

Build-out Analysis

**Performed for the
Jackson, New Hampshire
Planning Board**



By North Country Council, Inc.

The Cottage at the Rocks

107 Glessner Road

Bethlehem, NH 03574

April 10, 2014

Purpose

This build-out analysis was performed by North Country Council Inc. in response to a request by the Jackson, New Hampshire Planning Board as a step in the update of the town's master plan. The goal of the project was to estimate the town's potential growth and development under existing zoning.

The build-out analysis is a tool for considering the consistency between the community's vision for the future and the current regulatory environment. The term "build-out" is a planning reference to a hypothetical calculation of the maximum development allowed under existing regulations.

The results of the build-out analysis provide a basis for community discussions about the future, such as:

- How will the potential growth affect the character of the community and its landscape?
- Are there areas where a lower density of development would better balance community and landowner interests?
- Are there areas where concentrated development will support community goals?
- What additional facilities and services would be required to serve the needs of future residents?

A build-out analysis is a model for calculating development potential. This build-out analysis estimates potential development in Jackson under current zoning. It is predicated on certain assumptions which are outlined in this report. A different set of assumptions would have a different result. A build-out analysis, unless performed lot by lot, also relies on many generalizations. The underlying assumption is that factors which may bias the numbers in one direction or the other balance out, and that presenting the numbers aggregated for larger areas of the community also balances out irregularities associated with data collected on smaller geographic areas.

Timing is not relevant to the build-out analysis as it is assumed that time is condensed to allow all possible development to occur today. A build-out analysis assumes that all forest and agricultural land not currently protected with a conservation easement, or ownership by a governmental or conservation organization, is eventually developed to the fullest extent allowed by existing zoning. It is also assumed that willing landowners obtain lot line adjustments over time to enable the land to achieve the maximum density possible under the zoning.

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The build-out analysis holds at today's conditions factors such as demographics, technology, municipal infrastructure and other variables that may affect development patterns.

Data Sources

This analysis utilized existing data layers available from the town and state as follows:

- Town GIS parcel shapefile and assessors' database file
- Soil Survey Geographic Database for New Hampshire, Natural Resources Conservation Service
- Digital Flood Insurance Rate Maps, Federal Emergency Management Agency
- New Hampshire Hydrography Dataset, US Geological Survey, US Environmental Protection Agency, Complex Systems Research Center, and NH Department of Environmental Services
- NHDOT road centerlines

Methodology and Assumptions

North Country Council used its geographic information system (GIS) and data layers available through the town and GRANIT, the state's GIS clearinghouse located at UNH Complex Systems Research Center, to develop the geodatabase utilized for the analysis. Each of the GIS data layers, as well as assumptions used in the analysis, is outlined below. The GIS software used was ESRI ArcGIS ArcMap v.10.2. Spreadsheet analysis was performed using Microsoft Office Excel 2007.

1. Surface Water

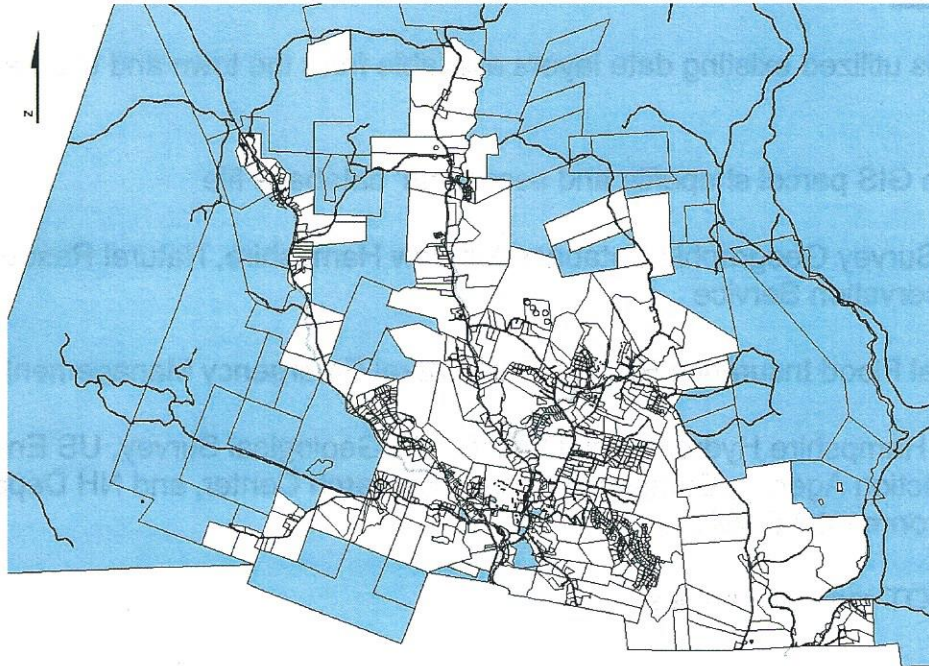
Surface water was excluded from the calculation of developable land utilizing the soil survey and town's GIS parcel layer.

2. Roads

Existing road rights-of-way were excluded from the calculation of developable land utilizing the town's GIS parcel layer.

