to meet future development needs of the community?
- Will the existing scheme of districts and related regulations help bring about the Town's goals, objectives and "vision" of future land use. *[Completed at the 1997 Town Meeting]*

4.1 Consistency with Zoning

Map L-1 shows an overlay of existing land use and the boundaries of the zoning districts and can therefore help answer the question of whether or not development is consistent with zoning. Stratham's existing districts include Residential Agriculture (RA), General Commercial (GCM), Office Research Park (ORP), Professional/Residential (PRE), Town Center (TC), Industrial (IND), and Manufactured Housing (MAH).

In comparing existing land use and zoning it appears that development has occurred in a manner that is both supported by and consistent with these districts. The exceptions are the numerous grandfathered non-conforming commercial uses that exist along Portsmouth Avenue between the Town Center District and the Greenland town line. However, these non-conforming uses are advantageous in that they permit limited commercial use of properties that have diminished residential value due to the changing character of the highway. The non-conforming uses, together with the home occupation provisions of the ordinance, reduce the pressure to rezone this section of Portsmouth Avenue for more intense commercial uses.

Table L-6
Developable Land Analysis by Zoning District
(numbers are acres)

	Resid./Agric	Gen Comm.	Prof./Resid	Office Park	Town Center	Manuf. Housing	Industrial	Total
Total Acres	8459.6	297.5	78	104.9	71.1	321.1	342.2	9674
Not Developed	5705.6	184.6	37.7	104.2	44.8	213.9	264.6	6555
Not Developed and Not Protected	5095.1	184.6	37.7	104.2	44.8	178.9	264.6	5910
Not Developed and Not Protected and Not Hydric A	4799.2	184.6	37.7	104.2	44.8	154.5	263.4	5588
Not Developed and Not Protected and Not Hydric A and Not Hydric B	3152.9	130.5	33.2	73.9	31.6	90.7	189.1	3702

Source: Rockingham Planning Commission GIS Analysis

(1) NOTE: This analysis did not take into account two recent changes within the Industrial Zone: (1) the subdivision and usage of a 58 acre parcel for the construction of the Cooperative Middle School, and (2) the gift from the Rollins estate of a 35 acre parcel of protected conservation land. Both parcels are wholly within the existing Industrial Zone. Although not all this land was developable, its removal will have the effect of significantly reducing the amount of potentially developable land in this zone.

4.2 Adequacy of Existing Zoning

The adequacy of existing zoning should be looked at both from the perspective of land area needs and effectiveness. To assist in determining land area needs, a GIS analysis was undertaken to determine how much vacant, developable land remained in each of the defined zoning districts. It should be noted that this analysis was <u>not</u> done at a parcel level and therefore will tend to overstate the amount of developable land on which it is viable or *practical* to build. However as an approximation, this approach is sufficient to determine whether the existing zones can support future development. Furthermore, parcel boundaries can and do change, especially in the process of land development.

The method used is described as follows: (1) the total land area within each zone is computed; (2) from this total, land that is already developed (as shown on the existing land use map) is subtracted; (3) from this result, land that is restricted from future development (e.g. town or state owned conservation land and private land with conservation restrictions) is subtracted; (4) from this result, land that is unsuited for development due to environmental constraints (as indicated by hydric soils or steep slopes) is subtracted. The final result is an approximate number of vacant developable acres in each zone. The results of this analysis is displayed visually on **Map L-3** ***Vacant Developable Land by Zone*** and numerically in **Table L-4.**

The results indicate that there is at least some remaining developable land in all zones. That amount ranges widely from about 3200 acres in the residential/agricultural zone to about 30 in the Town Center and Professional/Residential zones.
The next step, then, is to assess whether these amounts are adequate to meet the expected and desired future amount of development appropriate for each zone. In considering this question, and in light of the Tax Base Analysis presented above, the Master Plan Committee concluded that a key goal for future development would be to maintain or improve upon the existing balance between residential and non-residential uses. The rationale is that in order to sustain a stable tax base, any further residential development must be offset by an amount of non-residential growth sufficient to balance the revenue deficit created by residential development. The adequacy of the non-residential zoning districts depends therefore on the amount of residential growth that is expected to occur.

The Office of State Planning's most recent population projections show that Stratham will grow from its current (1995) population of 5,524 to 8,936 by 2015 -- a 62% increase over a 20 year period. That will mean 3412 more people to house and, at an average occupancy of 2.4 per housing unit, about 1420 new housing units to build. Will there be enough land to accommodate this? Assuming an average density of 60,000 sq. ft.(1.37 acres) per housing unit (a reasonable number considering that the vacant developable acreage calculated for this analysis *excludes* all wetland soils), a total of 1955 acres of residentially-zoned land will be required. This amount of land is available in the Residential/Agricultural district, but using it will result in the loss of two-thirds of the remaining open and undeveloped land in Stratham.

If this amount of residential growth does occur, it will require a substantial amount of non-residential development in order to meet the goal of maintaining the balance of land uses. Determining the exact amount needed is neither possible or necessary. We can, however, approximate the amount of non-residential land needed by using existing acreage and valuation ratios of residential-to-commercial/industrial uses. The relevant ratios are as follows:

	Comm./Ind. Devel.	Residential Devel.	Ratio
Assessed valuation (1995)	$ 58.3 M	$ 318.0 M	1 : 5.45
Acres in Use (1996)	257.2	$ 2,861	1 : 11.1
Avg. Value per Acre	$226,944	$111,147	2.04 : 1

Assuming these ratios remain constant in the future, the projected residential acreage need of 1955 acres would result in $217.3 million in assessed valuation. This residential development would be offset with the addition of $ 39.9 million in new commercial and industrial development, based on the stated ratio of 1:5.45. At an average assessed value of $226,944 per unit this amount of development would take up about 176 acres of commercial and/or industrially zoned land.

According to the developable land analysis presented in Table L-4, there are 458.3 acres of vacant developable land remaining in the non-residential zones, or more than the projected need over the next twenty years. However, there are numerous factors which will tend to reduce the actual amount of non-residential land from the total that is economically viable for development. These include:

- most of the 130.5 acres of available land in the GCM zone is either located behind the existing development and largely inaccessible, or on land

belonging to the Scamman Farm which many in Stratham hope will not be developed;

- the 33.3 acres in the Professional/Residential zone are unlikely to result in high valuation development given the limited uses permitted;
- the 73.9 acres in the Office Research Park zone has, to date, proven commercially unattractive to the uses permitted in the zone;
- the 189 acres available in the industrial zone are diminished by site planning, access and buffering requirements of this zone, as well as the construction of the new Exeter Coop. District Middle School on a portion of this land and the Rollins conservation land deeded to the Town.

When these factors are considered it is reasonable to conclude that Stratham should take additional steps in the near future to make modest additions to the supply of commercial and industrially zoned land, and/or make to adjustments to the existing districts to attract high valued and appropriate development on the land which remains. These actions should be focused on the zones that can support the highest value development — Industrial, Office Research, and General Commercial. Given the pace and distribution of residential development, this will be the last, best opportunity to make such changes.

