



SUSTAINABLE VILLAGE CENTER STUDY

for the Town of Bolton, Massachusetts

Department of Landscape Architecture and Regional Planning
University of Massachusetts, Amherst
Fall 2008

Final Report

Sustainable Village Center Planning: Town of Bolton, Massachusetts



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under the instruction of Robert L. Ryan, Associate Professor

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1. EXECUTIVE SUMMARY

This report summarizes the research and findings of the Bolton Village Center Study, which was performed for the Town of Bolton by the University of Massachusetts (UMass) department of Landscape Architecture and Regional Planning (LARP) graduate Landscape Planning Studio. This report describes the approach, framework, findings of the research, as well as recommendations and implementation strategies that will help Bolton residents preserve and develop their village center in a sustainable manner.

The Bolton Village Center Study is an outgrowth of the 2006 Bolton Master Plan that called for the creation of a “Mixed Use Village Overlay District”. The Master Plan calls for the formation of a District that allows a mix of uses including compatible retail and commercial space, and allows for the preservation of open space. The District should have “strong pedestrian connections, architectural design guidelines, consistent architecture, and small scale structures that service Bolton residents and agricultural tourism” (Bolton Master Plan, 2006).

Early in the process, the UMass Team recognized that public participation would play a vital role in the success of the study, and was therefore made an integral part of the process. Much of the work presented here was structured around and informed by information and feedback from Bolton residents garnered from in-person and online surveys, in-person mapping and landscape preference studies, and the three public meetings held throughout the process.

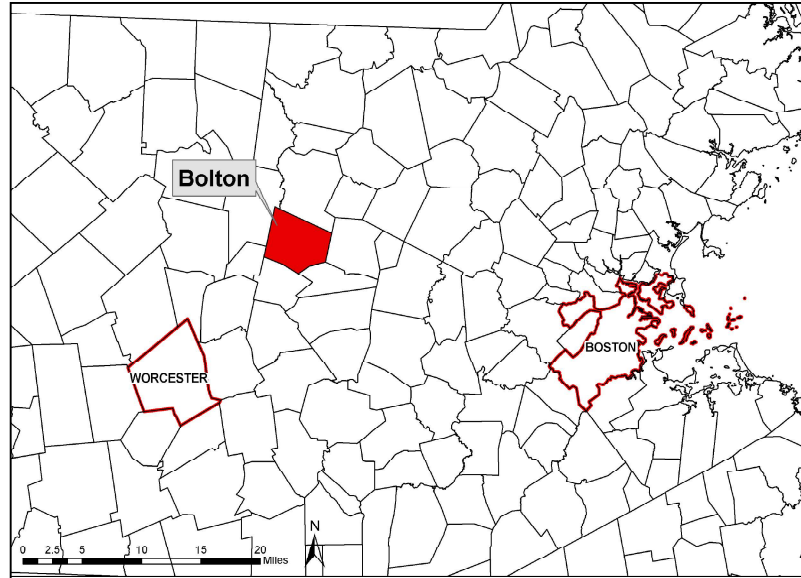
The report begins with the extensive background research crafted by the team to foster a greater awareness of the geographic, social, economic, and built character of Bolton. The next step was to create preliminary designs for each of four study areas: along Rte. 117 by the Stow line, at the Davis Gravel Pit at the corner of Rtes. 110 and 117, at Wattaquadock and Rte. 117, and just east of 495 on 117. Based on these design explorations as well as public opinion, the Team selected the area centered around the intersection of Route 117 and Wattaquadock Road as the most suitable site for a Village Center. The design vision for this area was further developed using feedback received from the public. Regulatory tools and design guidelines were then identified that would enable the vision to become reality. Finally, this report offers an implementation timeline that suggests responsible entities for the different aspects of the project as it goes forward.

2. INTRODUCTION

2.1 The Town of Bolton, Massachusetts

The Town of Bolton is located in Worcester County in central Massachusetts. The town was first settled in 1682, and was incorporated in 1738 following a moderate population increase. Current population is approximately 5,000 people. Early settlers took advantage

of the productive agricultural lands, which soon defined the cultural character and landscape of the Town. Lime deposits also supported limestone quarries and kilns which once produced potash, lime and brick products. In years following, Bolton continued to nurture numerous orchards and preserve large areas of open space, which still remains a high priority of current residents. Located along the 495 Corridor (or the ‘Arc of Innovation’),



Bolton is experiencing increased growth pressure as a result of increased commercial development along the ‘Arc’. The current center of Bolton, located on Route 117 adjacent to the intersection of Interstate 495, is a Registered National Historic District and consists of numerous examples of early American architecture, a town hall, police department, two schools, a library, and a church. There is little commercial activity within the historic district and heavy commuter traffic. Bolton seeks to continue to protect open space and preserve the cultural character and integrity, while still allowing for affordable housing and increased tax revenue resulting from increased, responsible commercial or mixed-use development.

2.2 Focus and Goal of the Study

One of the goals identified in Bolton’s 2006 Master Plan is to develop tools that will guide and control future development in Bolton that benefit or enhance the community and retain the historic village character of Main Street and its small town and rural character. To that end, this study examines the possible establishment of village center zoning within the Town of Bolton. The Town is interested in studying ideas for small scale economic development that centers new commercial and residential growth around and within the existing village center and other already developed areas. This project assesses existing development patterns, parcels, building types and uses, infrastructure and environmental features such as topography, habitat, and viewsheds to determine a logical boundary for this proposed village center zone. In addition, this report includes implementation suggestions for policy decisions and future regulatory tools.

The concept of sustainability helps form a framework for our project's study goals. The most common understanding of sustainability is as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission 56). After consideration of the natural and social resource assessments, community feedback and the regional economy, the studio team defined sustainability as it applies to Bolton. This definition includes encouraging diversity and adaptability within ecological, economic and community systems. For Bolton, this manifests as expanding housing options, supporting local businesses, creating gathering spaces, proposing infill development, enhancing natural ecological systems and expanding pedestrian connectivity.

Below are the objectives associated with planning for a sustainable village center in Bolton:

Town Assessment

- Examine and assess the Town's current land use, housing stock, open space and places for recreation.
- Understand the historic, cultural, and natural features.
- Look at its current transportation circulation, infrastructure, and public facilities and services.
- Analyze the Town's current zoning and agricultural preservation policies.
- Document view-sheds, special places, landmarks, and architectural styles.
- Conduct a regional analysis of economic and demographic trends.
- Research case studies of other town centers in the region.

Public Participation

- Run multiple workshops to elicit the Town's visions for future and desired development.
- Web-based survey

Village Center Planning & Regulatory Tools

- Understand current state bylaws pertaining to Village Overlay Districts and potential for use in Bolton

Defining Village Center Boundaries

- Identify appropriate boundaries for Village Overlay using relevant assessment data, public feedback.
- Determine methods/tools for implementation

Visualizations

- Establish a visual understanding of place
- Provide visual renderings of proposed Village Overlay District
- Identify design guidelines appropriate for Bolton

Recommendations

- Integrate current planning strategies with proposed recommendations
- Develop an implementation matrix

2.3 Bolton's Planning To Date

This project is informed by recent planning efforts in the Town and directly from the Implementation Action Plan of the 2006 Master Plan. Active public participation and planning efforts demonstrate a strong citizen base interested in constructing the future direction of their town. These recent efforts include the following:

2006 Master Plan

The Master Plan discusses priorities and strategies of implementing town goals. It recognizes the need for a framework so as to effectively plan and expedite Bolton's future by using a recommendations matrix timeline. In addition the Town included an Evaluation Form component as a template to aid the Town in understanding progress being made in implementing each individual recommendation. This is significant for this project as modifications may be made to the existing matrix to accommodate for the development of a Village Overlay District.

2006 Open Space Plan

The Open Space Plan was constructed as a way for Bolton to inventory, analyze, and understand existing undeveloped, agricultural, and/or conservation land. Results of the open space assessment concluded that although the Town is replete with open space, there is a pocket-pattern (pockets of open space) of fragmentation. The town seeks to continue to preserve open space as a means to connect the fragmented pockets currently existing so as to create a contiguous system of protected land. A strategy for implementing this goal is to accommodate development in a concentrated village center in order to further preserve open space.

2006 Reconnaissance Plan

The Reconnaissance Plan was done by a citizen-led collaborative consisting of 37 communities along the Route 2 corridor. Its main focus was on defining and identifying heritage landscapes within each of the communities and their relation to the people and culture of place. This broad-based assessment is valuable for this project as a means to identify special places of cultural value within the Town of Bolton and inform the cultural context of a proposed village center.

1998 Preservation Plan

The Preservation Plan was prepared by Bolton historians as a way to clearly identify and define architecturally significant assets within the Town. The plan documents significant historic structures and informs typology that will be useful in the creation of design standards for use in developing a village center. It also provides cultural and historic boundaries for development in order to preserve significant dwellings located within the Registered National Historic District.

Affordable Housing Plan

Bolton's housing stock is largely made up of single-family, large-parcel residential lots. As a result, little affordable housing is available within the Town. In recognition of this, the Town created an Affordable Housing Plan to help address this and keep pace with the Commonwealth's overall goal of increased affordable housing statewide. In 2003 the percent of affordable housing within Bolton was 0.9%. The town began to work more with 40B developers to remedy this exceptionally low percentage and has made some progress towards the town goal of 8% by 2008. Although not achieved, Bolton currently has 3.6% affordable housing and is working to implement various strategies such as 'Buy-Downs' and deeding existing accessory apartments as affordable housing in order to meet the overall goal.

3. DISCUSSION OF VILLAGE CENTER

3.1 What is a Village Center?

Although there is no accepted definition for a village center, most people will recognize a village center when they experience one. While every village center is different and unique to the town in which it is situated, they do share some important common characteristics. In Massachusetts, village centers are typified by historic patterns of settlement that are traditional to the New England region. These patterns often include smaller lots, buildings closer to the street, and a mix of building uses. These development patterns lead to an efficient use of space, allowing farms and natural areas outside the village center to remain as they are. The compact nature of village centers also produces a pedestrian-friendly environment. Village centers typically make a positive contribution to the quality of life in an area and act as a center for the civic and social life of the town.

While this description is useful to designers and government boards, ordinary citizens experience a village center in a different way through their day-to-day experience. Townspeople know the village center as a place where they can run errands, go out to eat, or meet a friend. Seniors may choose to live as close to the village center, since there's no need to waste time driving to have a full and active life in the village center. Young adults often choose to live in the village center as well, since they can get an affordable apartment near their work.

Happily, many of the physical characteristics that a designer or board member might recognize in the earlier description contribute directly to the positive everyday experience of a village center that everyone can enjoy. Understanding and implementing policies that will support these physical characteristics can go a long way toward fostering the development of a lively village center where people want to go.

3.2 What is Village Center Zoning?

Village center zoning is a regulatory tool available to towns to help them develop a village center. Over the past decades, the way zoning regulations are written has evolved to separate different land uses from one another. While this way of regulating the way development occurs has some advantages (for instance, it is usually fairly easy to write these codes), it has had the unintended consequences of making village center-type development almost impossible without a special section of regulations for the area the town would like to designate as the village center. Village center zoning addresses this need.

Village center zoning allows for the creation of a specific zoning district to accommodate the unique needs of a small, mixed-use commercial area. A village center district should support the preservation of existing mixed uses within a town center and encourage new construction that is compatible with the setbacks, scale, and architectural style of existing structures (Skelly, 2003). Some important considerations for communities seeking to (re)develop or preserve a village center are:

- Supporting a mix of residential, civic, and commercial uses and types in a compact area
- Balancing public and private space
- Promoting walkability and connectivity
- Defining town center and edges
- Building community
- Exhibiting architecture and design features that are compatible with the rest of the Town (Mass Smart Growth Toolkit 2006).