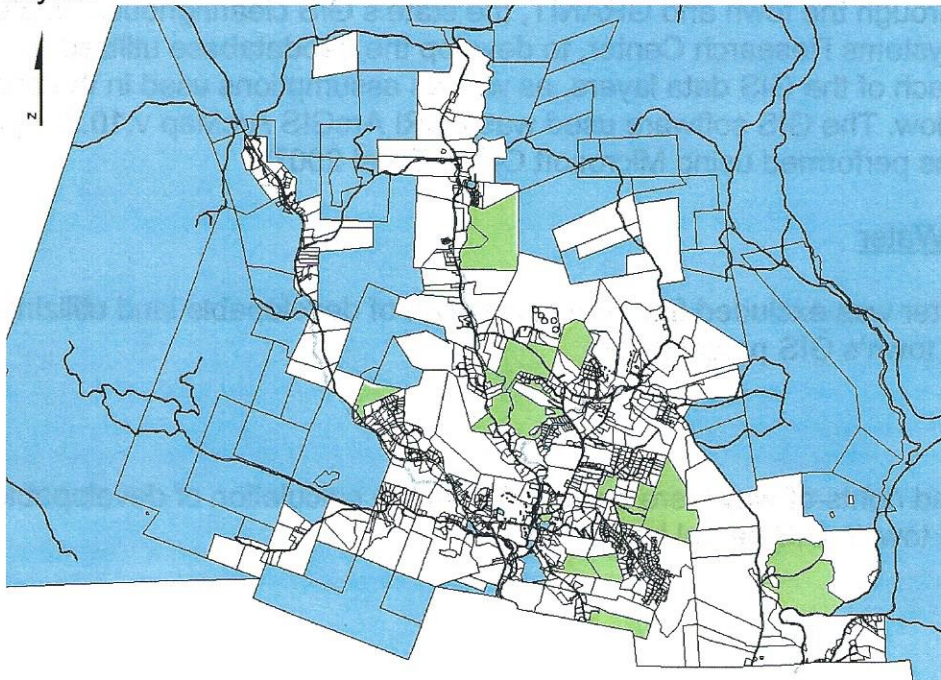
3. Tax Exempt Land

Federal, state and municipally exempt land shown in blue on the map below was excluded from the land considered to be available for development. It is assumed that facilities can expand on this land already owned by the public as the community grows and with it the need for services.



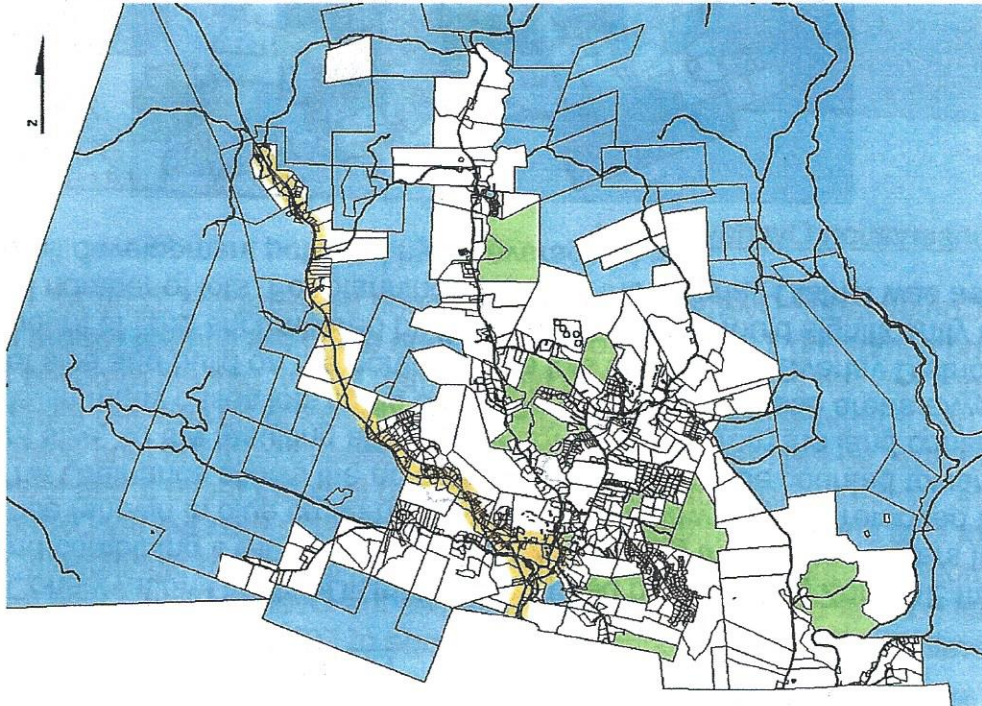
4. Conserved Land

Conserved land was identified from several sources: the town, Upper Saco Valley Land Trust, and GRANIT. Conserved land shown in green on the map below was excluded from the analysis.



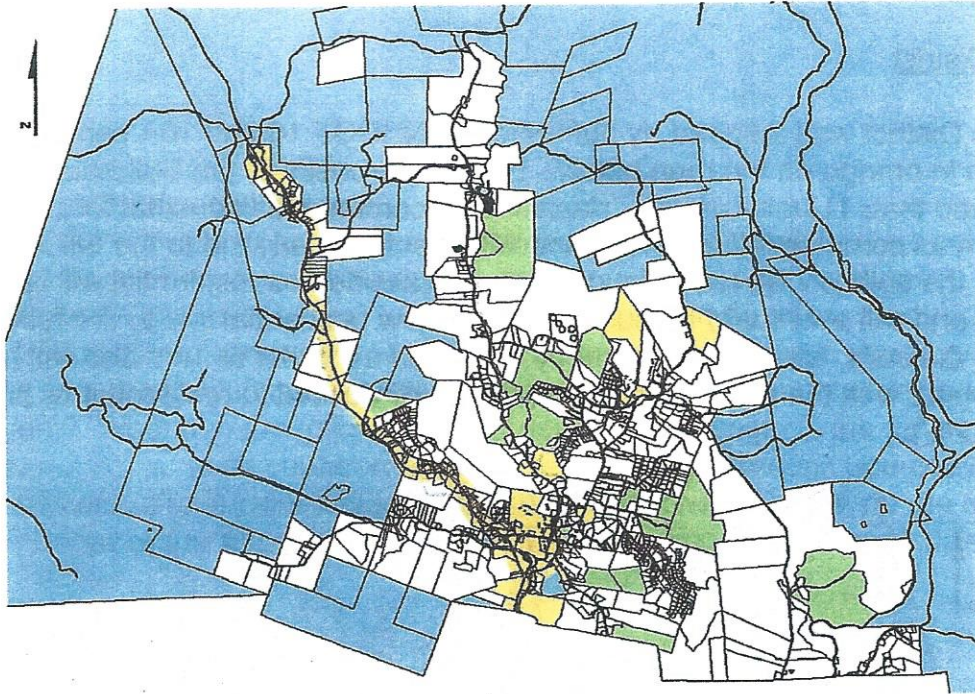
4. Village District

The Village District was mapped by buffering the NHDOT 16 and 16A centerlines 500 feet (shown in orange on the map below). For the purposes of the Build-out Analysis, it was assumed that: 1) land currently classified as commercial/industrial for tax purposes will continue as commercial/industrial, and will eventually expand to the fullest extent enabled by the soils on the lot; 2) land currently classified as residential will remain residential, and will eventually be subdivided for new residential lots to the fullest extent enabled by the soils; and 3) land currently classified as forest or farmland will become fully developed, with the same ratio of commercial/industrial to residential as is the case today (22.12%).