4.3 Effectiveness of Zoning

The effectiveness of zoning is best measured by how it contributes to reaching the long term goals and overall vision of the Town. Any such "measurement" is inexact at best, but still useful in gauging whether the zoning ordinance will carry the Town toward its desired future — or somewhere else. There were four such goals highlighted in the Community Stewardship Process that relate most directly to zoning. These are paraphrased and assessed with respect to zoning effectiveness as follows:

GOAL: *Maintain the rural/residential character of the Town, especially through the protection of open space and agricultural uses.*

Supports Goal: The ordinance encourages open space protection though cluster development, although improvements are needed to make this form of development do more to preserve useable and visible open space. The ordinance limits further expansion of high intensity commercial development beyond Bunker Hill Ave/Reader Drive on Portsmouth Ave.
Does Not Support Goal: Large amounts of open land are unprotected and available for sprawling development; the cluster ordinance can permit higher overall density of development in some cases. Zoning can't preserve the open space, only direct how it is used!

GOAL: *Protect the natural environment and cultural heritage of the Town.*

Supports Goal: Stratham has long been at the forefront of implementing land use controls which protect the environment (ex: wetlands, shoreline, excavation, aquifer, wellhead protection).
Does Not Support Goal: The ordinances are ineffective at addressing the incremental effects of development, except where a cluster development produces a very large contiguous block of protected land. There is no Historic District or other measure to encourage the preservation of historic structures; the control of commercial groundwater extraction is not effectively addressed in the ordinance.

GOAL: *Address traffic congestion, safety and appearance problems on Portsmouth Ave.*

Supports Goal: Stratham requires large development setbacks and connecting easements to adjoining properties on Portsmouth Avenue to make room for future road improvements and to promote secondary access between development. Traffic impact and access issues are carefully reviewed in design, Aesthetic design standards have been developed.
Does Not Support Goal: No comprehensive access management plan exists; connecting easements not always enforced; Route 101 corridor study recommendations are not always observed; Signage and pedestrian/bicycle facility requirement should be improved.

GOAL: *Maintain a stable tax base by*

encouraging a balance of residential and non-residential growth.

Supports Goal: Stratham does provide good opportunities for non-residential development in its existing zoning district and is cognizant of the need to balance growth

Does Not Support Goal: the ORP zone if ineffective in attracting development; commercial development on Portsmouth Ave. Has diminished the rural residential quality of the community; open space acquisition has not yet been used to limit tax impacts of residential development.

5.0 FUTURE LAND USE

The Future Land Use section of the Master Plan should represent the Town's broad "vision" for the long-range development of the Town. It requires a careful evaluation and synthesis of all other parts of the Master Plan. The evaluation should take into account existing natural features such as soils, topography, wetlands, water resources and other indicators of development suitability. Other important factors include existing development patterns, road conditions, zoning, existing and anticipated municipal services, as well as community policies. The vision should be both general and specific. As a "policy document," the Master Plan must establish general policies and goals with which to guide development. As a "plan" it must go further and specify measures that will help bring about the desired future of the Town. Such measures include changes in zoning and site development regulations; others require new initiatives in land protection, facility development or changes in Town policy.

This section is divided into separate discussions: general development suitability; zoning districts and land use regulations; the future development of Portsmouth Avenue; open space protection; and other future land use issues.

A. General Development Suitability

It continues to be the policy of Stratham to discourage growth in areas that have poor natural development suitability or which have significant resource values which should be protected. In general, these areas include wetlands, steep slopes, flood hazard areas, immediate shoreland environments and aquifer recharge areas. The rationale for limiting or prohibiting development from these areas is well established in other sections of this Plan. In general, because Stratham relies almost exclusively on onsite septic disposal and onsite wells, soil conditions play a dominant role in determining suitability for development. Although there are other factors which should and will influence future land use in Stratham (for example its zoning districts), general development suitability forms the basis of the future land use policy.

To help visualize the areas suitable for future development, an analysis map was prepared. This map, labeled **Map L-4 – General Development Suitability,** classifies soils into three general categories: 1) land unsuitable for development; 2) land poorly suited for development; and 3) land generally suited for development. The elements of each category are explained below. It is important to note that the categories of land and the associated map are useful for town-wide planning purposes, but are not accurate enough for site specific assessments. Without respect to type of development, this map defines where development should be permitted to occur in the future.

1. Land Unsuitable for Development

   Land not suited for development includes wetlands and areas which have very low potential for the siting of septic systems (such as poorly and very poorly drained soils and steep slopes). The significance of these areas is described as follows:

   a. Wetlands: The importance of preserving and protecting wetlands is well established in the Water Resource section of this Plan. In addition to the importance of preserving wetlands, it is equally important to prevent building in such areas because of the potential negative impact on water quality, public health and protection from flood hazards. Since a municipal sewer system is unlikely in Stratham, at least in the foreseeable future, all buildings requiring sewage disposal should be located at a safe minimum distance from wetlands, surface

waters and groundwater.

The Town's existing Wetlands Ordinance will continue to guide future development in regards to wetlands.

b. Areas with Very Low Potential for Septic Systems: The ability to adequately place a septic system on a parcel of land is the most important consideration for determining development suitability. The Rockingham County Conservation District (RCCD) has developed a system to indicate the relative potential of a soil for siting a septic system. This system objectively and scientifically rates a soils potential on a five level scale ranging from very high to very low.

The system judges soils that have a "very low" rating as economically unfeasible for development due to the existence of wetlands or severe slopes. Regardless of economic feasibility, it is clear that land classified as having very low potential is not suitable for development under any reasonable standard. The development of such land only invites hazards to public health.

All wetland soils and steep slopes (greater than 25%) have very low potential for septic systems. Current regulations in Stratham prohibit construction on land with greater than 15% slope, due to increased erosion potential.

c. Developed and Protected Land: Also included as not-suited for development is land already developed and land for which the development rights have been acquired or placed under protective easement for conservation purposes. This included common open space land associated with cluster development.

2. Land Poorly Suited for Development

Land which is poorly suited for development includes the following categories: 1) buffer areas around wetlands; 2) buffer areas along river corridors; 3) aquifer recharge zones; 4) 100-year flood hazard zones; and 5) areas with low potential for septic systems.

All of these areas are considered to be poorly suited for development. However, unlike those areas not suited for development, these areas do not pose serious enough environmental and public health problems to justify a prohibition on all construction. Poorly-suited areas are considered "problematic" and are best suited for low density residential development. Carefully developed land use regulations are required to safely guide future development in these areas.

a. Buffer Areas Around Wetlands: A wetlands ordinance which prohibits development in wetlands does not necessarily protect wetlands from harmful uses occurring immediately adjacent to them. Structures that are potentially harmful to wetlands, such as septic systems, waste storage areas and salt storage areas, should be excluded from buffer areas. Many wetland ordinances also restrict the placement of structures and impermeable surfaces within the buffer area. As much as possible, natural vegetation should be protected or restored in these areas to control erosion and sediment from contaminating wetlands.