A number of communities in Massachusetts and New England have adopted ordinances and bylaws that allow for village center zoning. Regional planning agencies like the Pioneer Valley Planning Commission and the Cape Cod Commission offer model village center bylaws on their websites for communities to modify and adopt (see: <http://www.pvpc.org/val_vision/html/toolbox/SmartGrowthStrategy.html> and <<http://www.capecodcommission.org/bylaws/village.html>>, respectively). Many of these existing town bylaws and models reflect the principles listed above for village center planning.

3.2 Village Center Case Studies

Three case studies were conducted on the processes by which different towns implemented or are implementing Village Center Zoning. One town studied was the Town of Dennis, MA, the second town was Concord, MA and the third town was Charlestown, Rhode Island.

Dennisport, Massachusetts

This case study was conducted through a telephone interview with the Director of Planning, Daniel Fortier, of Dennis, MA. Dennisport is a village within Dennis, MA. This part of Dennis was originally a mixed-use area with retail on the ground floor, and residential units on the second floor. In the 1950s, the area was destroyed by fire, and rebuilt in their place were single-story structures housing retail. Due to the opening of the Patriot's Square Mall in the 1990s, many of the businesses closed down leaving about half of storefronts empty. To deal with this problem the Dennisport Revitalization Committee (DRC) was formed. The DRC was one of the driving forces behind the new Dennisport Village Center District.

Dennisport's Village Center Bylaw was highlighted in Massachusetts Smart Growth Toolkit for their efforts at developing and passing a Village Center Bylaw that helped revitalize this area making it a mixed-use center with active sidewalks. The process was driven by the combination of the DRC, the Dennis Economic Development Committee (EDC), and Daniel Fortier, who worked to engage local businesses, residents, and property owners. They used a variety of traditional and new ways to elicit feedback from the public. They included:

- A spaghetti dinner;
- Outreach at a public festival;
- Internet groups;

- Webcasts;
- Educational brochures, and;
- One-on-one conversations with business owners in the Dennisport area.

The boundaries of the Dennisport Village District had a natural demarcation, one side was bordered by another town, another side by a town park, another by a library, and the fourth was bordered by a shopping center. Daniel Fortier used historic pictures from the historical society to get a feel for what the area should look like.

Through their process, EDC, ERC, and Daniel Fortier identified a number of community concerns. Overall, the community expressed worry that increased, denser development would affect the appearance of the community, that the town character would be altered adversely and that development would be constrained by septic limitations. In the end, the Town was successful at adopting an overlay district that supports many of the considerations listed in the above section. This village district bylaw seeks to:

- Protect and enhance the character and quality of Dennisport while maintaining and strengthening a recognizable identity and character that is unique to Dennisport.
- Enhance the human scale of development and respect the scale and character of residential neighborhoods that adjoin commercial uses.
- Mitigate the negative visual impact that can arise from the scale, bulk and mass inherent to large commercial buildings and centers, such as big box retailers.
- Strengthen the pedestrian environment.
- Allow for needed flexibility to respond to conditions and constraints inherent to specific sites and specific areas within the community.
- Provide flexibility to respond to the unique characteristics and constraints inherent to mixed-use development and to evolving development configurations.
- Promote building designs and practices that are adaptable to multiple uses for extended building lifecycles.
- Minimize negative impacts from on-site activities to adjacent uses.
- Balance the economic requirements of the development with aesthetic concerns of the community.
- Promote sustainability as well as energy and resource efficiency.

Since the passage of this bylaw, the Town of Dennis has been successful at supporting mixed use development and commercial/residential growth within the center of town in a way that is supported by the community.

Concord, Massachusetts

Concord, MA has been researching and planning for three different village center areas in their town. They hired an outside firm, the Cecil Group, to put together a Village Center Study of Concord. Within this document it describes the process the firm and the Town used to plan the three town centers. It states that the Town created the Concord Village

Center Committee under direction of the Planning Board in 2006. The Concord Village Center Committee formed three different task forces to study three villages in the Town: Concord Center, Thoreau/Depot, and West Concord. They involved the public and got the word out to the community by writing six newspaper articles for the Concord Journal, having a mass mailing campaign, having numerous public meetings, sending out questionnaires, interviewing business and property owners, and conducting two interactive workshops. The committee will hold a final meeting to get feedback from this report. At these meetings, it was asked what characteristics in each of the three areas must not or will not change, what characteristics may change, and what characteristics must or should change. The study came up with a variety of options to help with the land management of these village areas it included:

- Circulation, sidewalk and roadway improvements
- Access easements and agreements for pedestrians
- Design guidelines and review
- Façade and signage improvement programs
- Design competitions – maybe on an annual basis
- Request for Proposals for town owned land to build a preferred development
- District increment financing
- Feasibility study
- Parking solutions including: agreements, exemptions, management associations, financed structures, and shared parking
- Stewardship groups
- Zoning: amendment, chapter 40R, and overlays

Charlestown, Rhode Island

This case study was conducted through personal interviews with the current Town Planner, the Zoning Official, and a Planning Board member of Charlestown, RI. Presently, the Town of Charlestown, a town of approximately 9,000 residents, has a Traditional Village Zoning District in the Cross Mills section. It was enacted into the zoning bylaw in 2006. The process started in 2002, and is continuing still with discussions of design guidelines.

Originally, the Traditional Village District started out as a mixed-village overlay with had the same boundaries as the Historic Village Overlay, which was enacted in 1984. The area included in the overlay has many historic buildings in a small village-like area which includes an inn that is 340 years old. The impetus behind the mixed-village overlay was the desire to preserves the area's village character.

An ad hoc village center committee was formed, which included two members from the Economic Improvement Commission and two members from the Charlestown Planning Board. Early on, this four member committee invited all the business owners and residents in the village area to a charrette, where they discussed what they would like to see in the Cross Mills section of town. The committee hired an outside facilitator to conduct the charrette. They wanted the business community to see that they weren't

trying to limit business, but were trying to let more appropriate businesses occupy the village area.

The ad hoc committee was concerned mostly about regulating the type of businesses that should be allowed in the Cross Mills area. They worked on the use tables for this area. The ad hoc committee meet monthly and had workshops with town council, the rest of the Economic Improvement Commission, and the Planning Board, and the residents and business owners in the area. By 2004, a mixed-use overlay was enacted into law. Soon after, they found that Rhode Island state law didn't allow additional uses in an overlay zoning, so they went back to the drawing board and made a new Traditional Village District. This took two more years with additional workshops and then was ratified in 2006. One month before the by-law was brought up for a vote, the ad hoc committee had a joint workshop with the Town Council so that they would understand the new ordinance.

For the past two years, the ad hoc village center committee has been working on design guidelines for the Traditional Village District. These design guidelines cover setbacks, buffers, lighting, landscape, parking, roof pitch requirements, and materials to be used. One member of the Economic Improvement Commission has built a display board which shows samples of different materials, so builders can see what types of materials can be used. Another member of the ad hoc village center committee has compiled a book of images of traditional housing in the area to give builders an idea of what the planning board would like to see in the traditional village district. These new requirements have been approved by the Planning Board, but still need to be voted on by the Town Council.

4. TOWN ASSESSMENT

In order to fully understand the forces shaping Bolton, a thorough assessment of the town was conducted. This section provides a summary of the research that was completed to this end and forms the basis for recommendations for the village center.

4.1 Demographics

Population and Employment

According to the Town's Master Plan, Bolton's population has more than doubled since 1970. This trend is continuing today. In 2000, Bolton's population was 4,148. Eight years later, the 2008 town census counted 5,152 residents. Figure 4.1.2 shows Bolton's growth rate from 1970 to 2000.

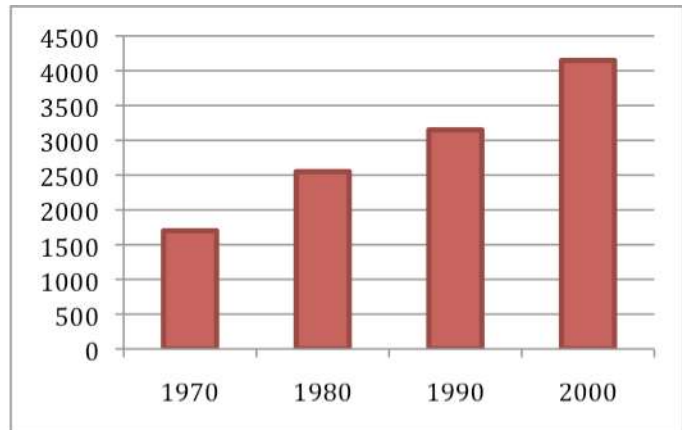


Figure 4.1.2. Population in Bolton.

Source: 2000 Census

Figure 4.1.3, from in Bolton's 2006 Master Plan, represents the change in population by age from 1990 to 2000. The data shows that the growing age bracket in Bolton is the population between 35 and 54 years of age. It also shows an increase in the 5-17 bracket. The data suggests that the people of Bolton are not only getting older but the young adult bracket is also increasing. These data help us to understand what the future needs of the Town might be especially in this case in terms of schools, resources and amenities for retired persons, and the types of housing that might be needed.

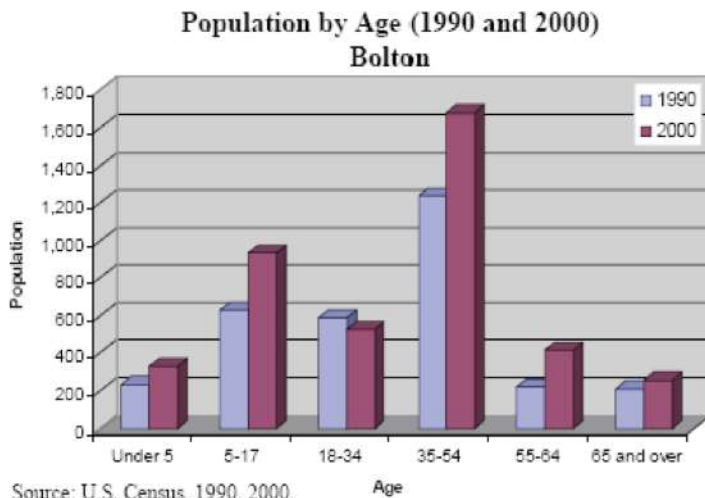


Figure 4.1.3. Population by age.

Comparatively, the Town of Bolton resides within the Metro West 495 Corridor. The Metro West Corridor is comprised of 32 communities that reside along interstate 495 and sits on the outlying suburbs of Boston. According to the Metro West 495 Corridor Partnership, “from 1990 to 2000 the I-495 corridor experienced the greatest change in population growth in Greater Boston, and a 69% gain in employment (Arc of Innovation, 2008). Figure 4.1.3 shows the total

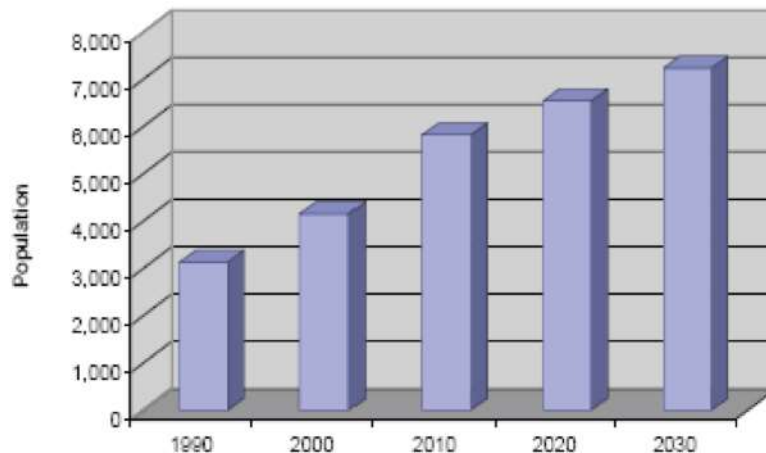


Figure 4.1.4. Projected population growth in Bolton.

