TOWN OF BROOKLINE, NEW HAMPSHIRE

BUILDOUT ANALYSIS

DECEMBER, 2003

Prepared by the

Nashua Regional Planning Commission

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INTRODUCTION

Upon request of the Brookline Planning Board, NRPC has prepared a Buildout Analysis for the Town of Brookline, NH. The study was funded by the NH Community Development Finance Authority (CDFA) in support of local economic development planning. The primary goal is to provide the Town and the public with information needed to make informed choices regarding the impact of future population growth. Data was assembled at the parcel level, but summarized as subsets for the entire community. The results can provide base data for the Town Facilities Committee and Capital Improvements Committee and other municipal boards and agencies. The information in the Buildout Study should also assist the Planning Board and Conservation Commission in their future planning efforts relative to land acquisition and Master Planning.

This Buildout Study uses Geographic Information System software (GIS) to analyze parcel specific data for the Town of Brookline and produce the results in both table and map format. A GIS utilizes computerized mapping software that incorporates a relational database management system to organize information about geographic features. The Nashua Regional Planning Commission is continually improving and updating the GIS database for its member communities to incorporate ongoing land use and natural resource changes.

I. METHODOLOGY

A. Parcel Review

The first step in the Brookline Buildout Analysis involved updating the local land use designations to accurately identify vacant and underdeveloped properties. In the local parcel database maintained by NRPC, all parcels were assigned one of five land use categories: Vacant, Undevelopable (roads, water), Open Space (Permanent Open Space or Town-Owned Lands), Developed Residential, or Developed Non-Residential. Map 1 displays the distribution of these land uses in Brookline. Properties considered Vacant, Developed Residential or Developed Non-Residential were examined to determine a set of parcels that would represent the net buildable area. A GIS database representing the Buildout Study area then selected all parcels coded as vacant, plus those coded as either developed category and in excess of five acres.

Two zoning districts exist in Brookline, Residential/Agricultural and Industrial/Commercial. The residential district is designed to provide locations in Town that are predominantly residential, while also allowing agricultural uses that help preserve the Town's rural character. Single family and duplex units are allowed by right in the residential district. The industrial/commercial district encompasses most of Brookline's commercial and industrial land uses. Light industry, auto repair, restaurants and professional offices are some of the permitted land uses in this district. The study area parcels were combined with the local zoning datalayer to associate the appropriate zoning district with each parcel.

B. Development Constraints

Constraints mapping involves determining the net developable area of the study area parcels. For the purposes of this Buildout Study, net developable area in Brookline is defined as the proportion of a privately owned vacant or underdeveloped parcel that is not constrained by the following features:

- Areas containing an existing improvement or set aside as permanent open space
- Wetlands and the 50-foot wetland buffer zone
- Slopes in excess of 25%
- 100-year floodplain

Table 1 describes the GIS datalayers that were combined to create a composite layer representing development constraints. These are presented graphically in Map 3.

Table 1. GIS Data Layers and Sources

Data Layer	Source	Description
Floodplains	FIRM	Depicts Zone A (100-year) floodplains
Landuse	NRPC/Brookline Assessor	Land use types by parcel derived from local Assessing values
Parcels	NRPC/Brookline	Includes parcels boundaries, attributes
Roads	NH DOT	Based on USGS Digital Line Graph
Town Boundary	NH GRANIT	Based on USGS Digital Line Graph
Water	NH GRANIT	Based on USGS Digital Line Graph
Wetlands	US Fish and Wildlife Service	NWI Wetlands
Zoning	NRPC/Brookline	Depicts all zoning districts

Note: FIRM = Flood Insurance Rate Map; UNH = University of New Hampshire;
NH DOT= NH Department of Transportation;
NH GRANIT = New Hampshire Geographically Referenced Analysis and Information Transfer System

C. Density Calculations

The quantity of development in a Buildout Study is expressed as the number of potential new lots. This study makes the assumption that housing availability drives population growth. Thus, an accurate calculation of a realistic density factor is critical. As practiced in Brookline, two (2) residential development styles are presently allowed by the local zoning ordinance: Conventional and Open Space Subdivisions. As shown in Table 2, the average density of recently approved conventional subdivisions in Brookline is one unit per 3.02 acres. To arrive at this density factor, a survey of several recently approved subdivisions in Brookline was undertaken. First, the net buildable area is calculated by subtracting the total amount of constrained land (wetlands, floodplains, steep slopes) on a parcel being subdivided from the total area of the tract. This net developable area is then divided by the number of lots being created to arrive at the density factor. The density factor used in this Buildout Study is the average net density of several typical conventional subdivisions.

The density factor is greater than the minimum permissible lot size of 80,000 square feet (about two acres) because the odd shape of many lots, together with the presence of wetlands and other constraints, results in a "real world" density less than the minimum lot size allows. This is especially true for small conventional subdivisions, which must use the existing frontage rather than frontage created to allow for new lots, as occurs with large subdivisions.