The General Development Suitability map shows land within 50 feet of wetlands as poorly suited for development. A 50 foot buffer, which is required by the zoning ordinance, probably provides for adequate protection of the wetland from the most common types of degradation, such as construction vehicles during construction of a house or road, sediment from erosion, and stormwater runoff from impervious areas. It should be noted, however, that a recent analysis prepared in cooperation with the Office of State Planning (*Buffers for Wetlands and Surface Waters, A Guidebook for NH Municipalities*, NH Audubon Society, 1995) recommends 100 foot buffers around wetlands. The Planning Board

should review this analysis and consider if the additional buffers are necessary, given the other protections currently in place.

b. Buffer Areas Along River Corridors: For many of the same reasons as for wetlands, the establishment of buffers along rivers and streams is a common protection measure. River corridors serve as travel corridors for many types of wildlife. Protecting river corridors will preserve wetlands, reduce flooding damage and preserve the scenic beauty of the river. Stratham was one of the first communities in the state to enact a comprehensive shoreland protection district. Stratham's shoreline district consists of all land within 150 feet of the shoreline of the Squamscott River and Great Bay Estuary, including any adjacent tidal marsh land, and, areas within 100 feet of the seasonal high water level of all brooks and streams appearing on the USGS quadrangle maps.

In 1991, the Comprehensive Shoreland Protection Act (RSA 483-B) was adopted by the State Legislature. The law imposes different standards than Stratham, including that a 150 foot natural woodland buffer be maintained along public waters, but does allow buildings within 50 feet of the shoreline. Although Stratham is grand-fathered from the State law, the Planning Board should review these differences and attempt to reconcile any unnecessary differences. For the purposes of the General Development Suitability map, all land within 100 feet of tidal waters, all rivers, and named perennial streams has been included as land poorly suited for development.

c. Aquifer Recharge Zones: Aquifer recharge zones are poorly suited for many types of development due to the potential for contamination of groundwater supplies. Vulnerability to contamination is particularly high in land overlying sand and gravel aquifers due to the high permeability of the associated soil types. Contaminants can spread rapidly into the aquifer and destroy it as a water supply. In general, development that does not involve the use of hazardous chemicals that if spilled could contaminate the groundwater, and which does not create large areas of impermeable surface, is acceptable.

The four aquifer recharge zones identified in the Water Resource Management and Protection Plan and discussed in the Water Resources Section of this Plan are included in the land poorly suited for development. The aquifers are relatively small and are overlain by residential development.

d. 100 Year Flood Hazard Zones: As discussed in the Water Resource Management and Protection Plan, floodplains are undesirable locations for development because of associated risks to life and property. Construction in the floodplains worsens flood hazards downstream, and the inundation of subsurface sewage disposal systems can cause water pollution and a public health hazard. Stratham's participation in the National Flood Insurance Program insures that future development will not be subject to flood hazards.

e. Areas With Low Potential for Septic Systems: These areas contain soils that have low potential for the successful siting of septic systems. The soils are limited due to one or more of the following factors: slope, shallow depth to bedrock, seasonal wetness or slow percolation rate. In most instances, these natural limitations can be overcome by modifying the site to comply with minimum State septic siting requirements, but only at high cost. These areas are suited for low density development only, with densities determined by the soil type lot size requirements.

3. Areas Generally Suited for Development

All other areas not specifically identified pose no unusual resource-related limitation to development. This does not mean that all land is

equally suitable. The source maps do not have sufficient detail to show the location of all physical limitations described above. Conversely, developable land is likely to be found within areas shown as unsuitable for development. Consequently, this map is not intended for, nor sufficiently accurate to be used in site-specific development determinations. It is, however, useful as a general guide about the general location and amount of developable land. Other factors must also be considered that are not related to land capability such as highway access, compatibility with surrounding uses, the need for municipal services, conservation and open space objectives, existing zoning regulations and the Town's overall vision for the location of future development of various types.

B. Zoning Districts and Land Use Regulations

It is the policy of the Town of Stratham to maintain a balance of land uses and development opportunities that results in a well planned community with a diverse tax base, but which preserves the environmental quality and predominant rural-residential character of the Town. This Plan defines a two pronged strategy to achieve these potentially conflicting objectives. The first is to ensure that there are adequate opportunities for future non-residential development and that the Town take a proactive approach in attracting the type of development that will be an asset to the community. The second is to ensure that a significant portion of the Town remains open and undeveloped so that it retains its essential character. This too will require a proactive approach in identifying and protecting key open space and conservation lands from development.

As Stratham continues to grow in residential population, it will be necessary to increase opportunity for additional commercial and industrial growth. This correlation has been demonstrated in previous sections of this chapter. The first five of the following recommendations are made toward achieving these objectives; the others address other zoning and related recommendations that should also be pursued.

1. <u>Rezone Office Research Park:</u> Although this zone has existed for more than a decade, no development has been attracted to the site despite its attractive and highly accessible location. This is likely the result of zoning provisions that prohibit the type of commercial development that represents the highest and best use of this location. The existing Office Research Park (ORP) zone should be modified to permit, in addition to ORP uses currently defined, low impact industrial and planned commercial development. (See zone labeled as "CLIO" on Map L-5 -- Proposed Changes to Zoning Districts) These changes should be made with the following conditions:

   -- Permitted commercial uses in this zone should be more limited than in the General Commercial District and tailored to those that are both appropriate to the site and likely to produce high quality development;

   -- Larger setbacks, and enhanced screening and site development requirements should be implemented on the northern and western boundaries of the zone to protect residential properties along River Road and the Squamscott River;

   -- As part of this zoning change the Planning Board should incorporate new site design and aesthetic standards to ensure that new development in this zone is well planned and is compatible with the community;

   -- Access to Portsmouth Avenue should be coordinated with existing access points; any new access roads from Portsmouth Avenue to serve the zone should be laid out to maximize opportunity for future construction of roadside commercial development perpendicular to Portsmouth Avenue; the intent is to concentrate future commercial development in a "block" fashion in the existing commercial and ORP zone, instead of further extending commercial development on Portsmouth Avenue;

   -- A larger setback from the Squamscott River (e.g. 200 ft. or greater) than presently required should be considered; best management practices for storm water

management should be required.

2. **Rezone Residential Agriculture District Southwest of NH 101/108 Interchange**: Under current zoning, a small isolated Residential/Agricultural district exists in the southwest quadrant of the NH 101/108 interchange. This area should be re-zoned to commercial/office research/light industrial. The rezoned area would be considered as part of the rezoned ORP zone as recommended above. (See Map L-5) Although there are a small number of residential units are located close to the affected area, they are all currently located within the General Commercial Zone. Some have been or will be acquired in conjunction with the NH 101 expansion project. It is expected that any remaining residential structures in Stratham and Exeter will be converted to commercial use because of the preponderance of surrounding commercial uses today, and the increased accessibility that will be brought by the highway expansion. Although this district is small it contains a significant area of developable land. It's major limitation is proximity to the Squamscott River. This zoning change should be made with the following conditions:

   -- Access to Portsmouth Avenue should be coordinated with corridor improvement and access controls being implemented by the NHDOT as part of the NH101 /108 interchange reconstruction

   -- The zoning change should include all relevant changes made to the ORP zone including increased setbacks to the Squamscott River and adjacent tidal wetland, as well as requirements for active treatment of storm water runoff from parking areas.

   -- Stratham should seek to negotiate an equitable arrangement with Exeter to allow tie-ins with that Town's sewer and water system.