Source: MAPC Population Forecasts for MAGIC region, March 2003 (partially updated January 2006).

Table 4.1.1: Percent distribution by occupation

	Management, professional, and related	Service	Sales and office	Farming, fishing and forestry	Construction, extraction, and maintenance	Production, transportation, and material moving
Massachusetts	41.1	14.1	25.9	0.2	7.5	11.3
Berlin	45.1	6.2	22.8	1.2	13.1	11.5
Bolton	68.9	4.5	18.7	0.9	3.5	3.5
Clinton	31.4	14.3	26.2	0.1	8	20
Harvard	73.9	4.7	15.2	0.4	2.8	3
Hudson	40.4	11.3	24.7	0.1	8.6	14.9
Lancaster	48.2	11.3	23.8	0	8.3	8.3
Stow	62	8.8	20.1	0	4.2	4.8

Source: 2000 Economic Census

Economic Indicators Report from Framingham State College, the 495/Metro West Corridor alone accounted for 10% of the State of Massachusetts employment and payroll in 2006 (Economic Indicators, 2008).

Local Employment and Income

Table 4.1.1 displays the distribution of occupations for the people in Bolton and its neighboring towns. 68.9% of those living in Bolton work in management and/or professional

population and projected growth from 1990-2030. Figure 4.1.4 provides more evidence that the Town of Bolton is experiencing the growth pressures in the region and is projected to almost double in size by 2030.

The 495/Metro West Corridor is also considered to be one of the fastest growing employment centers in Greater New England. In the

Table 4.1.2: Median household income in 1999 (\$)

Massachusetts	50,502
Berlin	65,667
Bolton	102,798
Clinton	44,740
Harvard	107,934
Hudson	58,549
Lancaster	60,752
Stow	96,290

Source: Census 2000

related jobs. The Town of Bolton identified its community character to be primarily rural and agricultural. The data here provides evidence that those living in Bolton are white-collar workers and that only 0.9% of its citizens actually farm in the community. Table 4.1.2 shows that compared to its neighboring towns, Bolton has the second highest median household income.

Of the 2,212 age 16+ workers living in Bolton, only roughly 197 people worked from home and 892 people worked within Worcester County. Thus suggesting that roughly more than half of the Town's employed residents, work outside Worcester County, presumably commuting to Boston. This supports the idea that Bolton is a bedroom community in which people prefer to live in Bolton but commute to work outside the town boundaries.

Table 4.1.4. Educational Attainment for Bolton residents 25 years and older		
	Population	Percent
Persons 25 years and older	2,768	100.0
Less than 9 th grade	10	0.4
9 th to 12 th grade, no diploma	56	2.0
High school graduate (includes equivalency)	318	11.5
Some college, no degree	312	11.3
Associate's degree	209	7.6
Bachelor's degree	1,063	38.4
Graduate or professional degree	800	28.9
Source: Census 2000		

Educational Attainment

Bolton is a well-educated, community with 74.9% of the population over 25 years old having earned a higher education degree of some kind, and 28.9% with graduate or professional degrees.

Race

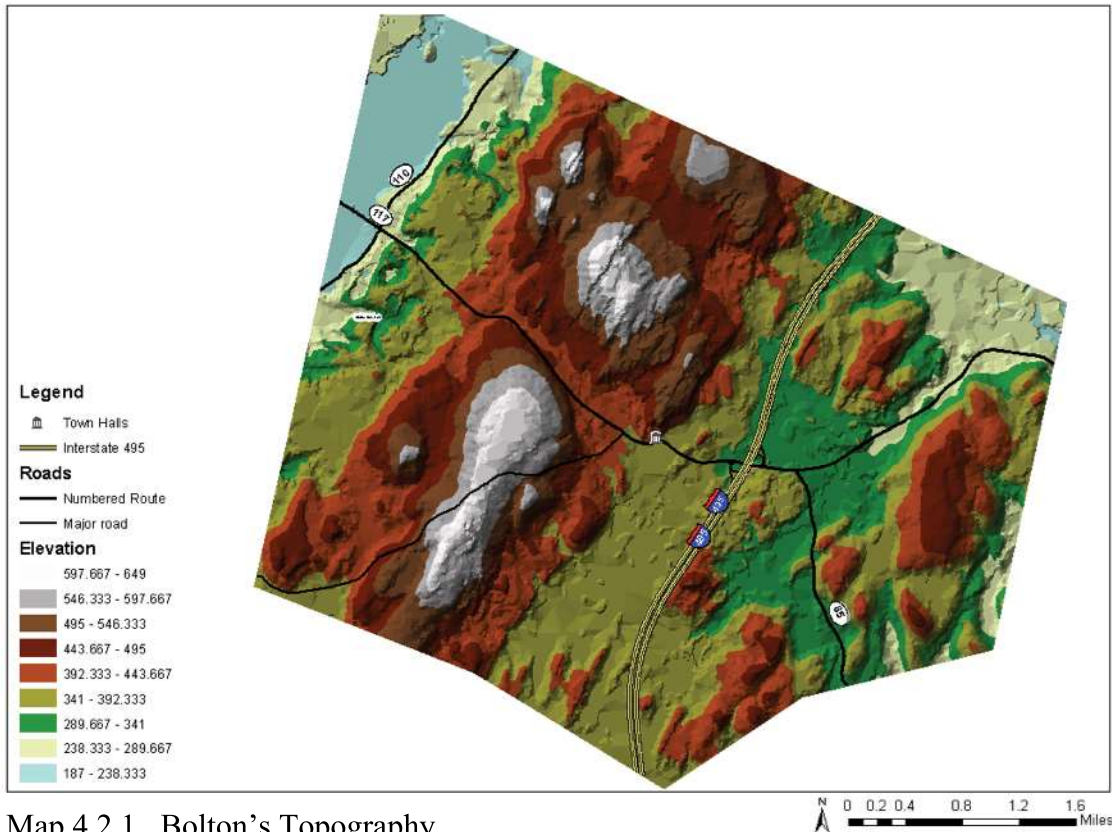
According to data from the 2000 census, Bolton is 97.8% white, 1.3% Asian and 0.2% black or African American. These statistics indicate that Bolton could benefit from measures to enhance racial diversity.

4.2 Natural Resources

The topography of Bolton is characterized by many rounded hills with plateau-like tops and expansive slopes (see **Map 4.2.1**). These hills are part of the northern extension of the Appalachian Mountains. The majority of the Town falls between elevations of 300 and 500 feet; however, Vaughn Hills and Wattaquadock Hill (660 feet) surpass 600 feet and are the highest points in the region between Boston and Mount Wachusett to the west. The only areas in town where elevations fall below 260 feet are in the northwest (Nashua River Valley) and northeast (Great Brook Valley) areas of Bolton (Bolton Open Space and Recreation Plan, 2005).

Soils in Bolton are mostly formed from local weathering of bedrock materials. Soils formed from weathered bedrock are found mostly in the upland areas of the Town (above 400'). In Bolton's lowlands, soils were formed in stratified glacial stream deposits and

outwash plains. These soils, which are prime for agriculture and development, are primarily concentrated in the western part of town along the Nashua Drainage Basin. Deposits associated with wetlands account for about 8% of the soil in town (Town of Bolton 2005 Open Space and Recreation Plan).



Map 4.2.1. Bolton's Topography.

Bolton lies within the boundaries of two large watersheds and drainage basins (Nashua and Sudbury-Assabet-Concord) and contains 12 sub drainage basins. Wattaquadock Hill and the peaks of the Vaughn Hills form the north-south divide from which surface waters flow either to the east into the Assabet River or to the west into the Nashua River (Open Space and Recreation Plan, 2005). This divide is known as the Shrewsbury Ridge, which runs southeast to northeast (see Map 4.2.2). An important regional consideration is Bolton's location at the top of the watershed and the impact that activities of this system have on neighboring towns downstream.

Bolton contains an extensive system of wetlands. These areas are important for water supply, filtration, flood control, storm damage prevention, pollution mitigation and wildlife habitat. The most common type of wetland in Bolton is a forested wetland with red maple. These wetlands are mostly connected to streams and serve as an important component of the floodplain.

Bolton contains three main aquifer recharge areas. The largest, high yield aquifer is

located on the west of town in the Bolton Flats Wildlife Management Area. This aquifer covers hundreds of acres of land and underlies the International Golf Course, Bolton Orchard, the Eastwood Cemetery, as well as a number of single family homes, and acres of preserved/open space. It is important to note that it has been identified in the Open Space Plan as an ideal site for a future public water supply, and the Master Plan Committee endorses protection of this area (Bolton Master Plan, 2006). A medium yield aquifer exists near the Nashoba Regional High School and a smaller medium yield aquifer is located in the east end of town near the Delaney Wildlife Management Area. **Map 4.2.2** highlights these important water resources.

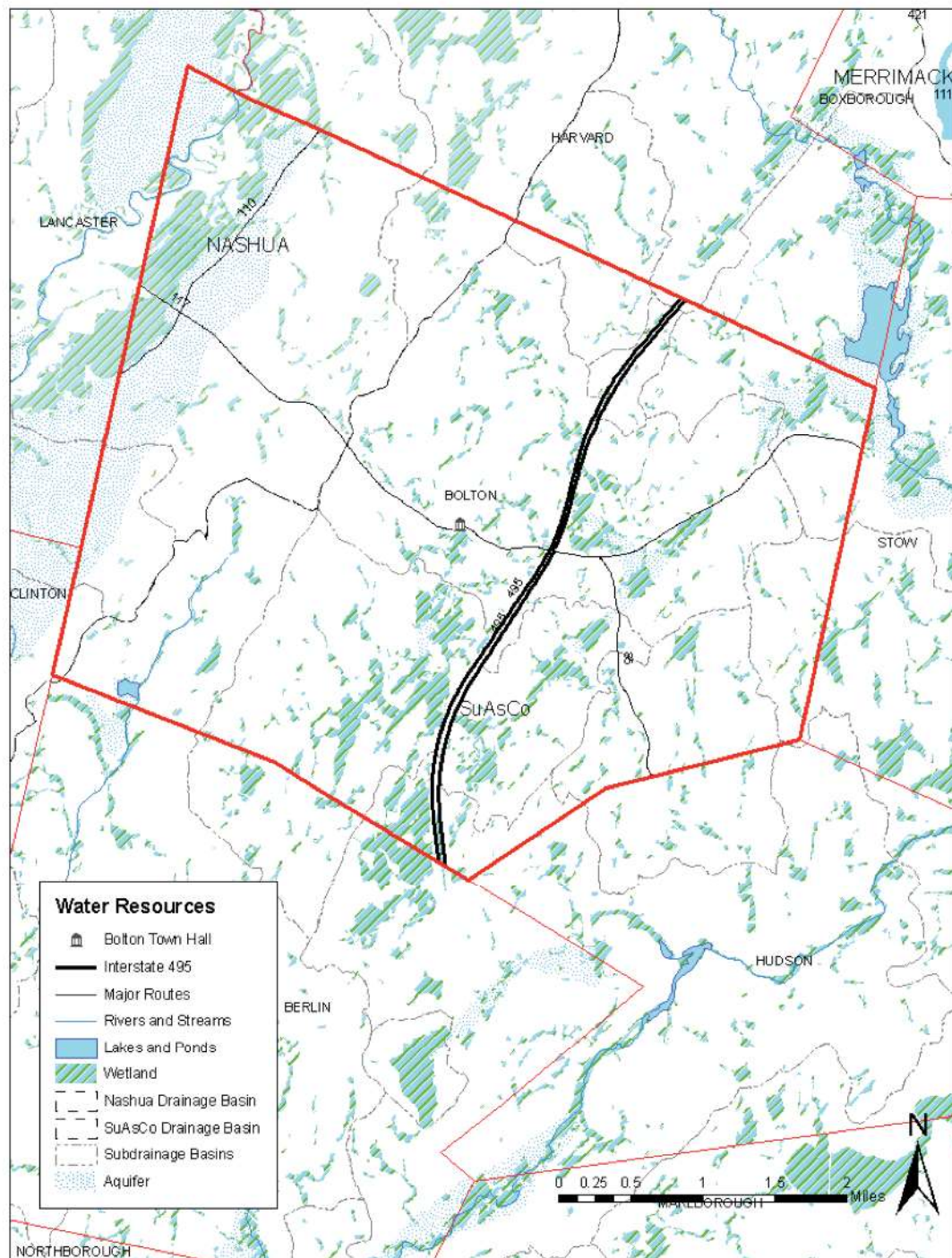
Bolton's diverse landscape of woodlands, open space, orchards, and wetlands are important habitat for many different wildlife species. Bolton is home to a number of rare and endangered plant and animal species (see Table 4.2.1 below) and contains 41 certified vernal pools, which are important habitat for amphibian species. Some of the most important habitat in town is located within the Bolton Flats Wildlife Management Area along the Still River in Bolton and in the undeveloped land along Great Brook in the Rattlesnake Hill area.