The Brookline Zoning Ordinance anticipates that subdivisions on tracts greater than 20 acres will be developed as "open space developments", where the overall density cannot exceed one unit per 80,000 square feet, but where individual lots can be reduced to a minimum of one acre. At least 35% of the total area being subdivided must be set aside as open space. Because this development style allows the developer to place house lots on the best (unconstrained) land, the net density of open space developments more closely approximates the minimum lot size required by zoning. The density factor for open space developments is derived in the same manner as for conventional subdivisions. It is important to note that the constrained land within the protected open space is considered when calculating the net developable area.

Table 2. Average Densities of Recently Approved Conventional Subdivisions

Subdivision Name	Approval Date	Net Buildable Area (acres)*	Number of Lots Approved	Density (acres per unit)
Comeau	2002	9.5	3	3.17
Cadorette	2002	9.0	2	4.5
Bross	2002	11.0	4	2.75
David Farwell	2003	7.17	3	2.39
Gerald Farwell	2003	11.68	4	2.92
Axel	2003	4.8	2	2.40
Average Density				**3.02**

Source: Town of Brookline Planning Department.
**Net Buildable Area = gross parcel area – area of wetlands and floodplains.*

Table 3. Average Densities of Recently Approved Open Space Development Subdivisions

Subdivision Name	Approval Date	Net Buildable Area (acres)*	Number of Lots Approved	Density (acres per unit)
Beaver Woods	1999	18.6	7	2.65
Maplewood Estates	2001	27	12	2.25
Stonehouse Estates	2002	78.2	36	2.17
Castle Drive	2000	27.94	13	2.15
Glendale	2003	41.6	15	2.77
Average Density				**2.39**

Source: Town of Brookline Planning Department.
**Net Buildable Area = gross parcel area – area of wetlands and floodplains.*

D. Parcel Size Ranges and Buildout Calculations

To accommodate the differing lot densities, NRPC stratified the developable parcels by lot size in order to determine the most likely development approach. Map 2 displays the distribution of vacant land by the parcel sizes **a** (less than five acres), **b** (five to twenty acres) and **c** (greater than twenty acres) as follows:

a) Five (5) acres or less in size. Given that the average net density of conventional subdivisions is one home per 3.02 acres (see Table 2), only one home is assumed possible on vacant lots less than five acres.

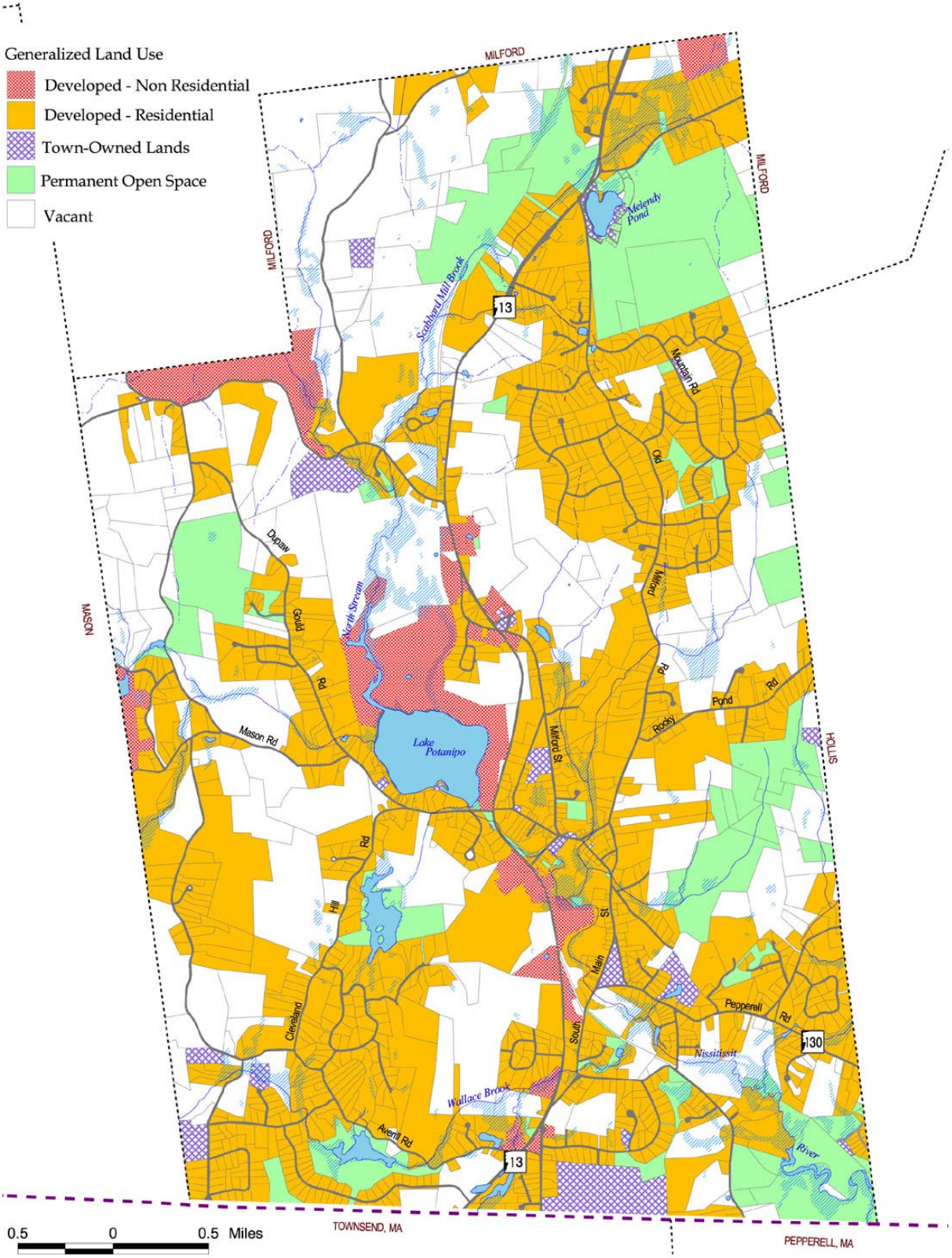
b) Greater than five (5) acres and less than twenty (20) acres. It is assumed that these parcels will be developed as conventional subdivisions in which the minimum lot size is one unit per 80,000 square feet (nearly two acres) with 200 feet of frontage. In actual practice, the net density of conventional subdivisions in this size range is one unit per 3.02 acres.