3. **Expand the Industrial District**: To provide expanded opportunities for industrial development in Stratham, this Plan recommends that the existing Industrial District be expanded to include additional land primarily to the north side of the existing district, in the vicinity of Rollins Farm Road. *The specific dimensions and location of this expansion should be determined by the Planning Board.* For discussion purposes a preliminary expansion area is shown on Map L-5, which is drawn to include good developable land immediately adjacent to the existing boundary. This change should incorporate substantial setback and buffer areas where the district abuts the new Cooperative School District Middle School, existing residential development and existing and proposed conservation land acquisitions.

4. **Establish an Economic Development Committee:**

(Note: The Town as already acted on this recommendation. The Committee was established at the 1997 Town Meeting.)

Given existing residential development patterns, and the unsuitable nature of much of Stratham's remaining vacant land, it is clear that commercial and industrially zoned land in Stratham will become an increasingly scarce resource in the Town. It is vital to the future of the Town that development on this remaining land be of a desirable quality. While it was being developed, this Master Plan Committee an recommended, that the Town formally establish an Industrial and Commercial Development Commission to identify and actively solicit appropriate development. The guidance of this Commission will be especially important if the Commercial-Industrial -Office Park zone is adopted because the mixture of uses allowed will require careful planning.

5. **Permit a Centralized Sewer Treatment Facility in the Commercial-Industrial-Office Park Zone**: The Town should pursue an equitable, long term agreement with Exeter to provide access to Exeter's sewer treatment system. The additional development density (and tax revenues) that could result under such an agreement might make this a cost effective

approach for the Town. If Exeter is unable or unwilling to enter into such an arrangement, the Planning Board should consider allowing as a special exception the development of a "package" sewer treatment facility in this zone, subject to local and state review and approval. Properly designed and maintained, these facilities can provide more effective treatment of sewage effluent, while consuming far less land than a conventional on site septic system.

6. **Boundary Adjustment to Professional-Residential (PRE) District**: It is recommended that the southern boundary of the Professional-Residential District along Bunker Hill Avenue be moved south approximately 500 feet to adjoin the boundary of the General Commercial District. This area, which includes the Municipal Center, is presently zoned Residential-Agricultural. The present zoning is inconsistent with that of all the adjoining parcels with frontage on Portsmouth Avenue.

7. **Consider Establishing Elderly Housing Overlay Zone**: The demographics of the nation point to the growing need for housing designed to accommodate the needs of the elderly. Although housing for the elderly can be built in Stratham's existing residential zones, certain desirable elements of "life-care" facilities such as the co-location of health care facilities and a larger number of residential units per building cannot. The Planning Board should consider establishing an overlay zone to permit and encourage such elderly housing in appropriate areas of the Town.

8. **Amend Cluster Development Provisions:** Residential cluster development (also known as Open Space Development) offers many advantages over conventional development. It encourages a form of residential land use that is more consistent with the rural-residential character of the town, such as the siting of homes in a compact "village" surrounded by large blocks of open space. The implementation of the cluster concept, however, often falls short of its promise. After reviewing Stratham's experience with cluster development, the Master Plan Committee concludes that it should be retained, though amended to encourage the form of cluster design originally envisioned. The following changes should be considered:

   -- Require internal deeded lot lines on all residential cluster development involving single family and duplex units.

   -- Further reduce the amount of wetland that can be credited to meet open space requirements.

   -- Strengthen language in the zoning ordinance to require open space areas in cluster development to have functional value and utility as open space. Require Conservation Commission review of the open space provisions of proposed developments, and wherever practical, require such provisions to be integrated into the Town's Open Space Plan.

   -- Reduce the minimum lot size permissible for cluster development from 30,000 sq. ft. to between 15,000 and 20,000 sq. ft. provided the overall development density of the tract is not increased and adequate sewer and water provisions are made.

9. **Establish Heritage Commission**: Following the completion of the Community Stewardship Process, the Master Plan Committee recommended Historic District or Heritage Committee be established whose purpose will be, among others, to study the creation of an Historic District in the vicinity of the intersection of Winnicutt and Union Roads, and make recommendations regarding its advisability, specific location and regulatory provisions. The Town Meeting of 1997 established the Stratham Heritage Commission.

10. **Amend Aquifer Protection District**: The recent installation and attempted permitting of a commercial production well by the Hampton Water Works Co. in Stratham indicates that the existing Aquifer Protection District should be strengthened to better address groundwater

extraction. The Planning Board should review and amend the aquifer protection district to include explicit provisions for assessing and regulating commercial well water extractions within the aquifer protection District to ensure that such extraction does not adversely affect private or community wells, surface waters and wetlands, or otherwise prevent reasonable use of the groundwater by other land owners.

11. **Adopt Telecommunications Plan and Ordinance; Participate in Regional Telecommunications Facilities Plan**: The passage of the Federal Telecommunications Act of 1996 is leading to the rapid expansion of wireless forms of telecommunication and the demand for locating new competing networks of cellular/PCS towers and other facilities. Improperly sited, these facilities have the potential to needlessly degrade the aesthetic qualities of Stratham. During the development of this Master Plan, the Committee recommended,,on advice from the RPC, that the Town immediately develop a telecommunication facility plan, zoning ordinance, and related site plan requirements for adoption to ensure that negative impacts of siting such facilities in minimized. The Planning Board proposed and the Town adopted a Telecommunications Ordinance at the 1997 Town Meeting. It should further participate in future regional efforts to coordinate the location of future telecommunication facilities.

C. Portsmouth Avenue

Managing the future development, access and traffic congestion on Portsmouth Avenue is one of Stratham's greatest challenges now and for the foreseeable future. The following recommendations are made to help meet that challenge:

1. **Prohibit Further Linear Expansion of the General Commercial Zone**: The commercial strip development along Portsmouth Avenue should go no further than the present extent of the General Commercial Zone. Further expansion along the highway will worsen existing traffic congestion and degrade the rural residential character of the community. Expanded commercial development opportunities in the revised and expanded "CLIO" zone, if implemented, will address commercial development needs for the foreseeable future. Although market forces for expanding the commercial strip will remain strong, the Town should remain steadfast in holding this line. Should further commercial development land be needed in the future, these same market forces can be redirected to developing behind or perpendicular to the highway within the 1600 ft. wide GCM zone.

2. **Prepare and Adopt an Access Management Plan**: Much of the congestion and hazardous driving conditions that exist on Portsmouth Avenue results from too many uncontrolled access points (curb-cuts) on the highway. At current traffic volumes of over 20,000 vehicles per day, it has become necessary to "preplan" future access points and, in the most congested areas, begin consolidating existing access at established signalized intersections. The Planning Board has already begun this process at the Shaw's entrance, and for many years has required the establishment of service road easements to facilitate access consolidation.

The Town, under the auspices of the Planning Board and in cooperation with the NHDOT, should formalize this effort by preparing and adopting an Access Management Plan which (1) identifies existing and future "approved" access points on the highway, (2) identifies where existing access points can be closed and access redirected to controlled points, (3) identifies physical highway improvements needed to implement the plan, including intersection realignment, signal coordination etc., and (4) establishes a protocol for joint NHDOT/Town review of highway access applications for new development. The plan should be developed to be consistent with the future highway improvements identified in the 1990 NH 101 Corridor Feasibility Study (NHDOT/Kimball Chase). Once the plan is in place, and to the extent permitted by law and governed by

reasonableness, the Planning Board should require that access provisions of new development be consistent with this plan.