Final Report

Table 4.2.1: Threatened, Endangered and Species of Special Concern in Bolton

Taxonomic Class	Species Common Name	Massachusetts Endangered Species Act Status	Most Recent Observation
Amphibian	Blue-spotted Salamander	Special concern	2006
Amphibian	Marbled Salamander	Threatened	1997
Amphibian	Four-toed Salamander	Special concern	2003
Bird	Grasshopper Sparrow	Threatened	2000
Bird	American Bittern	Endangered	1990
Bird	Least Bittern	Endangered	1985
Bird	Pied-billed Grebe	Endangered	1984
Bird	King Rail	Threatened	
Bird	Vesper Sparrow	Endangered	
Bird	Water Shrew	Special Concern	
Reptile	Blanding's Turtle	Threatened	2006
Reptile	Wood Turtle	Special concern	1999
Reptile	Eastern Box Turtle	Special concern	1989
Vascular Plant	Cat-tail Sedge	Threatened	1999
Vascular Plant	Autumn Coralroot	Special concern	2003
Vascular Plant	Fringed Gentian	Special Concern	
Vascular Plant	Climbing Fern	Special Concern	
Vascular Plant	Houghton's Flatsedge	Endangered	
Vascular Plant	Pitch Pine- Scrub Oak	Imperiled	
Vascular Plant	Ovate Spike-Sedge	Endangered	
Natural Communities	Alluvial Red Maple Swamp	Vulnerable	
Natural Communities	High-Terrace Floodplain Forest	Imperiled	
Invertebrate	Pink Sallow	Special Concern	

Source: BioMap and Living Waters: Core Habitats for Bolton 2004,
http://www.mass.gov/dfwele/dfw/nhesp_temp/land_protection/twnrpts/bolton_core_habitats.pdf.



Map 4.2.2. Water Resources in Bolton.

4.3 Open Space & Recreation

Bolton's primarily agricultural open spaces and tracts of densely forested land are defining elements of its aesthetic character. Bolton is unique amongst the 12 towns in the Metropolitan Area Planning Council's Minuteman Advisory Group on Interlocal Coordination (MAGIC) because it has the highest proportion of forest (63%) and agricultural lands (14%) (Open Space Plan 13). The town's many hills serve as a border between the watersheds of the Nashua and Assabet Rivers, and their slopes serve as prime spots for enjoying some of the most unique and scenic views in the region (Open Space Plan).

Bolton's characteristic landscapes are threatened by development though. The town's Open Space Plan cites figures that during the years 1985 to 1999 residential developments increased in size by 52% while open space and agricultural land decreased by 22% (Open Space Plan).

According to a 2002 survey, Bolton residents see open space conservation as a vital method in preserving the Town's character. When asked what they would make a priority if money were no object, 23% of residents indicated they would like to increase the amount of open space protected. This is significant, as only taxes received a higher rating of priority (31%) in the same survey question (Master Plan).

In addition to the surveys indications of a desire for preservation, Bolton's Open Space Plan identified the following goals for open space preservation:

- Preserve the rural and historical character of Bolton
- Conserve open space areas for public use
- Preserve and encourage agriculture
- Protect natural resources and wildlife habitats
- Provide active recreation opportunities to Bolton citizens
- Protect the water resources of Bolton

Bolton's town government has already passed bylaws that will assist in the preservation of open space. Currently the Town uses a Farmland and Open Space Restricted Development (FOSPRD) bylaw that allows developers to reduce required setbacks and road frontage to better preserve open space behind new development. Bolton's FOSPRD law also requires developers to submit a FOSPRD plan and conventional subdivision plan to the Planning Board. The town also has a Site Plan Approval bylaw that requires commercial and industrial developments to submit a site plan detailing driveway and parking locations, screening vegetation, landscaping, and open space locations. Other methods the Town has been using for open space preservation include temporary conservation of land through Chapter 61 restrictions, conservation restrictions and agricultural preservation restrictions, and the purchase of conservation land by the Town or the privately run Bolton Conservation Trust (Open Space Plan).

Regional Open Space and Recreation

The overall regional inventory shows there are significant recreational open spaces in close proximity to Bolton (see **Map 4.3.1**). One town north from Bolton, in Harvard, lies the Oxbow National Wildlife Refuge (Open Space Plan), and passing through town are the Delaney Wildlife Management Area, and the Bolton Flats Wildlife Management Area. The Assabet River Rail Trail bikeway passes through the neighboring towns of Acton, Maynard, Stow, Hudson, and Marlborough, the Assabet River Rail Trail (Assabet River Rail Trail Website). One final notable feature are the old Central Massachusetts Railroad tracks, there are efforts to convert the rail bed into a trail that would run from Northampton to Boston-just crossing into Bolton in the south (Central Mass Rail Trail Website).

The town of Bolton has identified fifteen core areas in the Open Space Plan, which it would like to target for conservation. Many of these areas already contain some preserved lands, and all are considered areas of agricultural or conservation value. The overall goal for these core areas is to create contiguous areas of conservation through agricultural preservation restrictions and purchase of land. The sites are located on Map 4.3.2, and consist of:

- **Annie Moore/Long Hill:** this area is the site of impressive hemlock stands and valuable canyon habitat. Access is limited due to the lack of trails.
- **Barrett's Hill:** Barrett's Hill is the site of the 2nd largest undisturbed forest area in the Town.
- **Boy Scout Area:** This highly vegetated parcel on the east side of I-495 is owned by the Boy Scouts. Amenities include Little Pond, which is the location of the Town beach. There are no plans to create an APR or any other type of legal preservation.
- **Danforth Brook/Century Mill:** This area includes the site of an early mill, whose remains and mill pond are still extant. This area has also been the site of recent residential development.
- **Northwoods:** A forest area in the north of town, which has been the site of recent residential development.
- **Randall Road Area:** This site in the southwest of town includes some of the larger forest resources in Bolton.
- **Sawyer School Area:** This forested area owned by the Town includes trails that run through the area south of the Sawyer School and the historic town center.
- **Wattaquadock Hill:** An area of significant agricultural and resources in the form of Bolton Orchards, scenic resources, as well as the source for many of the Town's brooks. It has been the site of a cellular communication tower since 2002.
- **Wilder Pond to Forbush Mill:** This section of Bolton was cited in the Shrewsbury Ridge Report as being of prime scenic importance. In addition, the Forbush Mill Brook and two old dam sites exist as historical remains of water-powered mills of colonial Bolton.
- **Bolton Flats State Conservation Area:** A large state owned conservation area with parking for at least 20 vehicles, including handicap vans. There are beautiful

vistas of the land and water from the parking area. Some of the trails are wide and flat enough to afford access to a motorized or pushed wheelchair. None are paved.

- **Vaughn Hill:** This area has three trail heads off Bare Hill Road, one off Green Road (opposite Nourse Road) and two off Vaughn Hill (Woodside Dr and Moen Trailhead). Vaughn Hill has some hilly areas, which are mostly concentrated as you approach the peak. Hiking trails circle the peak in deep forest, from which additional trails run to the summit.
- **Bower Springs:** Bower Springs is one of Bolton's most popular conservation areas due to the scenic ponds, flat grassy fields suitable for picnicking and well distinguished trails connecting on to the Vaughn Hill/Hansen conservation areas.
- **Rattlesnake Hill:** The Rattlesnake Hill Conservation area is made up of many contiguous areas which combined provides nearly 500 acres to be explored.
- **Delaney State Conservation Area:** State owned flood control and wildlife management land. Great Brook flows into Delaney pond here. It is the endpoint of the current Bolton Loop Trail, and stocked with ring-necked pheasants for hunting.

Recreation

The town has limited active recreation areas, but they were identified in public participation at the Bolton Fair as significant spots in the Town for socializing. There are three municipal playing fields, one at each school and Flatley Field. In addition there is one playground, and the town beach at Little Pond. Motorized recreation, such as snowmobiling and ATVs, are banned in Bolton. Hunting is extremely popular, but is only legal on the state wildlife reservations and on private land where owners give permission.

Many of the Town's conservation areas are the sites of passive recreation, especially hiking and biking in warmer seasons, and cross-country skiing in the winter. Most trail networks are informal, but the Town does have a Trails Committee that works on creating maps and periodic clearing and maintenance of trails. The most significant trail system in the Town is still in development, the Bolton Loop Trail. The concept of the Loop Trail is to create a trail that will pass through the whole perimeter of town, connecting the various conservation areas throughout the Town. Currently the trail is in development, and only a northern portion has been formally constructed. Further progress is being made as the Trails Committee secures more easements from landowners, and licenses for the trail (Bolton Trails Committee Website).

A potential trail exists in the form of the abandoned rail bed for the Lancaster and Hudson railroad (Open Space Plan 115). Built in the 1870s and abandoned before it was ever used, the old line still exists throughout much of the Town in the form of a raised earthen berm (Master Plan 44).

Wetlands create some of the most diverse recreational opportunities in Bolton. There are ample locations for swimming, ice skating, and fishing, while opportunities for boating are limited. The Open Space Plan identifies the Still River, Delaney State Flood Area, and Little and West Ponds as key fishing spots (Open Space Plan 32). The Still River frontage is primarily in private and state ownership, fishing at Delaney is located

primarily at a small roadside pond, and Little and West Ponds are accessible only by permission of the landowner.

Swimming and ice skating are only publicly available at the town beach, located near the Boy Scout Camp on Little Pond. West Pond is used by the Girl Scouts and also informally by residents for skating. Bowers Springs is used for the Tom Denney Nature Camp, run by the Bolton Conservation Trust.

There is no public boating in the Town of Bolton. West Pond is sometimes used by boaters, though there is no formal access for the public.