c) Twenty (20) acres and greater. The Brookline zoning ordinance assumes that parcels twenty (20) acres and greater will be developed as "open space developments". In actual practice, the average net density of open space subdivisions is one unit per 2.39 acres (see Table 3).

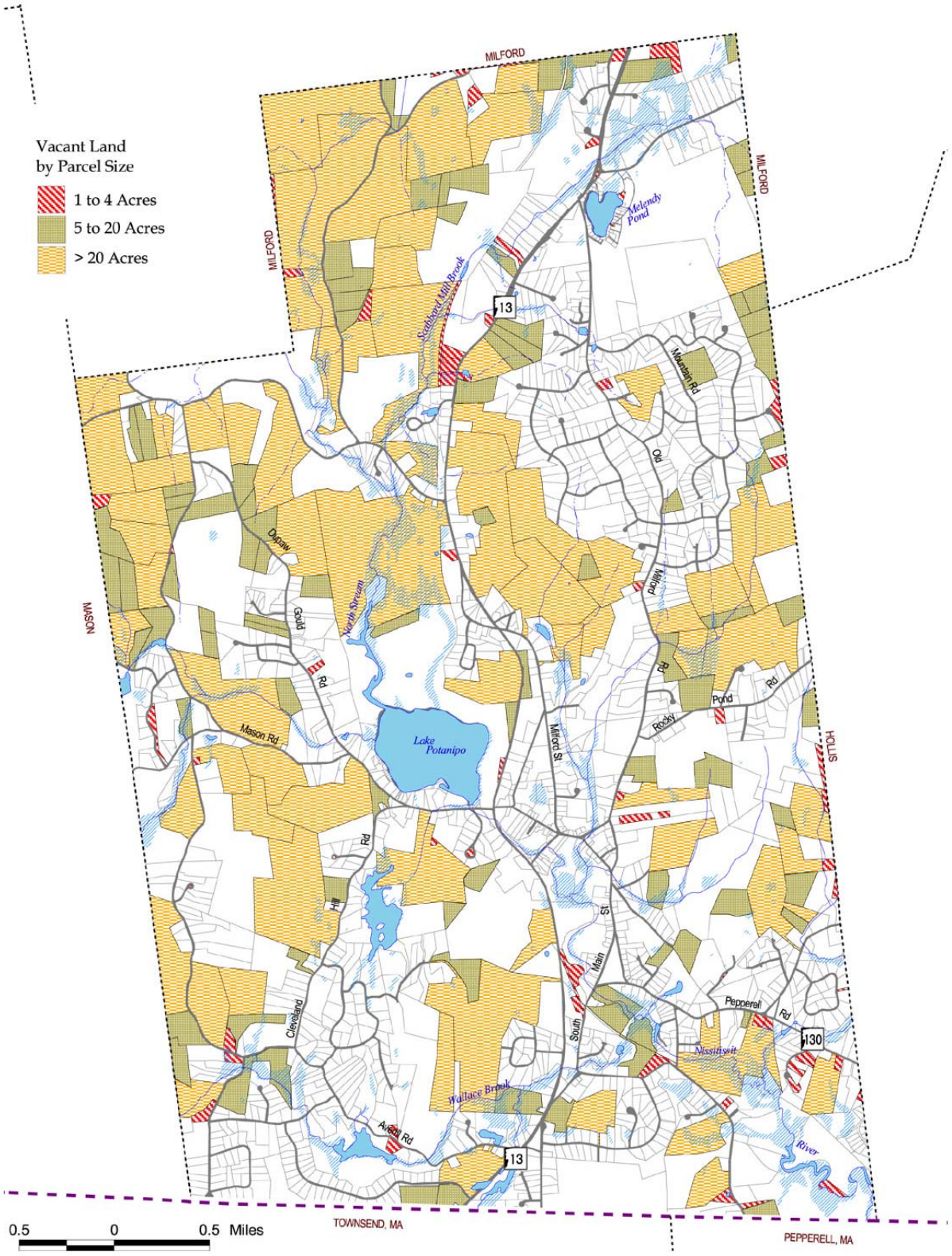
The density of industrial/commercial development on vacant and subdividable land zoned for that purpose is one unit per acre, according to the requirements of the Brookline Zoning Ordinance.