3. **Site Development Improvement**: The Site Plan regulations should be amended to improve architectural design, landscape architecture, site landscaping, parking and signage to make development on Portsmouth Avenue more visually appealing and more compatible with the character of the community. In addition, public safety aspects of site development should be strengthened in the site review process.

4. **Off-Site Improvements/Impact Fees**: The Planning Board should continue the current policy of negotiating off-site impacts without a formalized impact fee system. A formal impact fee system should only be considered if a defined plan and implementation schedule for roadway improvements on Portsmouth Avenue is adopted.

5. **Home Occupations on Portsmouth Avenue**: The Planning Board should review provisions of current Home Occupation requirements and consider modifications for existing residences on Portsmouth Ave. on signage, setback and parking which make reasonable use of these residences more reasonable and equitable. Any changes, however should continue to require that the property remain principally residential.

D. Open Space

The protection of open space in Stratham is necessary and desirable for a variety of reasons, many of which were clearly articulated and well supported by the 1996 Community Stewardship process:

- to help preserve the rural and residential character and overall quality of life in Stratham
- to help maintain a stable tax base by keeping a balance of residential and non-residential development as well as developed and undeveloped areas;
- to protect the ecological health and diversity of the environment;
- to protect groundwater recharge areas over identified aquifers;
- to ensure that an adequate base of agricultural and forested land exists to support farm and forest uses;
- to support outdoor recreational opportunities in Stratham;
- to complement regional open space plans.

The Stewardship Program began a process of defining priorities for open space acquisition, including the identification of an "S" shaped pattern of largely undeveloped and scenic land which remains in the center of the town. The pattern begins at Stratham Hill Park and traverses south across Winnicutt Road, east behind Bunker Hill Ave., and then south and west along Parkman Brook. This area, as roughed-out on **Map FLU-2**, is intended to show a general area where open space protection should be a priority. There are other important areas of open land in the Town outside the "S" that are also shown. Although much of this land is presently enrolled in the Current Use program, this does not ensure that the land will remain undeveloped in the future. It is important that the town take a strong and proactive role in protecting the most important of these areas by securing the development rights to them, either directly or indirectly. The following specific recommendations are made:

1. The Conservation Commission and Recreation Committee should cooperatively update the 1989 Open Space and Recreation Plan to include a specific implementation plan for land protection/acquisition. This plan should (1) identify and prioritize specific parcels to be protected, (2) recommend specific protection measures and funding sources to be used (i.e. through conservation easement acquisition or development rights transfer, partial development, private sector/land trust acquisition) and (3) map out recreational trail connections and usage. Particular attention should be paid to prioritizing lands within the priority areas identified on Maps and RCP-10 and FLU-2. Help in devising an implementation strategy should be solicited from the Rockingham Land Trust, the Society for the Protection of New Hampshire Forests, and the national Trust for Public Lands.

2. The Town should establish active dialogue with

Stratham Cost of Community Services Study

Stratham recently completed a Cost of Community Service Study (COCS) to help in its 1996 Master Plan revision. The COCS process was developed by the American Farmland Trust, a organization working to protect agricultural lands throughout the country. This method has been used in a number of other states in the northeast. In New Hampshire, COCS have bee completed in Dover, Fremont and Deerfield. The method is an analysis of a community's budget for a given fiscal year. The 1994 fiscal year was used for the Stratham study. All revenues and expenses were reviewed and assigned proportionately to the town's commercial/industrial, residential and current use land use components. Proportionate cost assignments were made by reviewing town records, discussions with public officials and town employees and/or by assigning costs based on the total assessed value of each land use component. After all of the expenditures and revenues are totaled by land use, a ratio of revenues to expenses is calculated.

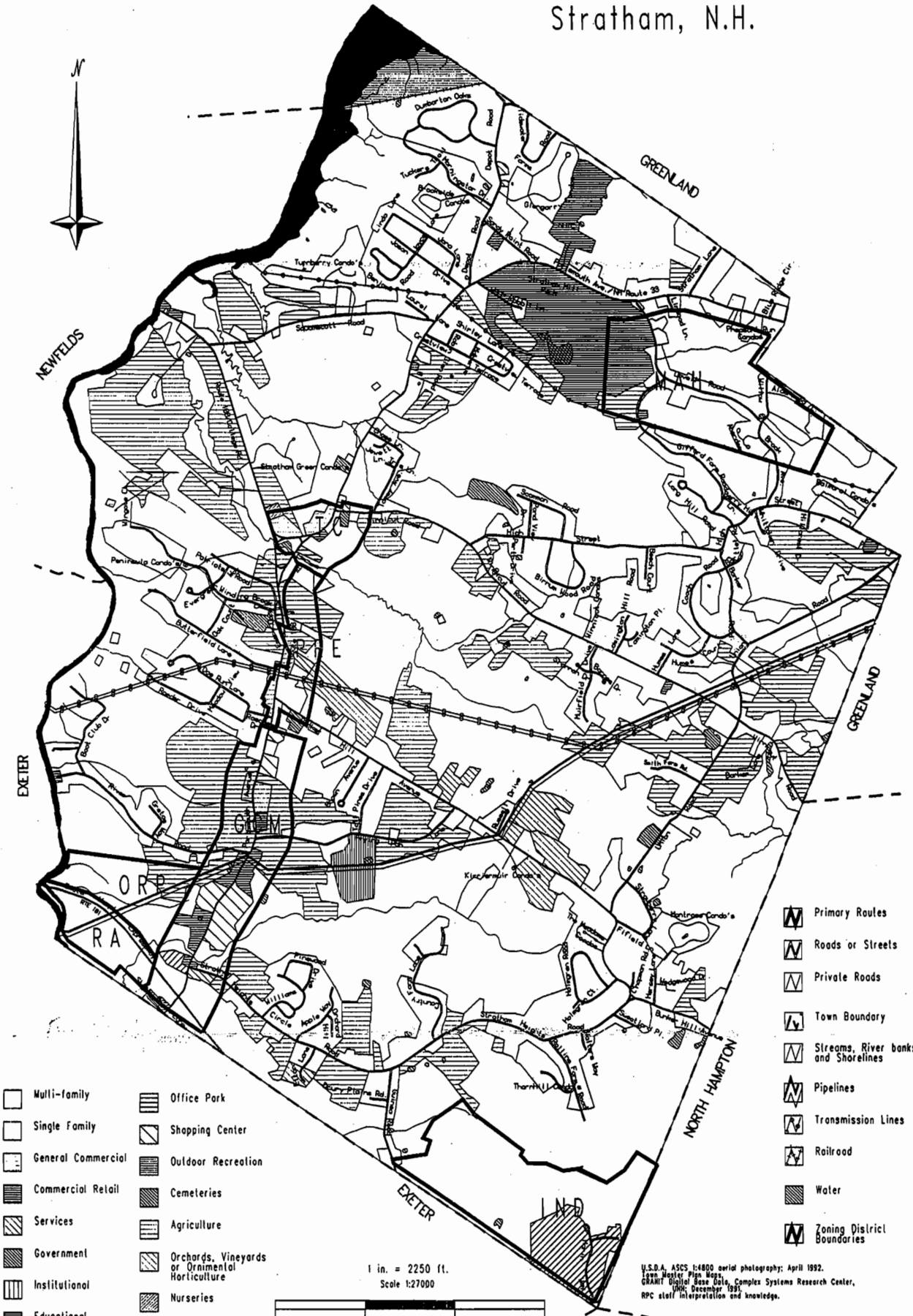
This ratio provides a quick and easy to understand analysis of how tax dollars are being usec in a community for a given year. Refer to the chart on this page for the results of the Stratham COCS. The total revenues and expense are in the first two columns by land use component. The ratio in the third column is expressed in this way. The left side of the ratio i each dollar of revenue generated by taxes and other sources of income, the given land use component. The right side of the ratio is the expense (service cost) side of the ratio. Here's how the ratios for the Stratham COCS should be read as follows:

- For every dollar of revenue generated by commercial and industrial properties in Stratham during the 1994 fiscal year, 19 cents was expended in service costs.
- For every dollar of revenue generated by residential properties in Stratham during the 1994 fiscal year, $1.15 was expended in service costs.
- For every dollar of revenue generated by current use lands in Stratham during the 1994 fiscal year, 40 cents was expended in service costs.

COMPONENT	REVENUES	EXPENSES	RATIO
Commercial/Industrial	$1,339,275	$256,696	1.00:.19
Residential	$6,939,002	$7,957,296	1.00:1.15
Current Use Lands	$20,498	$8,132	1.00:.40

The Stratham COCS was completed by Paul Deschaine, Jim Stuart, Gerry Batchelder and Phil Auger, an Extension Educator with UNH Cooperative Extension. It is hoped that this analysis will lead residents to a constructive dialogue and, ultimately, the best possible Maste Plan for Stratham. Complete spread sheets for the study are available at the town office.

Map L-1
Existing Land Use and Zoning Districts
Stratham, N.H.



U.S.D.A. ASCS 1:4800 aerial photography; April 1992.
Town Master Plan Maps.
GRANIT Digital Base Data, Complex Systems Research Center, UNH; December 1991.
RPC staff interpretation and knowledge.

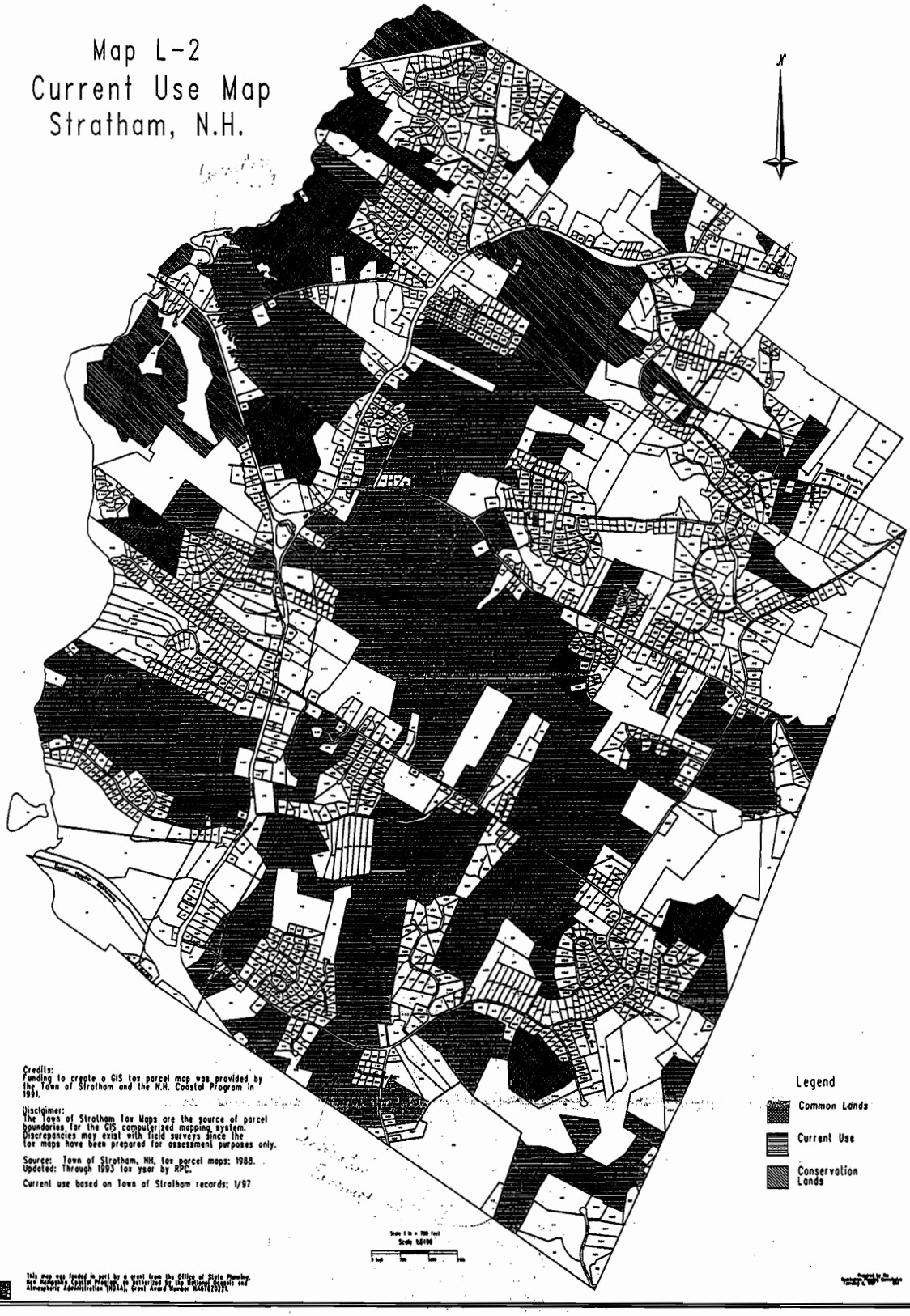
Roads data from NH DOT GPS data collection efforts at 1:24,000, as an update to the current U.S.G.S. DLGS. The data represents a combination of new roads and existing GRANIT roads; NH Department of Transportation, 1994.

NEW HAMPSHIRE GRANIT

This map was funded in part by a grant from the Office of State Planning.

Prepared by the Rockingham Planning Commission

Map L-2
Current Use Map
Stratham, N.H.



Credits:
Funding to create a GIS tax parcel map was provided by the Town of Stratham and the N.H. Coastal Program in 1991.