Open Space & Recreation Assessment

Forests and agricultural land are a vital part of Bolton's scenic character. Preservation of open space is a key element in preserving the Town's sense of place while accumulating growth. The town has done significant work already in preserving its spaces, and identifying target areas for preservation. The Open Space Plan provides a framework for preservation, and many of the ideas identified in the following assessment are derived from that document.

First, the Town wants to target Chapter 61 land for permanent preservation. Much of the land currently under protection of Chapter 61 have been identified in the Open Space Plan as prime parcels for creating more contiguous stocks of preserved land.

Second, we recommend the Town consider at additional sources of funding for buying conservation land. Cooperation with larger conservation organizations besides the state is one option for funding open space conservation. (The town has already started this sort of work. In order to obtain APR's on the Schartner and Nicewicz farms a partnership was put together with funding from the Town, the Bolton Conservation Trust, and the Trust for Public Land.) An additional source of funding identified in the Open Space Plan is the passing of a Community Preservation Act. While this act has already been voted down twice in town, it is still a prime potential source of revenue for open space conservation. Another option the Town has explored and should continue is the leasing of conservation land for cell phone towers. While it is important to consider the impacts on viewsheds these structures can have, they also provide vital revenue for conserving more land.

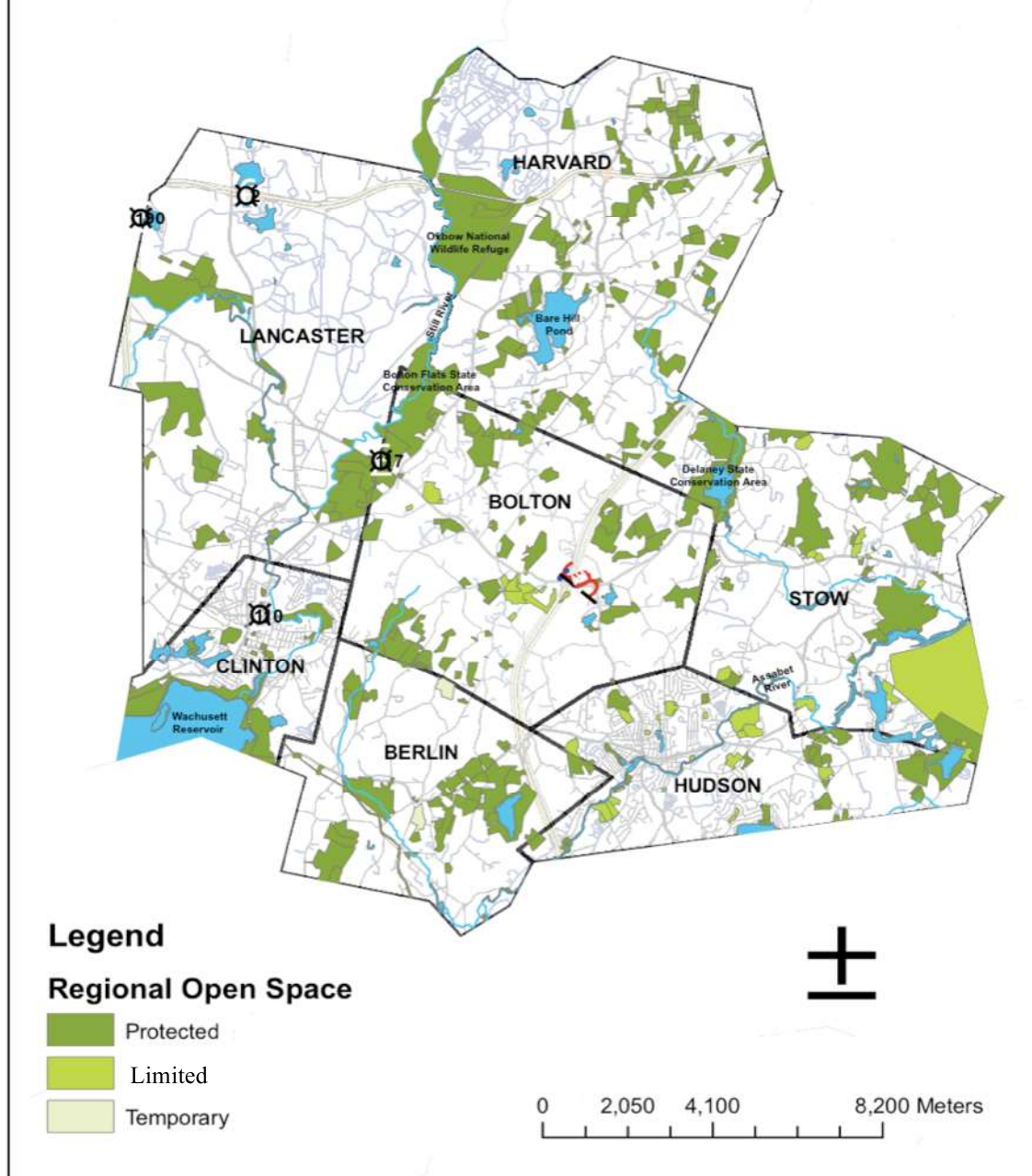
Our third recommendation is that Bolton create a concept to organize its open spaces into a network. With the creation of contiguous areas of preserved land, it will be important to connect them for wildlife as well as for recreational purposes. The process has already begun with the efforts at the creation of the Bolton Loop Trail. Additional trail networks could provide vital connections to other towns, transit, or even regional trails like the Central Mass Rail Trail. The Lancaster and Hudson rail right of way represents one potential connection to regional resources, and is identified by the Open Space Plan as an existing wildlife corridor.

In terms of a village center, Powderhouse Hill, Wattaquaddock Hill, and the Sawyer School are all key conservation areas identified by the Town that could be affected by

development in the historic town center. Powderhouse Hill and the Sawyer School are also the sites of significant trail systems, though neither connects to the greater Bolton Loop Trail. The old Lancaster and Hudson rail line passes very close to the town center, and could be an amenity for creating greater walkability to a village district. The area around the Bolton Orchard store poses fewer complications for a potential village center. The only conservation area nearby is the Bolton Flats, which is already permanently protected by the state.

Map 4.3.1

Protected Open Space in the Surrounding Communities of Bolton



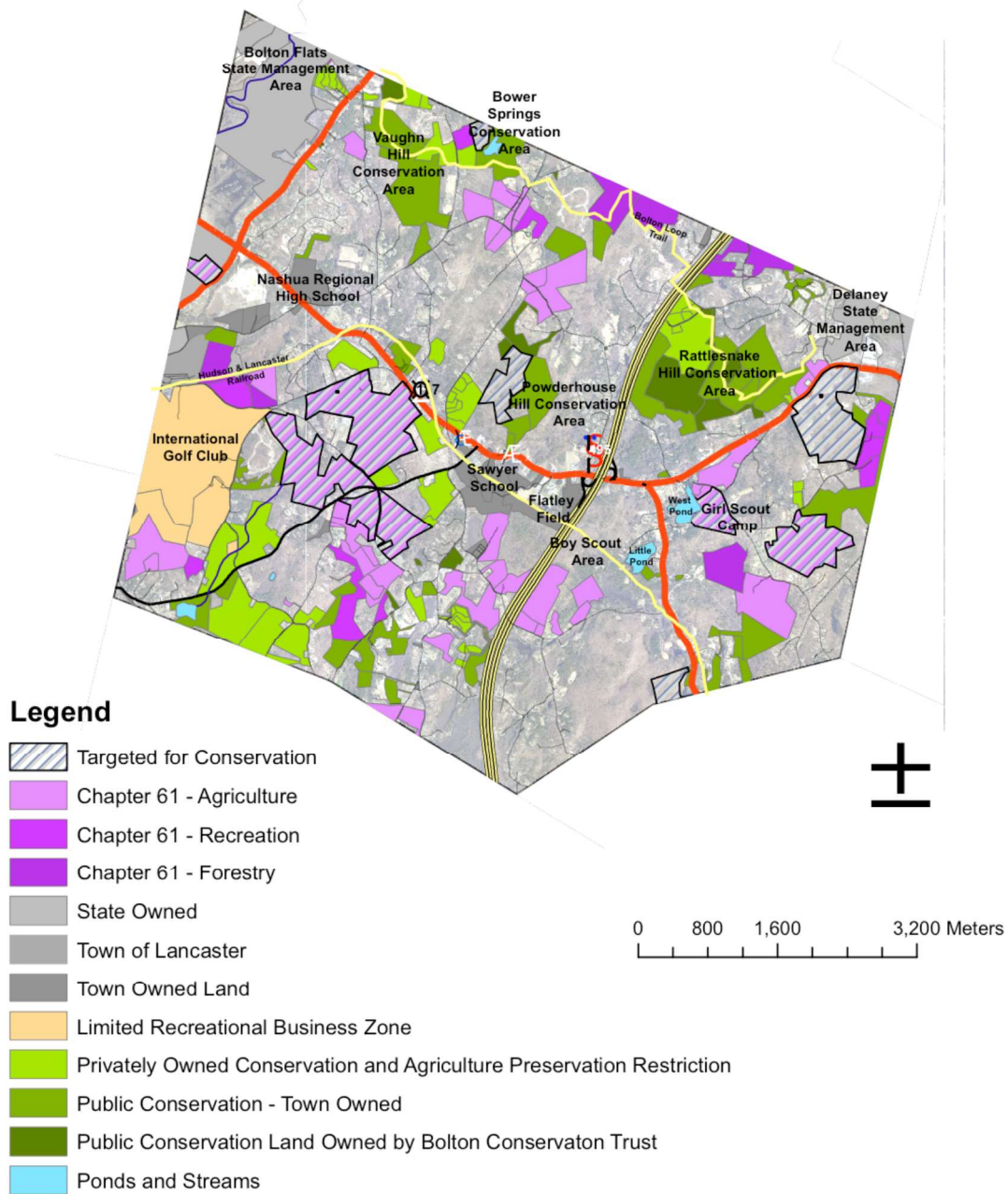
Data source: MassGIS September 2008

Map 4.3.2



Data source: MassGIS September 2008

Bolton's Open Space



Data source: MassGIS Se

4.4 Agriculture

Bolton's landscape determined its destiny as an agrarian community. Within its boundaries, rolling hills and fertile lands are well suited for orchards and dairies.

Historically, the Town sustained itself with agriculture, and this was important after the few industries that were in the Town closed. For a time in the late nineteenth century, there was a "rural retreat" movement, in which wealthy city dwellers bought up existing farms as summer and weekend homes, where they indulged in the pursuits of prize cattle-raising, horticulture, riding, and other gentlemanly pastimes (Town of Bolton website), which indicates that agriculture and the soils in Bolton were well known in urban areas such as Boston and Worcester.



Figure 4.4.1. Nashoba Valley Vineyard

Today, Bolton is the largest apple producer in Massachusetts. There are 66 parcels of land in Bolton that are designated agricultural, for a total of 1,790 acres or 13.9% of the Town (Bolton Agricultural Commission pamphlet). The 2002 Census of Agriculture identified 29 farms in Bolton – 14 farms are less than 50 acres while 15 are between 50 and 100 acres. The majority of farms earn less than \$50,000 a year. Only one farm in Bolton made over \$250,000 in 2001.



Figure 4.4.2. Apples in Bolton's orchards

Local farmers in Bolton grow and sell, grapes, tomatoes, peaches, apples, annual and perennial plants, corn and other vegetables. They also raise horses, pigs, sheep and rare livestock. According to the 2002 Agricultural Census, six of Bolton's 29 identified farms have orchards.

The largest of these farms is Bolton Orchards, which has 600 acres of orchards in cultivation as well as a successful farm store that serves as a small grocery store. There is also Bolton Springs Orchard which has a small farm stand and pick-your-own apples.