Most of the vacant land is found in parcels greater than twenty acres, with most of these located west of Route 13. The vacant land between five and twenty acres is more evenly distributed throughout the Town. The vacant parcels less than five acres are also widely distributed.

Map 1: Generalized Land Use in Brookline, 2003



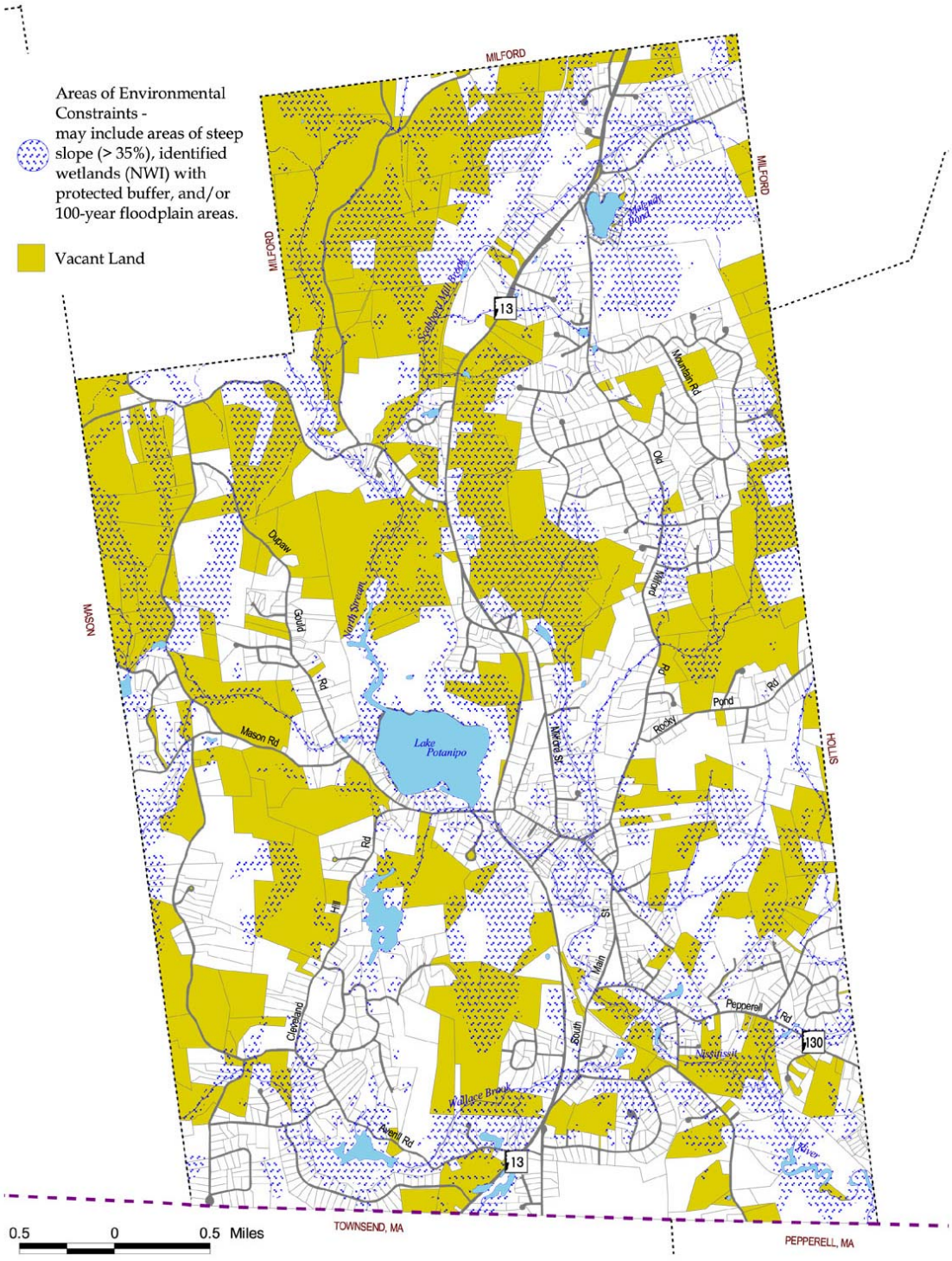
Map 2: Vacant Parcels by Acreage Value



Parcels that were considered 'underdeveloped' are those currently in some form of active use and greater than five acres in size. Given the current required minimum lot sizes in Brookline (two acres in the Residential-Agricultural district, one acre in the Industrial-Commercial district), these could conceivably be subdivided into several new lots. For parcels in the Residential-Agricultural district, two acres was subtracted from the total developable area in order to accommodate a legal lot for the existing structure. In the B zone, 1 acre was subtracted. The remaining acreage is then considered subdividable.
In addition to the above-mentioned constraints, the parcel currently occupied by Camp Tevya (Tax map E Lot 15), just north of Lake Potanipo, was removed from this analysis. The Camp property consists of approximately two hundred thirty acres, and though not currently protected, the Planning Board noted that it was unlikely development would occur on the site given the Community's interest in the property.

Finally, vacant lots less than one acre in size were also removed from the Buildout Study. Given that the Brookline Zoning Ordinance requires a two acre minimum lot size, these parcels were considered substandard and thus no future development is anticipated for these parcels.

Map 3: Environmental and Use Constraints



E. Non-Residential Square Footage

To calculate the potential future amount of commercial and industrial space, a survey of all lots in the Industrial/Commercial zoning district was undertaken. The average square feet of commercial or industrial space on these lots was found to be 5,776 square feet. That number was then multiplied by the number of new industrial/commercial lots being created to obtain the total number of potential industrial and commercial space at buildout.

II. RESULTS

Results of the Buildout Study were calculated and summarized for parcels in each size range according to whether they are zoned Residential/Agricultural (R) or Industrial/Commercial (I/C) and additionally for the entire town. Tables 4, 5 and 6 summarize the potential number of new residential and industrial/commercial lots for the study area by Zoning district. The two zoning districts are treated separately because of their different minimum lots size requirements; one acre for industrial/commercial and approximately two acres for residential.