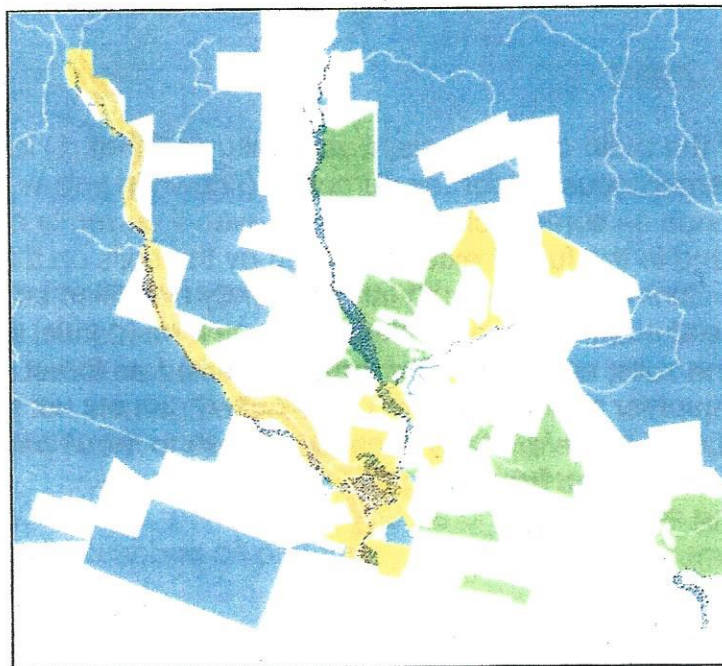
5. Rural Residential District

For the purposes of the Build-out Analysis, it was assumed that: 1) land currently classified as commercial/industrial for tax purposes (shown in yellow on the map on the next page) will continue as commercial/industrial – even if currently non-conforming – and eventually expand to the fullest extent enabled by the soils on the lot, as allowed by Section 2.2.4 of the Zoning Ordinance; 2) land currently classified as residential land will remain residential, and eventually be subdivided for new residential lots to the fullest extent enabled by the soils; and 3) land currently classified as forest or farmland will become fully developed for residential use. Land-locked parcels not presently developable are counted in the analysis because access to those parcels could theoretically be obtained in the future.



6. River Conservation Overlay District

The River Conservation Overlay District was mapped by extracting Zone AE from the DFIRMS and combining it with a 75 foot buffer zone along the surface waters listed in the Ordinance (shown in blue cross-hatching on map below; parcels removed to aid in viewing). The Ordinance allows the acreage in this District to be counted toward the minimum lot size, so the resulting areas were not excluded from the land considered developable. In many cases lots could be configured to count these areas toward the minimum lot size and build on the portion of the lots outside the Overlay District. In other lots, the amount of land encumbered by the overlay district would significantly reduce the potential number of lots. For planning purposes the Overlay District was assumed to reduce overall development potential by an average of 50%.