Figure 4.4.3. Bolton Springs Farm Stand

Townshend farm is a successful Morgan horse farm that has some of the most idyllic landscape qualities in Bolton. The Nashoba Valley Winery is close to the center of town, has a popular restaurant, and hosts many events and festivals during the year. These farms and their landscapes help to define the rural character that residents cherish. The farms also help to generate revenue for the Town and have little demand for infrastructure that can increase taxes.



Figure 4.4.4. Townshend Farm

Seventeen percent of the soils in Bolton are prime agricultural soils. Twenty percent of the soils are of state-wide importance, and seven percent are of unique importance. It is very important to maintain the integrity of these soils, because once development occurs on them, the soils structure is lost forever. The majority of the prime soils are in the western part of town on Wattaquaddock hill and along the Bolton Flats. **Map 4.4.1** displays the distribution of agricultural soils in Bolton and the surrounding towns.

Bolton still retains its strong agricultural identity. In comparison to neighboring towns, Bolton maintains a greater percentage of acres in agricultural use. However, from 1985 to 1999, the Town experienced 22% loss which surpasses the regional loss of 13% and the overall loss for Massachusetts of nine percent (see Table 4.4.2). **Map 4.4.2** displays the regional agricultural land use.

Given the dramatic loss of agricultural land in the region and in Bolton, the Town recognized this trend and has taken proactive steps to protect and sustain agriculture in the community. Steps taken to preserve farms, maintain open space and promote a sustainable plan for open space include: the 2005 Open Space Plan, the 2006 Master Plan, the 2006 Reconnaissance Plan, the Right to Farm Bylaw passed in 2007, and the subsequent creation of an Agricultural Commission. In addition, the Town has actively preserved land through Farmlands and Open Space Planned Residential Development (FOSPRD) and the state's Agriculture Preservation Restriction (APR) program. The FOSPRD program protected 231 acres of open space in nine sub divisions – however, little of that open space is farmed or suitable for farming as was intended with the bylaw because of access or size limitations. The Master Plan mentions that projects now in the pipeline will increase that amount to over 300 acres.

The APR program is more attractive to the Town due to its minimal cost to the Town and permanent protection from development placed on large parcels of active farmland. To date, over 218 acres within 5 parcels have been permanently preserved through APR. With over 1,500 acres in Chapter 61A, the Town has a large amount of working farmland unprotected. A number of these parcels have been identified in Bolton's Open Space Plan as priority parcels for permanent protection and are displayed on **Map 4.4.3**. The six largest unprotected agricultural parcels have been prioritized by the citizens: Bolton Orchards (Old Bay & Wilder Roads); Townshend Farm and neighboring Taylor Farm (Wattaquaddock, S. Berlin and Old Bay Roads); Bolton Spring Farms (Main Street); Lord's (Annie Moore Road), and Long Hill Farm (Long Hill Road).

Supporting those programs to set aside and preserve land are the passing of the Right to Farm Bylaw and the creation of the Agricultural Commission. The Right to Farm Bylaw

reinforces the universal right of residents to conduct agricultural activities. While these activities may include odor, noise and dust, such disturbances are inherent in farming processes and the bylaw is intended to prevent nuisance complaints by neighbors. The Agricultural Commission is the supporting body that mediates disputes. The Town's Agricultural Commission has also produced a brochure and a website as well as other projects to promote agriculture in the Town.

The Open Space Plan outlined ways to help to encourage agriculture through education incentives to help local children realize the connection of agriculture to their lives through community gardens, as well as a long range land use curriculum. The Open Space Plan also encourages the exploration of establishing a farmer's market. An important initiative that the Open Space recommended which was not passed by the Town was the Community Preservation Act. Part of that plan would have included a fund to set aside open space/agricultural lands.

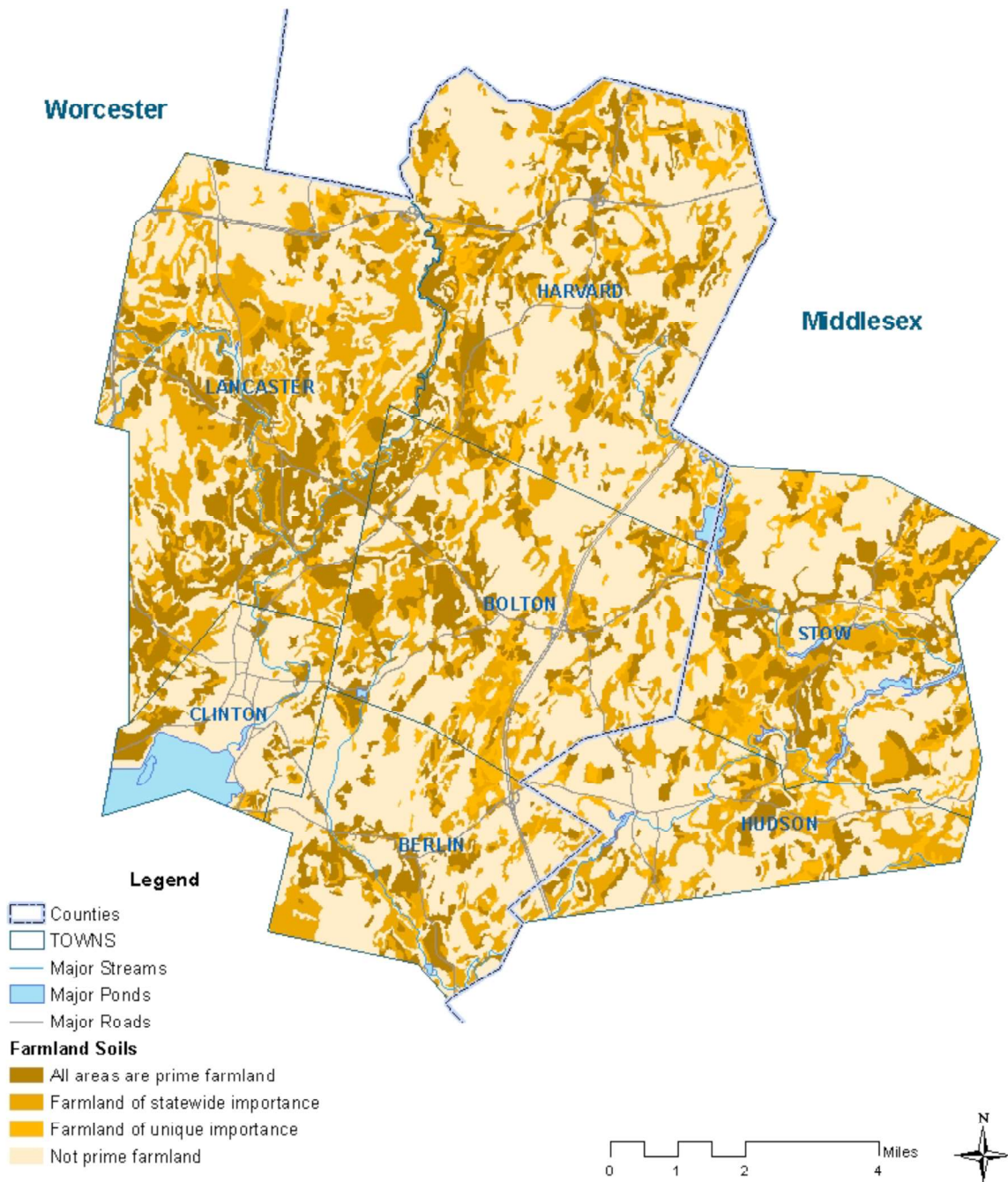
Talking to people at the Bolton fair revealed the strong attachments that residents of Bolton have to farm land as well as their commitment to supporting local agriculture. Many respondents indicated that they would like to see cornfields, orchards and open spaces maintained into the future. They also underscored the importance of those elements of Bolton to them today. When asked what they would like to see in the village center with regards to businesses – respondents said that they would like to see a co-op grocery store or a place that stocked local foods, and products like pottery. Many try and shop at farm stands, and the local farm stores – Bolton Springs and Bolton Orchards.

The soil maps indicate that there are some soils within the proposed village center districts. These are areas that should not be developed, because of their potentials for community gardens, school gardens or demonstration gardens for local farms and agriculture.

Historically, agriculture was part of village center life. There were several farms, including Sawyer farm and Blood farm within the traditional village center. Now, farms ring those areas that the Town Master Plan identified as possibilities for a village center: the eastern end of Bolton on 117, the traditional village center, and the western end of Bolton on 117 where the Bolton Orchards farm store is located. Many of those farms have been identified by the Open Space plan as priorities for preservation. Keeping these working farms maintains town character, as well as minimizing tax burden for town residents. Preserving these priority parcels will help to cluster development in the areas identified for village centers. The farm's proximity to the town centers fits a sustainable model, with them being able to provide quality produce, accessible open space and scenic views.

Map 4.4.1

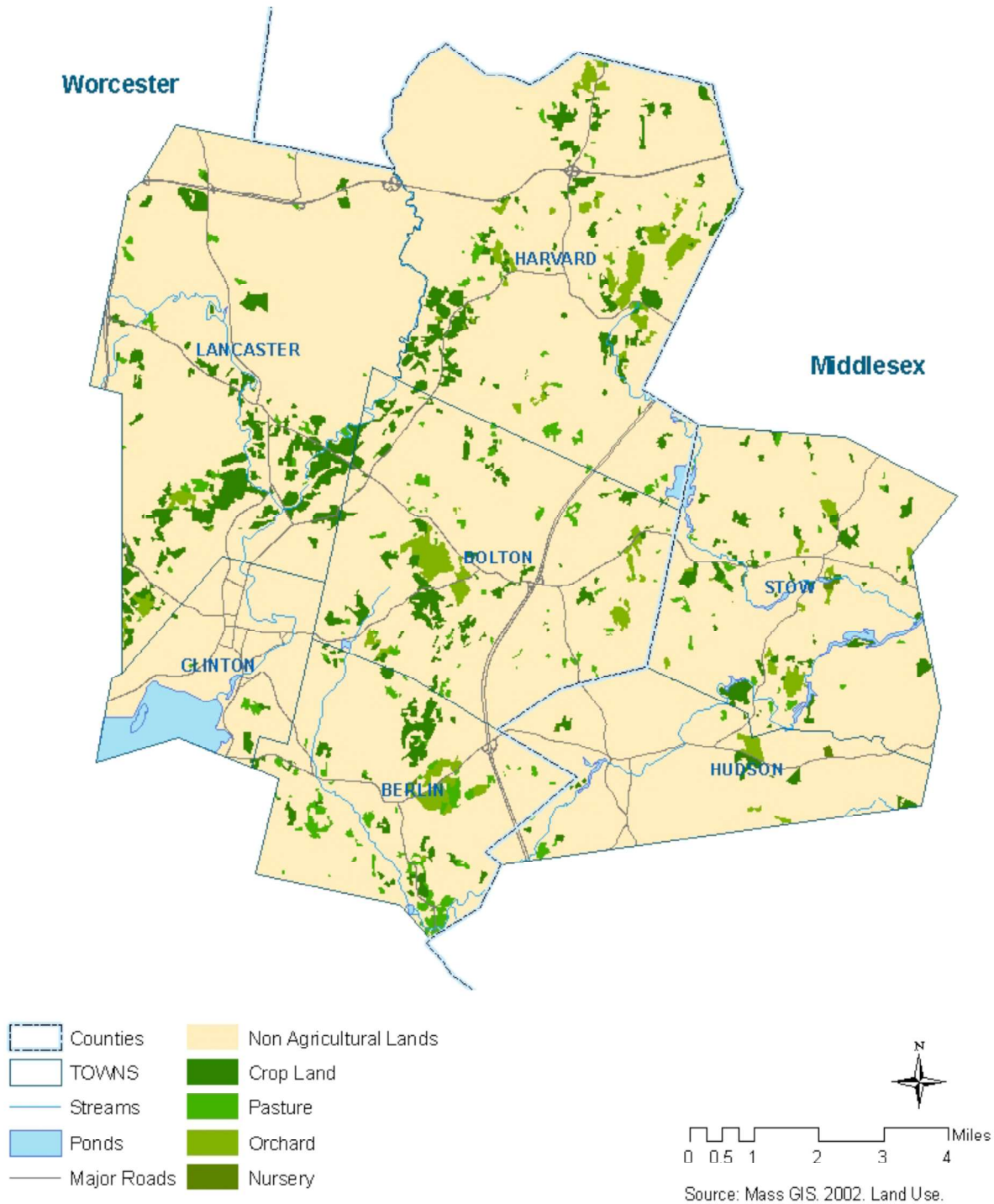
Farmland Soils in Bolton & Neighboring Towns