A. Parcels between one and five acres in size

As indicated in Table 4, there are 40 vacant parcels between one and five acres that are zoned residential in Brookline. These 40 parcels total 103.4 acres, of which 16.8 acres are constrained (wetlands, steep slopes and floodplains, 10% for roads), leaving 86.6 net developable acres. Applying a density of one lot per 3.0 acres results in an estimate of 29 potential new lots on parcels between one and five acres in size.

There are 4 vacant parcels between one and five acres that are zoned industrial/commercial. These parcels total 10.6 acres, of which 1.5 acres are constrained, resulting in a net developable area of 9.1 acres. The potential Buildout of industrial/commercial lots for parent parcels of less than 5 acres is therefore 9 new lots.

Table 4. Parcels between one and five acres

Development Status	Zoning	# of Parcels	Total Parcel Acres	Constrained Land (acres)	Net Developable Area	Lot Density Factor	Potential New Lots
Vacant	R	40	103.4	16.8	86.6	3.0	29
	I/C	4	10.6	1.5	9.1	1.0	9
DEV	R	0	0.0	0.0	0.0	3.0	0
NONRES	I/C	0	0.0	0.0	0.0	1.0	0
DEV	R	0	0.0	0.0	0.0	3.0	0
RES	I/C	0	0.0	0.0	0.0	1.0	0
Totals	**R**	**40**	**103.4**	**16.8**	**86.6**	**3.0**	**29**
	I/C	**4**	**10.6**	**1.5**	**9.1**	**1.0**	**9**

B. Parcels between five and twenty acres in size

There are 84 vacant parcels, one (1) non-residential parcel and 128 developed but subdividable parcels, for a total of 213 parcels zoned for residential use in Brookline. Looking at the totals row at the bottom, it can be seen that these 213 parcels account for 2,036 acres, of which 258 acres are built upon and 497.4 acres are constrained, leaving a net developable area of 1,281.2 acres. Since subdivisions for this size range of parent parcel will be conventional subdivisions, that number is then divided by three (3) to arrive at 427 - the potential number of new lots.

For land zoned industrial/commercial, there are 3 vacant parcels, 6 parcels developed with a non-residential use and 0 lots developed with a residential use, for a total of 9 parent parcels between 5 and 20 acres. These 9 parcels represent 81.6 acres, of which 6 acres are built upon and 15.3 acres are constrained, leaving a net developable area of 60.3 acres. Applying a density factor of one lot per acre, there are a total of 60 potential new commercial/industrial lots on parent parcels between five and twenty acres in size.