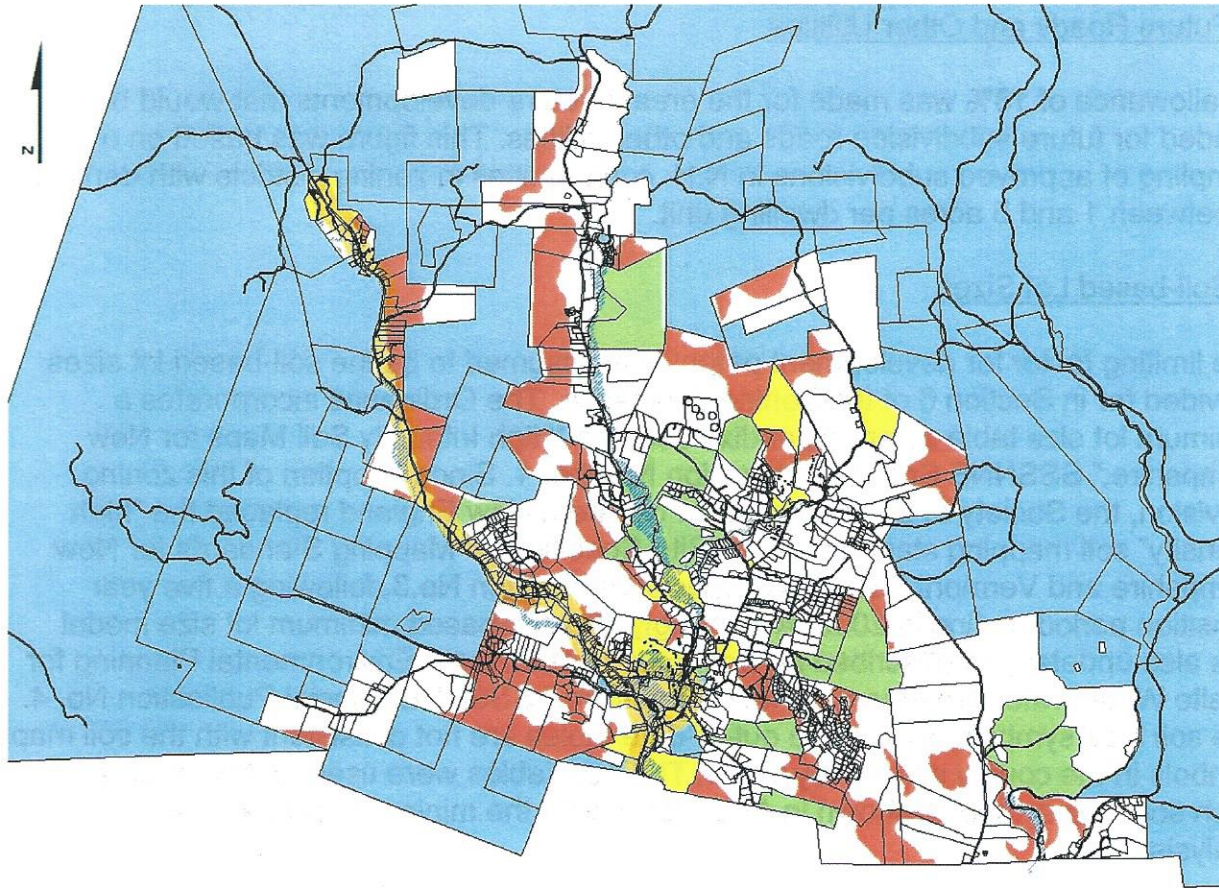
7. Future Roads and Other Utilities

An allowance of 18% was made for the area in future developments that would be needed for future subdivision roads and other utilities. This figure was based on a sampling of approved subdivisions in N.H. communities in zoning districts with densities of between 1 and 5 acres per dwelling unit.

8. Soil-based Lot Sizes

The limiting factor for development potential is assumed to be the soil-based lot sizes provided for in Section 6 of the Zoning Ordinance. The Ordinance incorporates a minimum lot size table as an appendix based on "High Intensity Soil Maps for New Hampshire," SSSNNE Special Publication Number 1. Since adoption of this zoning provision, the Society of Soil Scientists of Northern New England replaced the "high intensity" soil mapping standards with "Site-Specific Soil Mapping Standards for New Hampshire and Vermont," SSSNNE Special Publication No.3, following a five year transition period ending in 2002. Accordingly, the soil-based minimum lot size model was also updated, as described in "Soil Based Lot Sizing – Environmental Planning for Onsite Wastewater Treatment in New Hampshire," SSSNNE Special Publication No. 4. The soil type symbols used in the out-of-date tables are not consistent with the soil map symbols in the county soil survey maps. The new tables were used for this analysis. Each soil map symbol is shown in Appendix A with the minimum lot size used for this analysis.

Some soil map symbols found in the Jackson portion of the NRCS Soil Survey Geographic Database for New Hampshire were not listed in the minimum lot size tables contained in "Soil Based Lot Sizing – Environmental Planning for Onsite Wastewater Treatment in New Hampshire," SSSNNE Special Publication No. 4. In these cases the area for the most similar soil type was used. For soil complexes, the soils were assumed to be present in equal proportions. (For most soil complexes the minimum lot size was the same for each component.) For undevelopable soils, listed as NA in the tables, a minimum lot size of 999,999,999 sq. ft. was used in order to produce an insignificant result. These soils are shown in red on the map on the following page.



9. Data Limitations

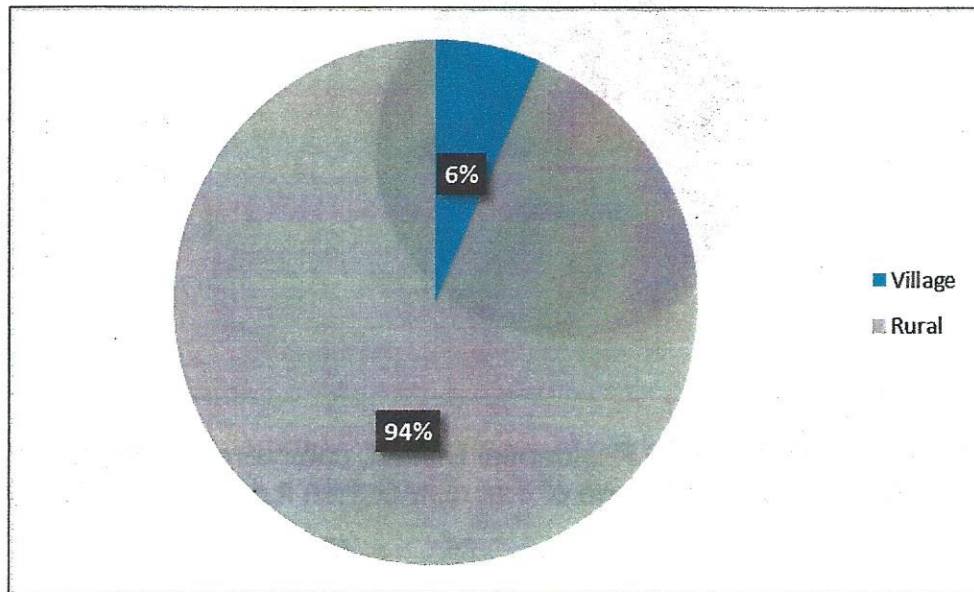
The town's GIS parcel shapefile and NRCS soil types layer are slightly misaligned. Because it is fairly uniform around the edges of town, this error was not considered to affect the results significantly.

Some parcels in the town's tax map shapefile did not have a corresponding entry in the assessors' data and so had no information on existing land use. Some were identified as land supporting condominium development. Polygons without data were treated as residential.

It should also be noted that linking soil-based development capacities with particular tax map parcels is based on the assumption that the differences between the county soil surveys and onsite soil mapping would even out across larger areas. It is done here only to assist the community with long range community planning.

Residential Build-out Results

Using the data sources, assumptions and methodology described above, the number of dwelling units that could exist in Jackson under the March 13, 2012 Zoning Ordinance at full build-out was estimated to be 3,380. This figure represents 205 units in the Village District and 3,175 in the Rural Residential District. (See Appendix B for detailed results.)