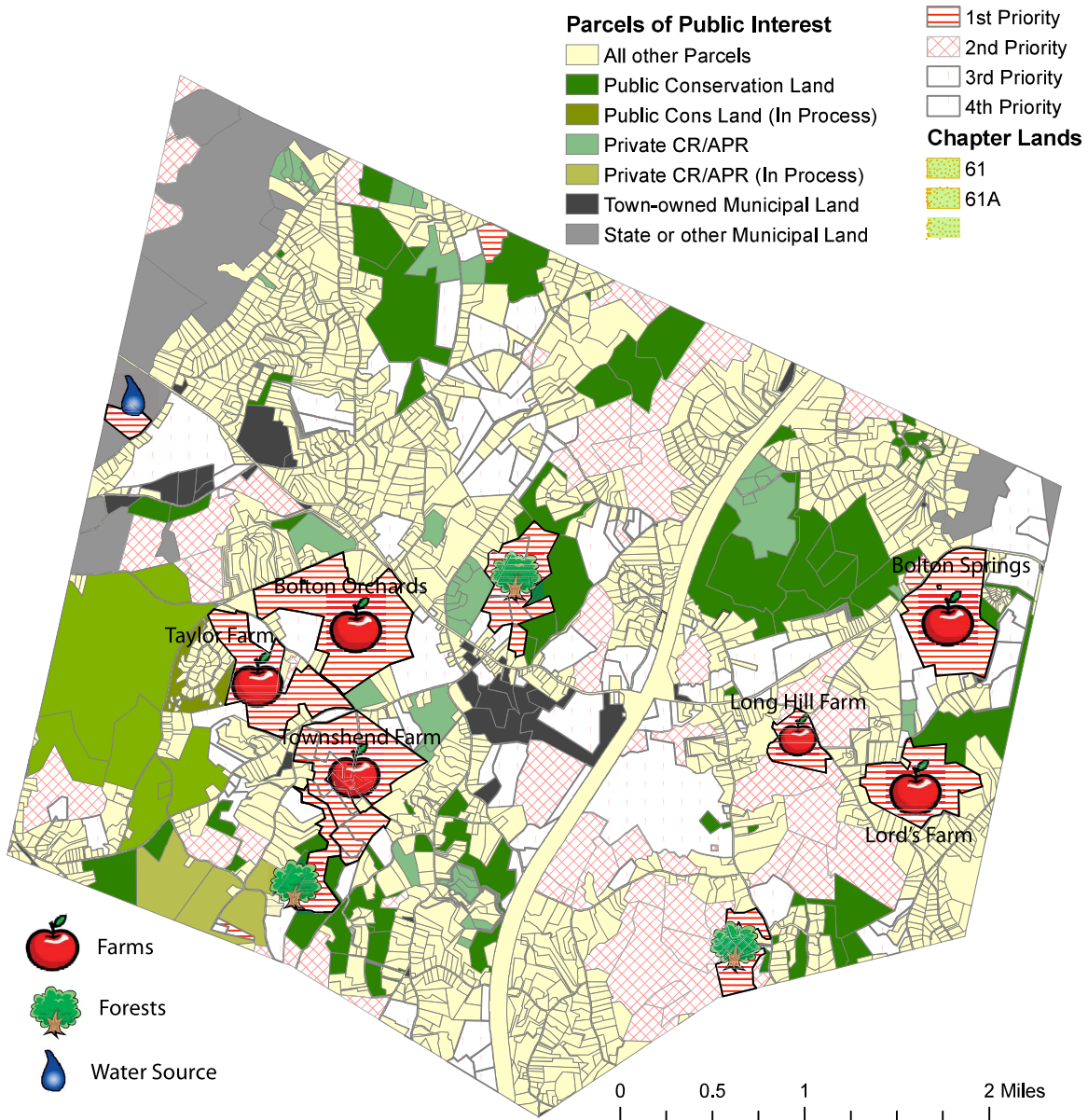
Source: Mass GIS. 2007. Soils Layer, based on soil surveys by US Department of Agriculture's Natural Resources Conservation Service.

Map 4.4.2

Agricultural Land Use in Bolton & Neighboring Towns



Map 4.4.3



4.5 Landscape & Historic Character

Reconnaissance Report Summary

Like most communities in the MetroWest area, Bolton has its share of 18th and early 19th century buildings, late 19th to mid 20th century neighborhoods (including a mix of residences, commercial properties and various institutional buildings), and farmland and related buildings. For the last several years, the Massachusetts Department of Conservation and Recreation Office of Cultural Resources have administered a Heritage Landscape Inventory Program. The program assists communities and regional agencies in identifying local landscapes vital to the history, character, and quality of life of local communities. In 2006, with technical assistance from the Freedom's Way Heritage Association and independent consultants, the Town took part in the DCR heritage landscape inventory program by commissioning a heritage landscape reconnaissance study.

The Reconnaissance Report identifies Bolton's center as providing the Town's most varied historical landscape, particularly the area south of Main Street that surrounds Great Brook as it meanders past old mills and dams, agricultural lands, and what remains of the Hudson & Lancaster Railroad. The area also affords the opportunity to walk down an old stagecoach road and over an old stone bridge, and is already a registered National Historic District. National Historic District properties are automatically included in the State Register, and the district is therefore covered by the Town's Demolition Delay Bylaw (the bylaw requires public notification and a six-month waiting period for buildings 75 years or older).

Other parts of the Town showcase Bolton's natural features, as well as industrial heritage. Nestled in the southeastern corner of town, the Century Mills area provides an ideal spot to explore the region's industrial heritage as well as interesting geologic features such as eskers and kettle holes. It is just on the other side of Route 495 from what is popularly known as Fryville, which was once one of the largest Quaker communities in the state. To the east of the Century Mill, lies another set of properties clustered around West Pond, the largest lake in town, which includes one of the old tanneries. An additional section adjacent to the pond features farm fields and historic homes, while on the opposite side of it are located some mid 20th century housing units. However, unlike many of the other sizable lakes in the region, the majority of the land around West Pond has been preserved as open space rather than settled with residences. The Reconnaissance Report suggests that areas such as West Pond may be further protected through local historic or neighborhood architectural conservation districting.

Bolton has already implemented a Scenic Roads Bylaw, designating 42 town-maintained roads. Routes south of 117, showcase the best agricultural landscapes in Bolton, including Old Bay and Wilder Roads in the western section of town. Old Bay Road is lined with stone walls, and in one section sugar maples, while Wilder Road includes the Bolton Orchards, the largest apple orchard in operation in the Town today. **Map 4.5.1** shows where the six districts identified in the report are located.

Architecturally significant homes can also be found along the community's scenic byways, such as the Wilder Mansion that overlooks the Bolton Orchards to the South, with a design inspired by the French "country seat."

Private-public partnership is an essential ingredient of any municipal preservation initiative as placing properties under preservation or conservation restrictions requires the willingness of the respective owners. Bolton has already placed properties such as the Town Hall and the Wilder Mansion under preservation restrictions. Less restrictive measures for structures are also available such as façade or other preservation easements. A flexible development bylaw might also be a useful measure for protecting historic structures in cases where development is unavoidable. In terms of preservation of scenic vistas, scenic overlay zoning is an option. The town should also seek the cooperation of private owners of farms and abandoned mills to enact preservation restrictions and/or establishment of walkable areas with interpretive displays. Some communities in the region have recently set targets for adaptive reuse of buildings used for mill and other industrial operations, sometimes encompassing entire former mill villages.

History of Bolton

Natural Context

The geologic history of Bolton has been instrumental in shaping the development and culture of the locale; therefore it is important to understand the major physical features of the landscape and their significance. Bolton's landscape of rolling, rocky hills, flat terraced areas with steep, sandy slopes and low lying streams surrounded by extensive fresh water meadows are directly related to the actions of glaciers as they first advanced, then retreated, during the last ice age, over 100,000 years ago.

As the glacier moved across the landscape, it altered the preexisting topography by scouring away at the underlying bedrock and picking up pre-existing soil and loosened rocks which subsequently redistributed across the area in a random fashion. This unsorted material – ranging in size from fine grains of sand and clay to gigantic boulders – is known as glacial till soil and is found in hill areas. In Bolton, glacial till was distributed across the land- however it exists in greater concentration around Wattaquadock Hill and in the southeast area corner of town near Hudson. The coarse composition of glacial till soils rendered them difficult to cultivate and therefore had limited agricultural viability (Lima, 1998).

In comparison to glacial till soils, glacial outwash soils are composed of stratified layers of sand and gravel and result from the deposits of glacial lakes and streams. In Bolton, glacial outwash soils are found in the western section and the low lying areas of eastern part of town, typically in the vicinity streams and watersheds. Historically, these areas were deemed by the Native Americans and European settlers alike to be the preferable areas for agriculture as the soil had optimal permeability. Glacial movement also led to formation of many significant geologic features, including eskers in East Bolton, drumlins in the vicinity of Long Hill and kettle holes off Forbush Mill Road (Lima, 1998).

The Bolton Flats and Still River are perhaps the most ecologically significant features in town. The Still River is a tributary of the Nashua River and runs nearly parallel to it. The Bolton Flats are the low lying areas of streams, wetlands and fresh water meadows situated between the Still and Nashua Rivers. These features were formed when Glacial Lake Nashua receded, leaving behind thick deposits of silt which provided the basis for the hardwood floodplain which later developed. The area acts as prime wild life habitat as well as Bolton's largest and most extensive aquifer.

Native American Populations in Bolton

Archeological studies have suggested that a small population of Native American nomadic tribes relying on hunting and gathering migrated through the area over 10,000 years ago. However, it was not until 9,000 years later after they had adopted agriculture and the climatic conditions were suitable did the tribes come to settle in a more permanent manner in the area.

At the time of the first encounter with European settlers, southern New England was inhabited by distinct sub-tribes belonging to the Eastern Algonquian nation. At this time, the Nashua River Valley including the area which would become Bolton and Lancaster was inhabited by the Nashaways, a sub group of the Nipmacs or "fresh water people." As their place name suggests, the Nipmacs often lived in small, often seasonal, encampments along interior rivers, streams and swamps, including Still River and Bolton Flats. Aside from offering prime access to fishing grounds and areas for fresh water fowl hunting, the soils in such areas were optimal for agriculture as they are periodically flooded and thus replenished with nutrients. In addition to practicing agriculture on the floodplains, the Nashaways carefully managed the surrounding woodlands as hunting grounds and transportation corridors.