Table 5. Parcels between five and twenty acres in size

Development Status	Zoning	# of Parcels	Total Parcel Acres	Built Upon Acres	Constrained Land (acres)	Net Developable Area	Lot Density	Potential New Lots
Vacant	R	84.0	910.3	0.0	267.1	643.2	3.0	214
	I/C	3.0	20.3	0.0	1.9	18.4	1.0	18
DEV	R	1.0	8.4	2.0	3.1	3.3	3.0	1
NON RES	I/C	6.0	61.3	6.0	13.4	41.9	1.0	42
DEV	R	128.0	1,117.9	256.0	227.2	634.7	3.0	212
RES	I/C	0.0	0.0	0.0	0.0	0.0	1.0	0
Totals	**R**	**213.0**	**2,036.6**	**258.0**	**497.4**	**1,281.2**	**3.0**	**427**
	I/C	**9.0**	**81.6**	**6.0**	**15.3**	**60.3**	**1.0**	**60**

C. Parcels greater than twenty acres in size

The last category of residentially-zoned parcels to be considered are those over twenty acres in size. The residentially-zoned vacant parcels in this size category will most likely be developed as open space subdivisions, as required by Brookline's zoning. Because an open space subdivision design often allows an applicant to make the best use of developable land, the net density of open space subdivisions more closely approximates Brookline's minimum residential lot size.

There are 67 vacant parcels, two (2) non-residential parcels and 23 developed but subdividable parcels, for a total of 92 parent parcels over twenty acres in size that are zoned residential in Brookline. Looking at the totals row at the bottom, it can be seen that these 92 parcels account for 4,406.8 acres, of which 50.2 acres are built upon and 1,596.4 acres are constrained, leaving a net developable area of 2,760.4 acres. Since subdivisions on this size of parent parcel will be open space development subdivisions, that number is then divided by a density factor of 2.4 to arrive at the potential number of new lots, which in this case is 1,150.

It is important to note that a significant amount of permanently protected open space will be generated by the development of these 4,406.8 residentially zoned acres. The Brookline Zoning Ordinance requires that 35% of the gross parcel area of parent parcels over twenty acres be preserved as open space when an open space development is undertaken. This equates to 1,542.4 acres of open space, which should help to further the goal of connecting large parcels of open space that have been purchased by the Town and preserved in open space subdivisions over the last few years.

For land zoned industrial/commercial, there are five (5) vacant parcels, 0 parcels developed with a non-residential use and one (1) lot developed with a residential use, for a total of six (6) parent parcels greater than 20 acres. These 6 parcels represent 103.4 acres, of which 1 acre is built upon and 15.3 acres are constrained, leaving a net developable area of 62.3 acres.

Applying a density factor of one lot per acre, there are a total of 62 potential new commercial/industrial lots on parent parcels greater than twenty acres in size.

Table 6. Parcels greater than twenty acres in size

Development Status	Zoning	# of Parcels	Total Parcel Acres	Built Upon Acres	Constrained Land (acres)	Net Developable Area	Lot Density	Potential New Lots
VAC	R	67.0	3,443.2	0.0	1,322.0	2,120.3	2.4	883
	I/C	5.0	82.7	0.0	28.5	54.2	1.0	54
DEV NONRES	R	2.0	58.7	4.0	24.8	29.9	2.4	12
	I/C	0.0	0.0	0.0	0.0	0.0	1.0	0
DEV RES	R	23.0	904.9	46.0	248.7	610.2	2.4	254
	I/C	1.0	20.7	1.0	11.6	7.1	1.0	8
TOTAL	**R**	**92.0**	**4,406.8**	**50.2**	**1,596.4**	**2,760.4**	**2.4**	**1,150**
	I/C	**6.0**	**103.4**	**1.0**	**40.1**	**62.3**	**1.0**	**62**

D. Entire Town/Overall Results

Table 7 summarizes the Buildout results for the Community level. The total number of potential new residential lots in Brookline at Buildout is estimated at 1,606. The total number of new industrial/ commercial lots is 132. As Brookline now (2003) has approximately 1,478 dwelling units, total Buildout will mean a total of about 3,084 dwelling units.