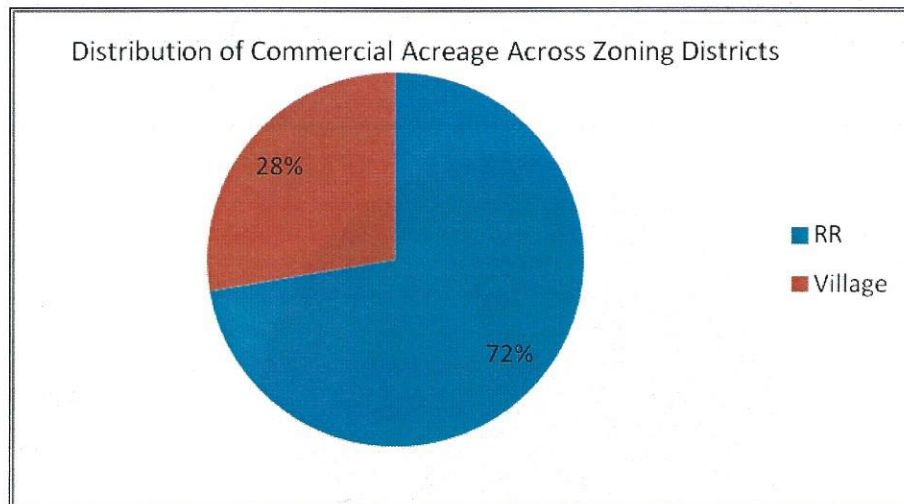
The 2010 US Census reported 816 Jackson residents living in 399 dwelling units, 570 seasonal units, and 40 vacant units, for a total of 1009 dwelling units. If we assume the same proportion of year-round homes (0.395) and the same household size (2.045) at build-out, this would mean an eventual year-round population of 2,730 living in 1,335 homes. For comparison, Bartlett had 2,788 residents in 2010, living in 1,307 of 4,115 total housing units (2,691 were seasonal) (2010 US Census).

	Jackson 2010	Jackson at Build-out	Bartlett 2010
Year-round Households	399	1,335	1,307
Population	816	2,730	2,788
Total Number of Dwelling Units	1,009	3,380	4,115

Demographers and economists studying growth trends in New Hampshire both expect the state to remain in a slow growth period for the foreseeable future. A recent population projection conducted for the state's regional planning commissions estimated that the year-round population of Carroll County will grow by 15% between 2010 and 2040.

Commercial/Industrial Build-out Results

When grandfathered parcels are taken into account, the commercial/industrial acreage in the Rural Residential District is substantially larger than that in the Village District.



Due to the larger size of the Rural Residential District, commercial/industrial land represents a much smaller percentage of that district than it does the Village District.

	RR	Village	Total
Commercial Acreage	379	145	524
Total Acreage	8801	553	9354
%	4.3%	26.2%	5.6%

A comparison of current commercial/industrial square footage with potential square footage is not enabled by the soil-based lot size zoning. An alternative approach was used to estimate the total potential wastewater loading utilizing the formula in Section 6.1.5 of the Zoning Ordinance. The Ordinance provides that the required lot size is equal to the maximum gallons of wastewater discharge per day divided by 1837, multiplied by the lot size contained in the table for residential lot size. In this case, the lot size is known, so the following formula was applied to commercial lands to determine potential loading:

$$\text{potential loading (gpd)} = (1837 \times \text{square feet}) / \text{soil-based minimum lot size}$$

Using this approach, it is estimated that the loading capacity of the soils in the Rural-Residential District on properties already in commercial/industrial use is 413,018 gallons per day. This does not include any reduction for the River District or accesses and other utilities (because subdivisions are not required), but instead assumes the capacity of the soils is maximized.

The loading capacity of lands in the Village District currently classified as being in commercial/industrial use is estimated as 194,823 gallons per day. If we assume that the loading capacity of land currently classified as forest or farmland for tax purposes in the Village District is used in the same ratio of commercial/industrial to residential as is

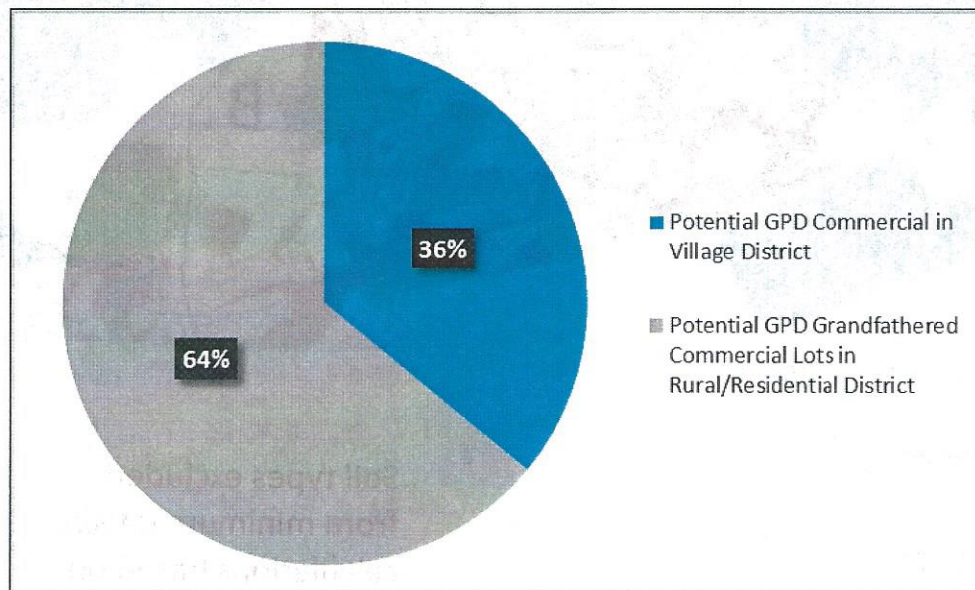
the case today (22.12%) this adds another 7,981 gallons per day. Alternatively, if we assume that all of the undeveloped land in the Village District is developed for nonresidential use, that adds another 36,925 gallons per day of capacity to the Village District, for a total of 231,748 gallons per day in the Village District.

To understand what these figures might mean in terms of various land uses, some example design flows are shown below.