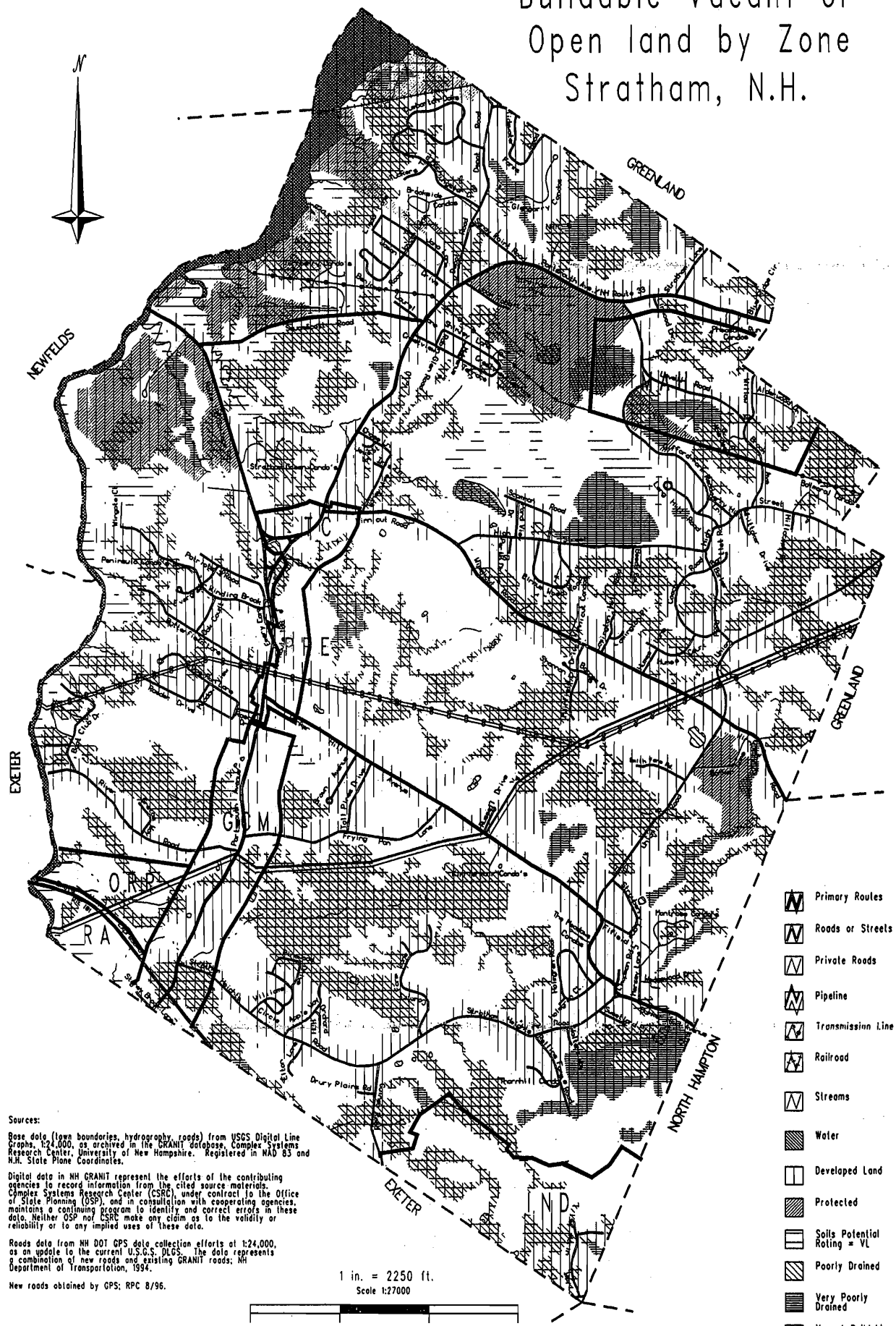
Disclaimer:
The Town of Stratham Tax Maps are the source of parcel boundaries for the GIS computerized mapping system. Discrepancies may exist with field surveys since the tax maps have been prepared for assessment purposes only.

Source: Town of Stratham, NH, tax parcel maps; 1988.
Updated: Through 1995 tax year by RPC.

Current use based on Town of Stratham records; 1/97

This map was funded in part by a grant from the Office of State Planning, the Federally Coastal Program, as authorized by the National Oceanic and Atmospheric Administration (NOAA), Grant Award Number NA67OZ0372.

Map L-3
Buildable Vacant or Open land by Zone
Stratham, N.H.



Sources:

Base data (town boundaries, hydrography, roads) from USGS Digital Line Graphs, 1:24,000, as archived in the GRANIT database, Complex Systems Research Center, University of New Hampshire. Registered in NAD 83 and N.H. State Plane Coordinates.

Digital data in NH GRANIT represent the efforts of the contributing agencies to record information from the cited source materials. Complex Systems Research Center (CSRC), under contract to the Office of State Planning (OSP), and in consultation with cooperating agencies, maintains a continuing program to identify and correct errors in these data. Neither OSP nor CSRC make any claim as to the validity or reliability or to any implied uses of these data.

Roads data from NH DOT GPS data collection efforts at 1:24,000, as an update to the current U.S.G.S. DLGS. The data represents a combination of new roads and existing GRANIT roads; NH Department of Transportation, 1994.

New roads obtained by GPS; RPC 8/96.