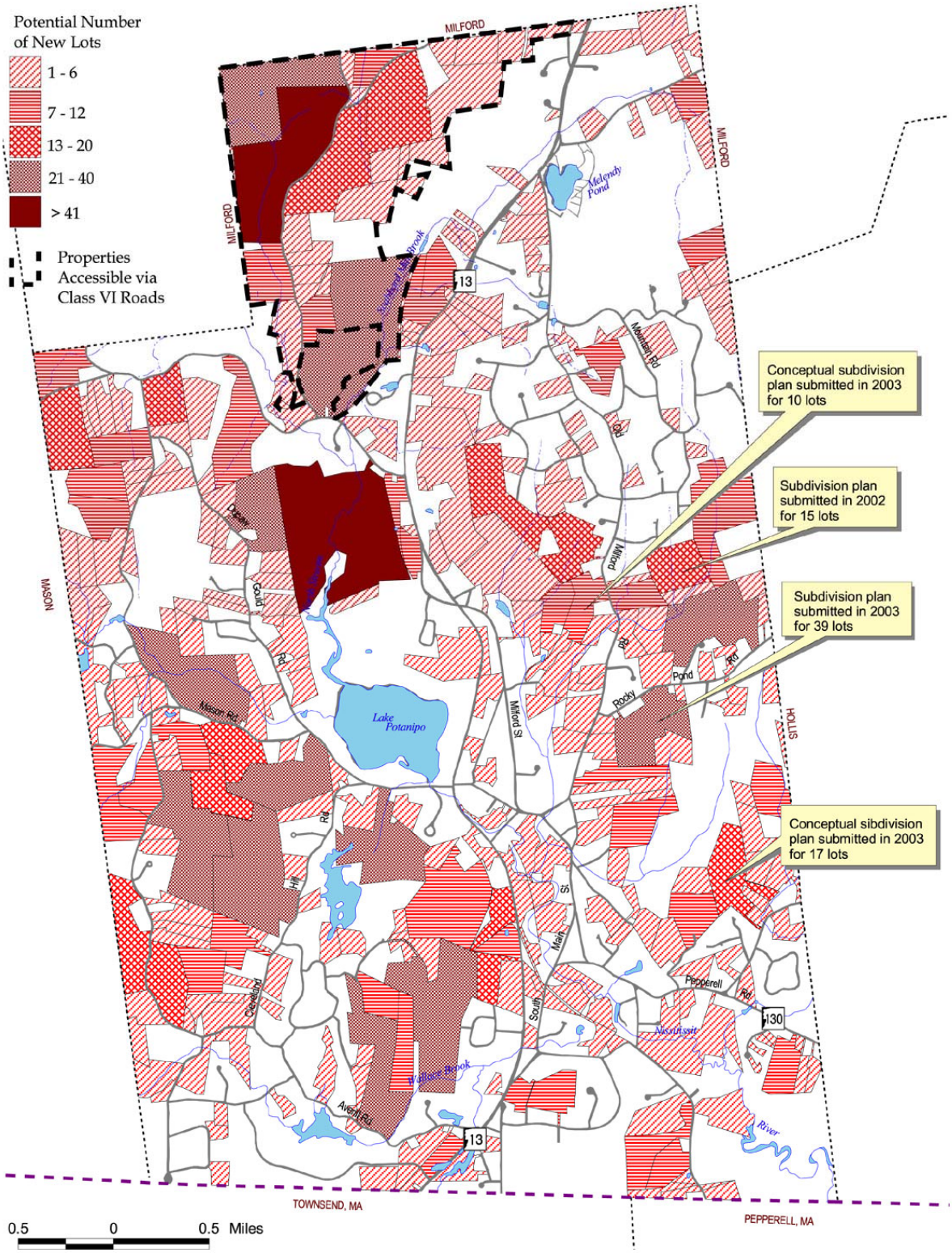
The average amount of commercial and industrial space on lots zoned for these uses is 5,776 square feet per acre. Therefore, full Buildout could generate an additional 762,432 square feet of commercial and industrial space in Brookline. This amount of new commercial and industrial development should help to generate jobs and enhance Brookline's tax base in the years to come.

Map 4, on the following page, shows the location of these potential new lots throughout Brookline on all classes of parent parcels. The darker the shading, the greater the potential number of new lots. The largest potential subdivisions appear to be located west of Route 13, which bisects the Town from north to south. Much of the developable land in far northwestern Brookline is presently only accessible from Hutchinson Hill Road, a Class 6 road. This land, though unlikely to be developed in the very near future, will likely become more attractive to developers once the more accessible land in Brookline has been used up.

Table 7. Total Potential New Lots for Town of Brookline

Development Status	Zoning	# of Parcels	Total Parcel Acres	Built Upon Acres	Constrained Land (acres)	Net Developable Area	Potential New Lots
Vacant	R	191.0	4,456.9	0.0	1,608.8	2,850.1	1,127
	C/I	12.0	113.6	0.0	31.9	81.7	
DEV	R	3.0	67.1	6.0	27.9	33.2	14
NONRES	C/I	6.0	61.3	12.0	13.4	35.0	42
DEV	R	151.0	2,022.8	302.0	475.9	1,244.9	466
RES	C/I	1.0	20.7	2.0	11.6	7.1	8
Totals	**R**	**345.0**	**6,546.8**	**308.0**	**2,110.6**	**4,128.2**	**1,606**
	C/I	**19.0**	**195.6**	**14.0**	**56.9**	**124.7**	**132**

Map 4: Buildout Potential by Number of New Lots



III. ANALYSIS AND CONCLUSIONS

A. Estimated Time to Buildout

This Buildout Study estimates that an additional 1,606 homes are possible in Brookline's future. As there are about 1,478 homes in Brookline today (2003), it appears that Brookline is roughly halfway to its full buildout potential of 3,084 homes. At the present rate of development, it will take several decades for Brookline to reach full buildout.

As seen in Table 8, an average of 44 permits for new homes were issued each year from 1993 – 2003. This represents a decade average growth rate of 3.6%, somewhat higher than the 3% target growth rate of Brookline's growth management ordinance. If this rate of growth is extended outward in a linear progression, it will take 36.5 years for Brookline to reach full buildout. This means that Brookline will likely achieve buildout in the year 2039 or thereabouts.