Use	Design Flow – Gallons Per Day
Apartment – 1 Bedroom	225 GPD
Apartment – 2 or more Bedrooms	150 GPD/Bedroom
Bed & Breakfast	60 GPD/Guest + 10 GPD/Employee
Day Care Center	10 GPD/Person
Doctor's Office	250 GPD/Dr.
Food Service – Eat-in	40 GPD/Seat + 35 GPD/Employee
Hairdresser	150 GPD/Chair + 35 GPD/Employee
Hotel – 1 doublebed per room	100 GPD/Room + 10 GPD/Employee
Hotel – more than one bed per room	200 GPD/Room + 10 GPD/Employee
Office Building without cafeteria	15 GPD per employee
Recreation Facility with showers	10 GPD/person

(Source: New Hampshire Code of Administrative Rules Chapter Env-Wq 1000 Subdivision and Individual Sewage Disposal System Design Rules)

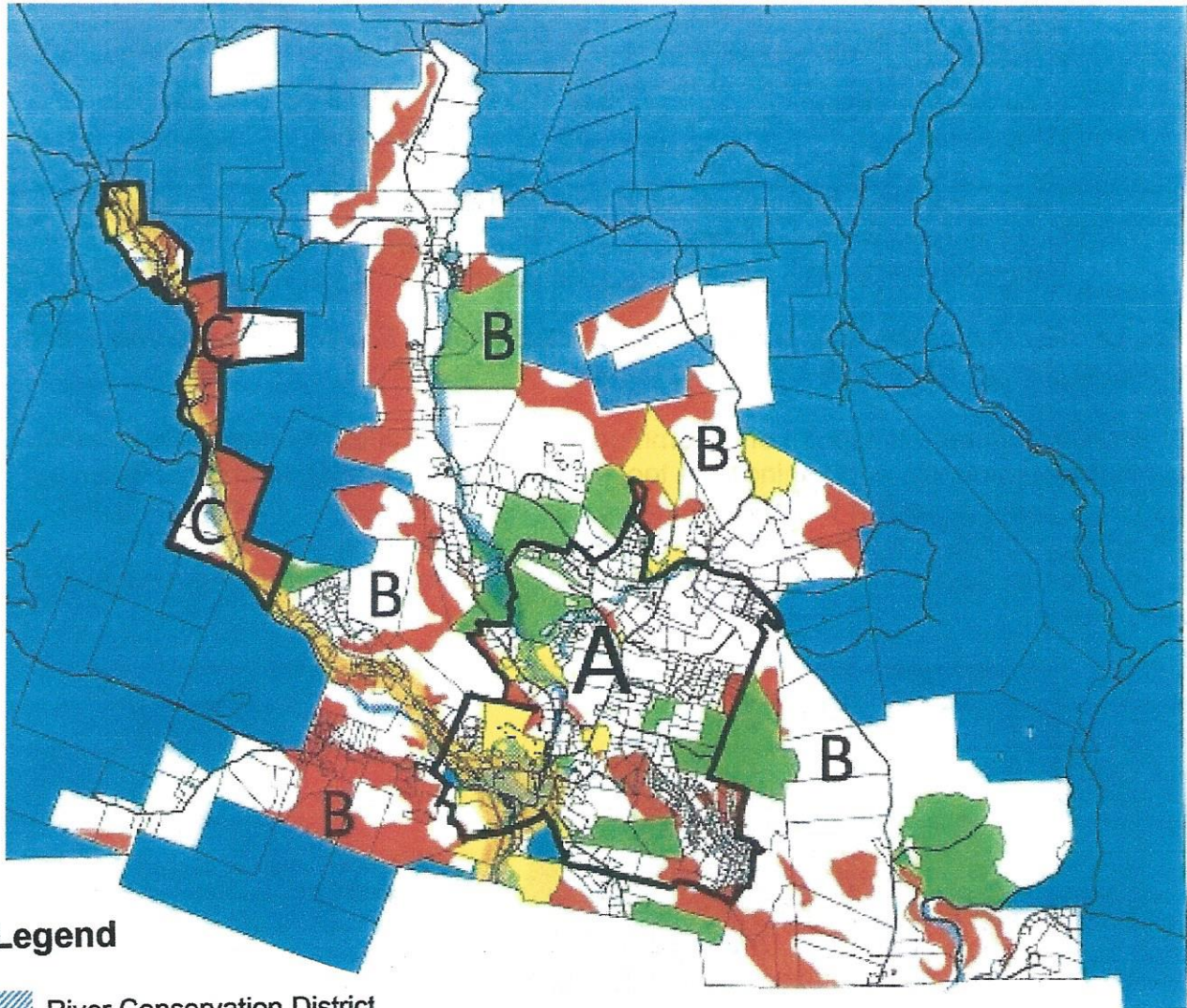
Of interest from the standpoint of accommodating various types of future development within the community, and zoning as a tool for steering that growth to areas desired by the community, is the fact that the estimated nonresidential development potential of grandfathered lots in the Rural/Residential District is substantially larger than the nonresidential development potential of the Village District itself (under the assumptions used herein).








Comparing Results Across Town

As a final step, the town was divided into three study areas and the development potential for each was compared. Tax maps numbers were used to establish the three data sets as shown below.

Subarea	Tax Maps
A	All Village ("V") Tax Maps
B	All "R" Tax Maps Except R8 & R9
C	Tax Maps R8 & R9



Legend

-  River Conservation District
-  Village District
-  Public Lands
-  Conservation Easement
-  Existing Commercial Use

Soil types excluded
from minimum lot size
calculations based on
drainage or slope
shown in red.

At build-out, under the current zoning and assumptions outlined earlier, about three-quarters of the residential units in the Village District would be located outside the town center along Route 16. In the Rural Residential District, about four-fifths of the residential units would be located outside the town center.