1 in. = 2250 ft.
Scale 1:27000

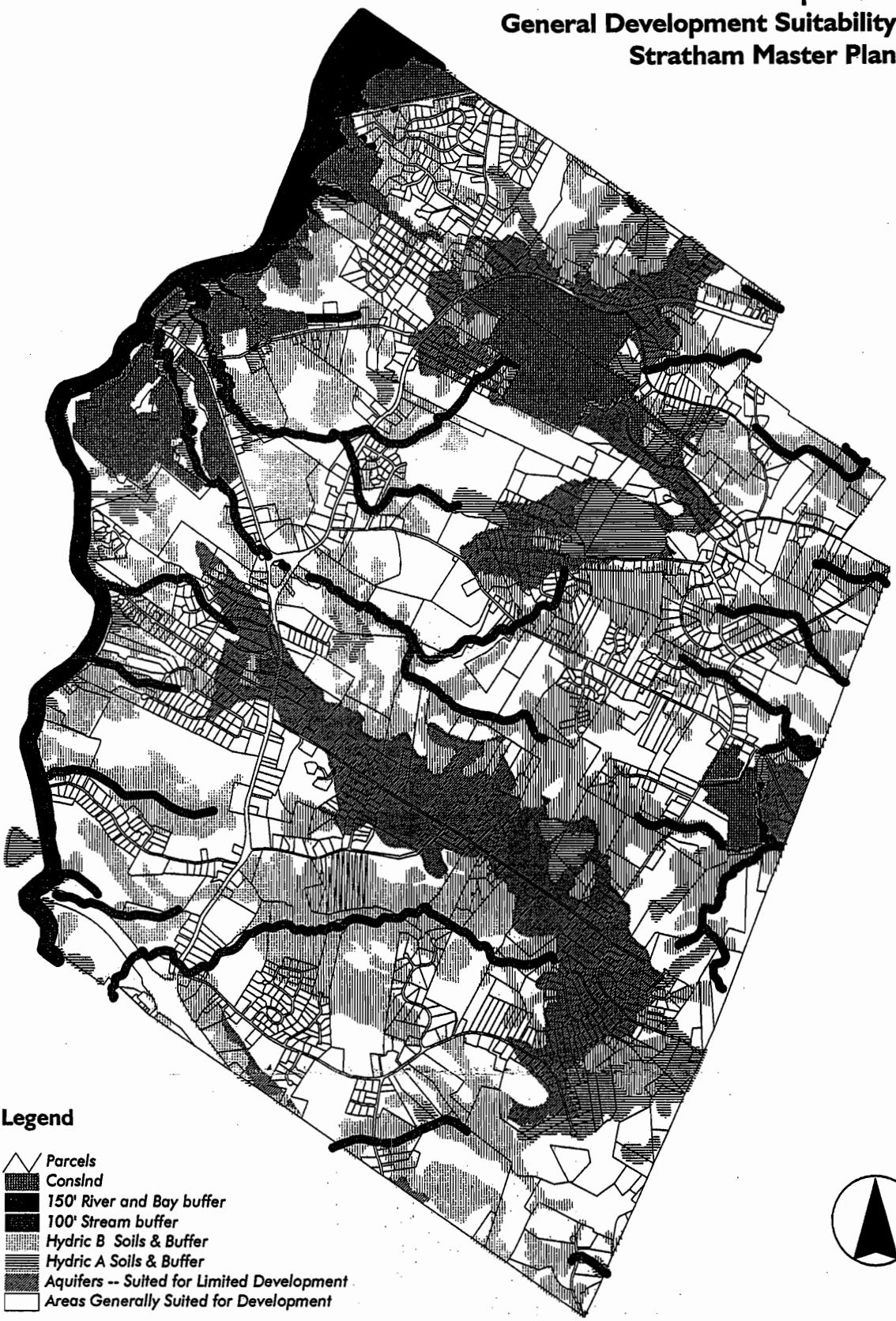
0 feet 2250 4500 6750

NEW HAMPSHIRE GRANIT

This map was funded in part by a grant from the Office of State Planning, New Hampshire Coastal Program, as authorized by the National Oceanic and

Prepared by the Rockingham Planning Commission

Map FLU-1
General Development Suitability
Stratham Master Plan



Legend

- Parcels
- ConsInd
- 150' River and Bay buffer
- 100' Stream buffer
- Hydric B Soils & Buffer
- Hydric A Soils & Buffer
- Aquifers -- Suited for Limited Development
- Areas Generally Suited for Development

2000 0 2000 4000 Feet

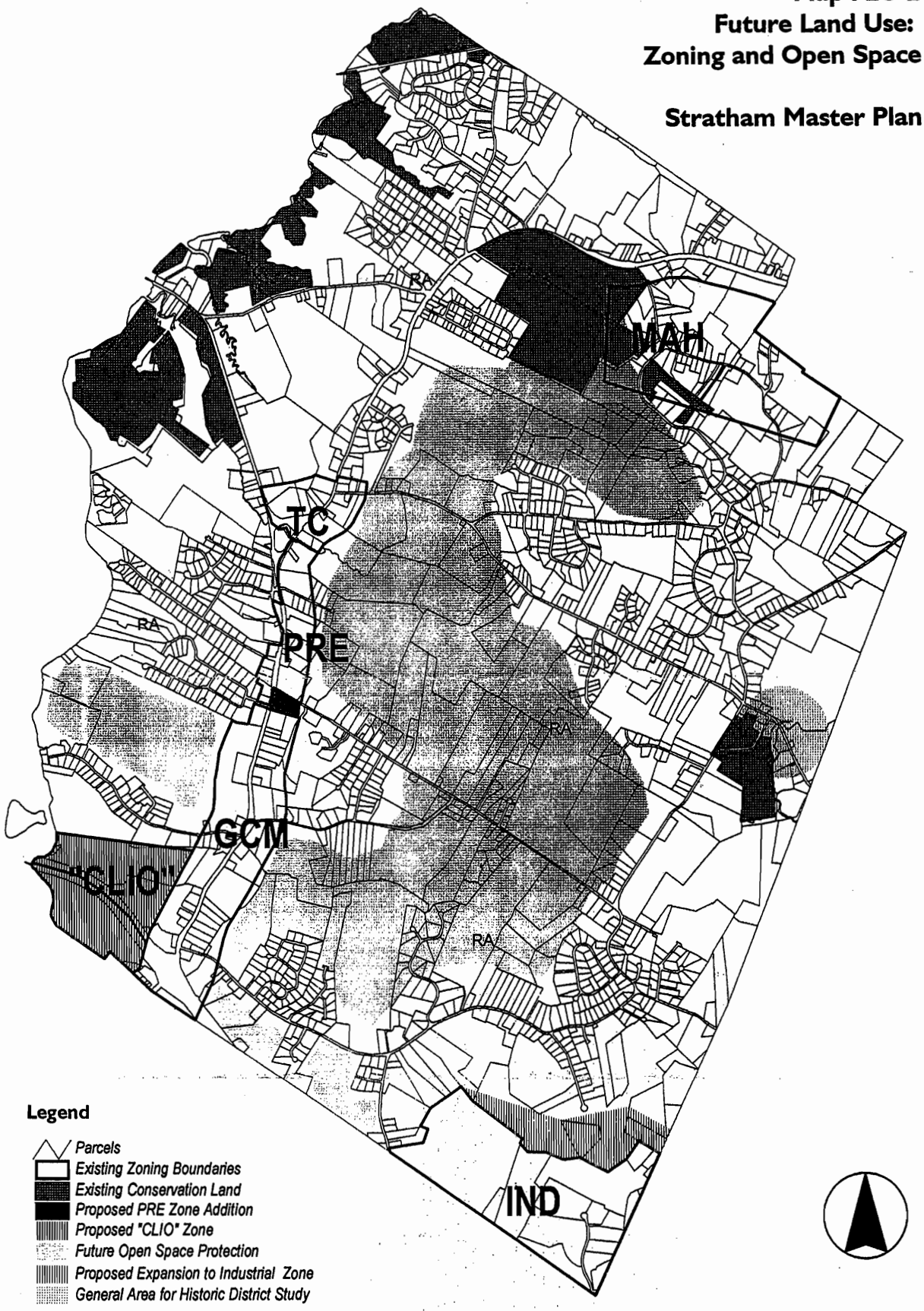
Rockingham Planning Commission

This map was funded in part by a grant from the Office of State Planning, New Hampshire Coastal Program, as authorized by the National Oceanic and Atmospheric Administration (NOAA), Grant Award Number NA57OZ0320.

Prepared by Rockingham Planning Commission
Exeter NH
October 1997

Map FLU-2
Future Land Use:
Zoning and Open Space

Stratham Master Plan



Legend

- Parcels
- Existing Zoning Boundaries
- Existing Conservation Land
- Proposed PRE Zone Addition
- Proposed "CLIO" Zone
- Future Open Space Protection
- Proposed Expansion to Industrial Zone
- General Area for Historic District Study

2000 0 2000 4000 Feet

Rockingham Planning Commission

This map was funded in part by a grant from the Office of State Planning, New Hampshire Coastal Program, as authorized by the National Oceanic and Atmospheric Administration (NOAA), Grant Award Number NA57OZ0320.

Prepared by Rockingham Planning Commission, Exeter, NH
October, 1997