Table 8. Number of Dwelling Units and Target Number of Permits, 1993 - 2004

Date	Permits Issued Year to Date	Total Number of Dwellings	% Change Over Previous	Target Number of Building Permits	Target Number of Dwellings
1993	58	1,056		-	
1994	46	1,102	4.4%	32	1,088
1995	41	1,143	3.7%	33	1,120
1996	59	1,202	5.2%	34	1,154
1997	49	1,251	4.1%	36	1,189
1998	41	1,292	3.3%	38	1,224
1999	40	1,332	3.1%	39	1,261
2000	35	1,367	2.6%	40	1,299
2001	44	1,411	3.2%	41	1,338
2002	32	1,443	2.3%	42	1,378
2003	35	1,478	2.4%	43	1,419
2004				44	1,462
Totals	**480**		**34.2%**	**422**	
Averages	**44**		**3.6%**	**38**	**3%**

B. Brookline's Future Population

In 2000, Brookline had an average of 3.11 persons per household according to the United States Census. This was the highest number of persons per household for towns in the Nashua planning region. In fact, Brookline was the only town where the number of persons per household increased from 1990 – 2000. It is therefore probably safe to assume that the number of persons per household will likely remain close to 3.11 over the years that Brookline proceeds towards buildout.

Brookline's population in 2000, according to the US Census, was 4,181. By 2003, the Town's population is estimated to have increased by nearly 10% to 4,597, due to the growth in housing units since 2000. By 2035, given the above assumptions, Brookline will nearly double to 8,975 people. The population at full buildout of 3,084 units would be 9,591.

Because Brookline's Growth Management Ordinance limits the number of new homes that can be built in approved subdivisions each year, there will be a gap of several years between the time the "last" subdivision is approved and the "final" home is constructed and occupied. Therefore, it is possible that new homes may still be constructed several years past the estimated Buildout year of 2039 or 2040.

Table 9. Estimated Number of dwelling Units and Population Change, 2000 – Buildout

Year	Number of Dwelling Units	Percentage Increase	Population	Percentage Increase
2000	1,367		4,181	
2003	1,478	8.1%	4,597	9.9%
2010	1,786	20.8%	5,554	20.8%
2015	2,006	12.3%	6,239	12.3%
2020	2,226	11.0%	6,923	11.0%
2025	2,446	9.9%	7,607	9.9%
2030	2,666	9.0%	8,291	9.0%
2035	2,886	8.3%	8,975	8.3%
2040	3,106	7.6%	9,660	7.6%

C. Potential Impacts of Buildout on Brookline's Capital Facilities and Municipal Services

All of this additional growth will have an impact on Brookline's capital and municipal facilities. At buildout, Brookline could have 4,995 more people than it does in 2003. The impact of that growth on the towns infrastructure, including roads, schools and emergency services, could be enormous. The good news is that this end state is at least several decades away, perhaps as many as four decades away (2040). The Town's growth management ordinance is helping to ensure that growth proceeds at an even pace and helps the Town to plan for that growth. Still, over time, the impact will be felt and its not too soon for Brookline to start preparing for its needs at buildout.

1,606 additional housing units could generate approximately 1,188 new school aged children, assuming a multiplier of 0.74 students per household, which is the present multiplier. To obtain this multiplier, the current number of Brookline students grades K-12 (1,097), is divided by the 1,478 housing units existing as of 2003. The potential number of students at buildout is roughly double the number of students in the school system now.

A built out Brookline could generate approximately 3,212 additional motor vehicles registered to Town residents, assuming two cars per household. This would impact the highway department as well as the Police and Fire Departments.

D. Addressing the Impacts of Development

The Town can begin to address the impacts of future development by: 1) keeping its Capital Improvements Plan up to date; 2) by implementing an impact fee schedule addressing residential development; and 3) by considering revisions to its land use ordinance and regulations. The Town is already undertaking some of these steps through its Selectmen and Planning Board.

In 2002, the Town updated its Capital Improvements Plan for the first time in many years. The Capital Improvements Committee (CIC) is completing annual updates that consider capital facilities planning over the next six to ten years. The Planning Board is in the process of adopting an impact fee schedule. The Planning Board is also participating in a study of "Smart Growth", which may suggest manners in which the land use ordinance and regulations can be amended to better accommodate the anticipated growth.

As part of its long-range planning efforts, the Brookline Board of Selectmen has started a subcommittee known as the Facilities Study Committee to perform an in depth assessment of the state of the towns buildings and tangible assets. The Facilities Study Committee also works closely with the CIC and

various boards and departments of the Town in developing its recommendations. Because a great deal of Brookline's vacant and subdividable land is located in presently remote areas off Class 6 roads, the Selectmen and Planning Board may want to develop an official policy on Class 6 roads and their conversion to Class 5 roads.

The most important immediate next step might be for the Planning Board to share this report with every board and department of the Town, and ask them for their input on how a built out Brookline could affect their operations. In this way, the Selectmen, Planning Board, Facilities Study Committee and Capital Improvements Committee can coordinate their efforts with each other and the general public. Once the potential impacts of buildout are clearly understood, rational action can be taken to meet the challenge.

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