Distribution of Potential Residential Units at Build-out

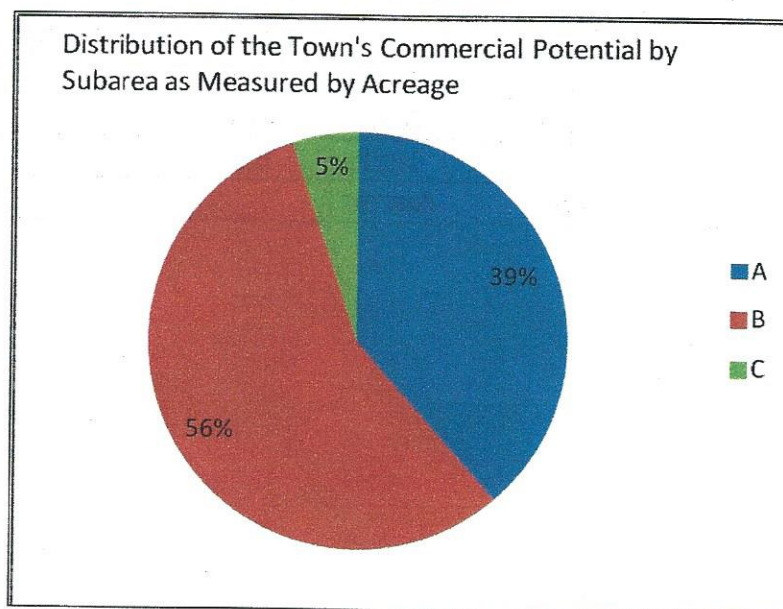
Zoning District	Subarea A	Subarea B	Subarea C
Village	51	73	81
Rural Residential	626	2269	280

Another way to compare residential development patterns is to look at the density of development. The average lot size below represents the unconsevered privately owned acreage estimated to be in residential use divided by the estimated number of units. As shown, the highest density of residential development is estimated for the Village District in the town center (Subarea A) and the lowest for the portions of Subareas B and C that are zoned Rural Residential.

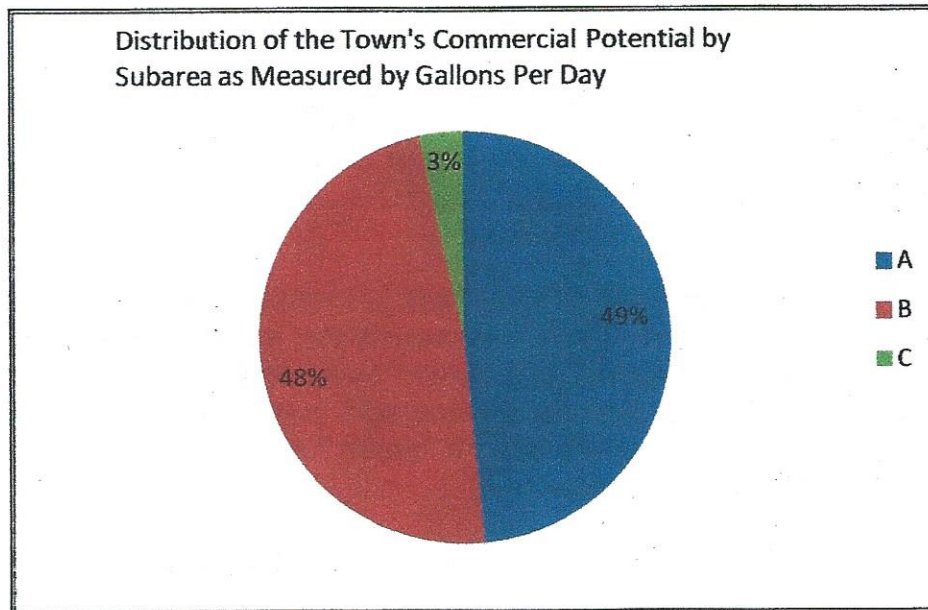
Density, Represented as Average Lot Size

Zoning District	Subarea A	Subarea B	Subarea C
Village	1 unit/1.6 acre	1 unit/2.0 acres	1 unit/2.2 acres
Rural Residential	1 unit/2.2 acres	1 unit/2.7 acres	1 unit/3.6 acres

Looking at nonresidential land use, Subarea B has the largest number of acres, due primarily to grandfathering.



When looking at commercial potential in terms of wastewater loading potential, we see a greater amount in Subarea A, indicating better soils in the town center than are found in the outlying areas.



The town center (Subarea A) also shows the highest commercial density, twelve percent of the unconserved privately owned land area. Subarea C, composed largely of Village District along Route 16, is projected to have the lowest commercial density at only two percent.

Subarea	Commercial Acreage	Commercial Potential (GPD)	Total Acres	% Commercial
A	202	312494	1668	12%
B	295	310051	6462	5%
C	27	22221	1224	2%
Total	524	644766		

Recommendations

The following recommendations are respectfully offered for the Planning Board's consideration based on observations made during the course of this project.

1. Update the Zoning Ordinance to incorporate the "Site-Specific Soil Mapping Standards for New Hampshire and Vermont." This replaced the "High Intensity Soil Maps for New Hampshire" for use with soil-based minimum lot sizes.
2. Clarify the wording of Section 5.2 relative to the River Conservation District boundaries, and combine with Section 12 which pertains to a portion of the River Conservation District. It was noted during this work that Sections 5.2.1 and 5.2.3 must be read together to understand the scope of the District. In addition, there is a redundant overlay district formed by Section 12 Areas of Special Flood Hazard.
3. Discuss as part of the master plan update whether the Village District should be separated into two separate districts. The characteristics of the village area and the NH 16 area are very different; the desirable features of development may be as well. In addition, there may be some types of development suitable for NH 16 with proper setbacks and screening that would not be suitable in the village area. In addition, certain types of grandfathered businesses in the Rural Residential District might warrant consideration for an additional use category in that district, e.g., special exceptions or conditional uses.
4. Conduct a community-wide conversation as part of the master plan update about the desirability of having the same density of residential development in the areas surrounding the village area as in the village area, and the majority of residents living outside the village area. As development continues in the way currently zoned, the distinction between the Village District and Rural Residential District will become increasingly unclear.
5. Consider as part of the master plan update what kinds of additional nonresidential development (if any) is desired by the community, and whether existing zoning is adequate for accommodating that growth, and for limiting future development to the desired land uses.
6. Ensure that adequate land is reserved for municipal facilities needed to accommodate future growth.

Appendix A
Minimum Lot Sizes Utilized in Build-out Analysis

MUSYM	MIN_LOT_SIZE	Name
101A	40,000	Ondawa freq. flooded
102A	31,750	Sunday occ. Flooded
170D	80,250	Lyman-Berkshire
214B	106,000	Naumburg - Category 5
21A	31,750	Colton gravelly
21B	31,750	Colton gravelly
21C	35,250	Colton gravelly
21E	46,000	Colton gravelly
297A	40,000	Salmon Variant
297B	40,000	Salmon Variant
301A	40,000	Ondawa Variant
36A	31,750	Adams
36B	31,750	Adams
395A	999,999,999	Chocorua v. poorly drained
409A	106,000	Limerick variant
413A	54,500	Duane
413B	54,500	Duane
435A	106,000	Raynham
559B	54,500	Skerry v. stony
57D	67,500	Becket
59B	54,500	Waumbek
647B	106,000	Pillsbury v. stony
701C	60,500	Becket-Skerry
715C	60,500	Waumbek-Skerry
716E	77,000	Marlow
716F	999,999,999	Marlow
73D	54,500	Berkshire v. stony
73E	67,500	Berkshire v. stony
745E	99,750	Lyman-Berkshire-Rock outcrop
745F	999,999,999	Lyman-Berkshire-Rock outcrop
747E	77,000	not in table, used Becket 56
748C	46,000	not in table, used Berkshire 72
748E	67,500	not in table, used Berkshire 72
748F	999,999,999	not in table, used Berkshire 72
76B	54,500	Marlow
76C	60,500	Marlow
77C	60,500	Marlow v. stony
77D	67,500	Marlow v. stony
77E	77,000	Marlow v. stony
780C	67,500	Lyman-Berkshire

APPENDIX B RESULTS

Total Town	Land Use Classification	Acres	Potential Total # Lots	Wastewater Loading Potential (GPD)
Rural Residential District				
	Residential & Undeveloped	8260	3124	
	Residential & Undeveloped in Floodplain/River Overlay	162	51	
	Commercial	335		322878
	Commercial in Floodplain/River Overlay	44		90140
	<i>Subtotal</i>	8801	3175	413018
Village District				
	Residential	332	172	
	Residential in Floodplain/River Overlay	76	33	
	Commercial & Undeveloped	107	10	158555
	Commercial & Undeveloped in Floodplain/River Overlay	38	1	73193
	<i>Subtotal</i>	553	216	231748
	TOTAL	9354	3391	644766

780E	99,750	Lyman-Berkshire
780F	999,999,999	Lyman-Berkshire
781C	60,500	not in table, used Peru 78
79B	54,500	Peru v. stony
79C	60,500	Peru v. stony
821C	96,250	Marlow-Peru
978B	106,000	Leicester-Moosilauke
979B	106,000	Leicester-Pillsbury
981B	40,000	Monadnock-Berkshire
981C	46,000	Monadnock-Berkshire
982C	46,000	Monadnock-Berkshire
982D	54,500	Monadnock-Berkshire
982E	67,500	Monadnock-Berkshire
983C	46,000	Monadnock-Berkshire v. stony
983E	67,500	Monadnock-Berkshire v. stony
983F	999,999,999	Monadnock-Berkshire v. stony
984A	999,999,999	not in table but Whitmand 49 is na
985E	67,500	Monadnock-Berkshire
W	999,999,999	

Subarea A ("V" Tax Maps)	Land Use Classification	Acres	Potential Total # Lots	Wastewater Loading Potential (GPD)
Rural Residential District				
	Residential & Undeveloped	1356	617	
	Residential & Undeveloped in Floodplain/River Overlay	28	9	
	Commercial	110		131037
	Commercial in Floodplain/River Overlay	36		74480
	<i>Subtotal</i>	<i>1530</i>	<i>626</i>	<i>205517</i>
Village District				
	Residential	47	34	
	Residential in Floodplain/River Overlay	35	17	
	Commercial & Undeveloped	29	0	57326
	Commercial & Undeveloped in Floodplain/River Overlay	27	0	49651
	<i>Subtotal</i>	<i>138</i>	<i>51</i>	<i>106977</i>
	TOTAL	1668	677	312494

Subarea B (Remainder)	Land Use Classification	Acres	Potential Total # Lots	Wastewater Loading Potential (GPD)
Rural Residential District				
	Residential & Undeveloped	5892	2229	
	Residential & Undeveloped in Floodplain/River Overlay	128	40	
	Commercial	225		191841
	Commercial in Floodplain/River Overlay	8		15660
	<i>Subtotal</i>	6253	2269	207501
Village District				
	Residential	130	66	
	Residential in Floodplain/River Overlay	17	7	
	Commercial & Undeveloped	53	10	81644
	Commercial & Undeveloped in Floodplain/River Overlay	9	0	20906
	<i>Subtotal</i>	209	83	102550
	TOTAL	6462	2352	310051

Subarea C (Tax maps R8 & R9)	Land Use Classification	Acres	Potential Total # Lots	Wastewater Loading Potential (GPD)
Rural Residential District				
	Residential & Undeveloped	1012	278	
	Residential & Undeveloped in Floodplain/River Overlay	6	2	
	Commercial	0		0
	Commercial in Floodplain/River Overlay	0		0
	<i>Subtotal</i>	<i>1018</i>	<i>280</i>	<i>0</i>
Village District				
	Residential	155	72	
	Residential in Floodplain/River Overlay	24	9	
	Commercial & Undeveloped	25	0	19585
	Commercial & Undeveloped in Floodplain/River Overlay	2	1	2636
	<i>Subtotal</i>	<i>206</i>	<i>82</i>	<i>22221</i>
	TOTAL	1224	362	22221