Trade was an important aspect of Native American tradition as it served to solidify political alliances and assert territorial rights. To this end, there were several well-established routes, some of which continue to be used presently, including: a primary east-west trail which traces today's Long Hill Road to Main Street to Wilder Road, an alternate trail from Wattaquodock Hill to Old Bay Road, and a north-south route which followed the Still River (Forbes, 1998).

Initial Settlement Period

Following years of strife, an accord was issued in 1643 by the regional tribal leader which effectively sold the land referred to as the Nash away Plantation to the English, which included the land that would someday be the town Town of Bolton. The Massachusetts General Court later affirmed the decision and a decade later, Nash away was incorporated as the Town of Lancaster in 1653. Within a few years, Lancaster had evolved into a small village. Discord between the native population and settlers persisted, reaching its height during King Philips War when the entire village was burned and the settlers captured (Forbes, 1998).

When Lancaster was resettled some months later; there was deliberate attempt promoted by the townspeople to establish homesteads in the outlying areas of town as they believed

that a more dispersed settlement would have a greater likelihood of surviving an attack. During this era, several farms, many of which included grain cultivation, animal husbandry and apple orchards were established in the outlying areas of town, in particular along Old Sugar Road, Bare Hill Road. and Wattaquadock Hill (Forbes, 1998).

Though agriculture would continue to be the dominant sector of Bolton's economy, local industries which utilized Bolton's natural resources were emerging including grist and saw mills and a lime quarry and kiln. The existence of lime deposits in Bolton proved to be an long lasting economic blessing as the Whitcomb quarry was only the second founded in New England and was productive for over 100 years at its height produced nearly 20,000 bushels of lime annually for plaster (Lima, 1998). Situated in East Bolton, the lime kiln has been consistently identified in the Preservation Plan and Bolton's Reconnaissance Report as critical heritage landscape.

Though the area now known as Bolton had long existed as an outlying agricultural community, not until 1738 did the community become an independent town. Within the next fifty years, the Town's original 35 square miles would be reduced by the formation of Berlin in 1784, the granting of land to Marlborough in 1829 and the formation of Hudson in 1868.

Colonial Period

From the 18th century onwards, Bolton's economic and physical development was directly tied to the emerging importance of the Great Road, now Route 117, as a major east- west through fare connecting towns in central Massachusetts to Concord and Sudbury. Once a Native American pathway, known as Bay Road, the alignment of the Great Road differed from its current layout. From east to west, entering town the road followed the same route as present day Route 117 until it met Meadow Road traveled south, avoiding the wetlands located at the center of town, from which point it rejoined Route 117 and further west Wilder Road as it entered Lancaster. In 1734, the northern branch of the Great Road was improved to address problems stemming from inadequate bridges and drainage. The contract states, the road should be made "so feasible as to carry, with four oxen, four barrels of cider at once" (Whitcomb, p. 37) illustrates the need for the route to function as a transportation and trade corridor. Throughout the colonial period, the Town would continue to construct and improve roads to ease access to surrounding towns and provide connections for local transportation to several of the outlying neighborhood districts, including Fryville, a Quaker community in southern Bolton. During this period, four school houses were built to serve the children of this outlying area which continued to grow in population.

Soon after the founding of the Town, the first meetinghouse was established near the intersection of Wattaquadock and Manor Roads with the burial ground located a short distance to the south. As tradition dictated the first structures were built in close vicinity to the meetinghouse including the first school house, an animal pound, an inn and a few residences. According to Forbes, the major architectural house form of the Colonial Period was the 2.5 story clapboard house with a center chimney and a five bay façade. The best remaining example of this type of structure can be found at 698 Main Street.

Built circa 1760, it is known as the Joseph Sawyer House and is distinguished for its detailed façade. During this period, Bolton experienced a boom in the opening of inns and taverns, few examples remain except for a portion of the Holman Inn, which operated for nearly a hundred years and was located opposite the Meetinghouse. Though it was demolished in the late 19th century, one wing of the Inn was relocated to 676 Main Street where it stands today (Forbes, 1998).

Federal Period

During the 18th century, Bolton experienced great economic prosperity as a significant agricultural and small-scale manufacturing center which is evidenced by the higher concentration of Federal Style buildings at the center of town on either side of Great Road. Notably, this period marks an important transitional phase of development in Bolton Center as farmers began to sub-divide their original one-acre house lots in order to give smaller lots, often with road frontage to their children. As a result of smaller lot size, houses became clustered and a more defined village center emerged (Lima, 1998). The construction of significant civic, institutional and commercial buildings along the Great Road in close proximity to this cluster of homes further reinforced the idea of the area as the town center. In 1833, the state ruled that the Town and church must function separately, and in the following year, the town house was constructed west of the meetinghouse on the town common which included the First Parish Church. A decade later, the Houghton School, Bolton's first high school, was built nearby (697 Main Street), as well Bolton's first fire station.

An increase in stage-coach travel proved profitable to local entrepreneurs who established several types of transportation-related businesses including inns, taverns, blacksmith shops, and stage coach lines. One of the most interesting transportation related projects initiated during this era was the Lancaster and Bolton Turnpike. Located in the western part of town, the route traveled down a portion of the Great Road, Sampson Road and ended in Lancaster. Though the road was later taken by the county as a public road, the toll house at 855 Main Street opposite Bolton Orchards still remains. According to the Bolton's Town History by Anne Forbes, "an average of forty loaded wagons passed through Bolton per day, carrying 14,000 tons of goods to the Greenfield/Brattleboro area."

Early Industrial

During this era, agriculturally-related such as blacksmithing, tanneries, cider-making, and the manufacturing of wheels, harnesses and oxbows developed as cottage industries. This new type of home-based manufacturing precipitated a new type of built structure, referred to as the "ten footer"; these were wood timber shops measuring 10' x 10'. A good example of this type of structure is visible at 443 Main Street (Forbes, 1998).

While these businesses were significant to the local market, the emergence of several niche businesses producing highly specialized products- including straw and palm leaf hats, horn combs and shoes - had a greater effect on the regional economy.

Late Industrial

Though Bolton had a diverse and promising economic base driven primarily by small-scale manufacturing and agriculture, it quickly became evident following the opening of the Fitchburg Railroad through Hudson in 1854 and the opening of the Agricultural Branch of the Boston, Clinton, and Fitchburg line in 1866, that it would be difficult to compete with nearby communities that had railroad access. Within a matter of years, Bolton's leading cottage industries shoe-making and comb-making would fold (Forbes, 1998). Soon after, the majority of the businesses related to stage coach travel including all the remaining inns and taverns as well as blacksmith and harness shops, closed (see **Map 4.5.2** for a map of the town center in 1870). In a brazen attempt to remedy the situation, a group of local investors spent several years building the Lancaster Railroad which was intended to run from Bolton through Hudson to Lancaster. Unfortunately, it is said that the project was such a financial disaster that only one train ever ran the tracks in 1871.

By the beginning of the Civil War, Bolton's once thriving industrial enterprises had for the most part been abandoned and as the Town returned to an economy almost completely based on agriculture.

“Orchards were still important, although with the growing temperance movement apples were more likely to be used to make vinegar than cider, and sold for winter fruit. The growing of corn, hay, potatoes and other crops continued through this period; oxen were gradually being replaced by horses as work animals, while the number of sheep declined. Bolton had at least twenty seven acres in cranberry production in the 1850's and 1860's, most of it along Great Brook and east of the center.”

-Forbes, 1998

During this period, farms began to shift more towards livestock and dairy production, as railroad access made these practices more profitable. Coinciding with the growth of agriculture was a movement to organize farmer's organizations, including the formation of the Bolton Grange in 1878 which ran the Bolton Fair starting in 1887.

Growth in the agricultural sector coincided with the “rural retreat” movement, in which wealthy urban residents would come to Bolton to establish summer retreats and gentleman farms where they could enjoy in the charms of the rural life. Often these retreats were located on the eastern and western slopes of Wattaquadock Hill and were sizable in acreage. In terms of landscape character, these farms were significant in that they were designed to be scenic agricultural landscapes.

Though building in Bolton center slowed during the late Industrial Period, a citizen led movement brought greater attention to the need for “village renewal”. The Village Improvement's Society first project consisted of removing the rundown mill and artisan shops which had been located along the mill pond and creating the small park, currently known as Pond Park.

Early Modern Period to the Present

Beginning in the 1950's, Bolton's population began to increase as it became known as an attractive bedroom community for people working in the MetroWest region. In the past fifty years, the population has approximately tripled with the greatest growth occurring in the last twenty years.

Through the middle of the 20th century, Bolton's economy continued to be dependent on agriculture with a growing emphasis on fruit production. Following the Great Depression, Bolton Spring orchard was established in the east end of town and Bolton Orchards on Wilder Hill. These two farms continue to be in operation to date.

Bolton's Visual Character

Bolton's natural and cultural history has led to the development of a series of distinct landscapes which reflect the complex interactions between geology, nature and humans. The layering of these different types of landscapes creates a unique sense of place which reflects the history and character of the community. Dynamic and evolving, these landscapes reflect the changing values of the community as it has evolved from a series of dispersed farms with a traditional center village to a residential community of substantial single- family homes, many of which have been built on former agriculture lands. The goal of this chapter is to identify and discuss the significant visual, natural and community landscape resources as well as the overall quality of the landscape; specifically along Rte.117, as it is the major transportation route and has been a determining factor in the historical and cultural development of the Town. It should be acknowledged that the majority of the places which have been identified as conveying Bolton's unique landscape qualities exist in areas well beyond Rte. 117. The majority of these landscapes have been identified in Town of Bolton Preservation Plan and the Reconnaissance Study, we recommend that the Town follow the outlined strategies to protect and preserve these irreplaceable resources.

Bolton Center

The following information was drawn from the Historical Properties Survey, which was completed in 1998 and served as the basis for the Preservation Plan published that same year.

Situated in the geographic center of Bolton, Bolton Center continues to act as the heart of the Town and the hub of community activity. The Bolton Center Historic District consists of 73 acres, located at the approximate center of town and primarily centered along Main Street, a major colonial and early 19th century transportation route. It is a traditional linear village with many barns and outbuildings dating to the 19th century and indicating an agrarian and manufacturing past. A diverse collection of other structures and objects are also apparent, including several historic roads and drives, a network of field stone walls, a fieldstone bridge, a stone marker that displayed mileage to Boston in the days of the stagecoach and a powder house. Overall, the Bolton Center Historic District retains its integrity of location, design, setting, materials, workmanship, feeling and association as a town center of over two centuries old.

In terms of general architecture, most buildings are wood frame, domestic scale residential buildings, and have 1.5-2.5 stories with one or two wings. Most were built between the late 18th and mid 19th century and the predominant architectural styles are Colonial Revival, Georgian, Federal, and Greek revival. Colonial architecture is distinguishable due to the location of chimneys in the center of the house and the slightly lesser amount of exterior detailing compared to the other styles from this period. Cape style houses, named after the Cape Cod cottage type, are a subset of Colonial houses.

Accessory structures such as barns are common, and these enhance the character of the center giving it its rural appeal. Some barns are attached via a wing producing the extended farmhouse; nearly all of such houses predate 1830 and most are barns with a main wagon door. Of all residential types, gable-end cottages are the most likely to have multiple outbuildings, and most have attached barns. Probably the oldest barn in town is a low-evade barn at 694 Main Street that was rehabilitated some time after Pond Park was dredged and landscaped in 1905 (the rehabilitation of the park included construction of the rustic bridge). **Table 4.5.1** lists the most architecturally significant buildings in and adjacent to the National Historic District. **Figure 4.5.1** shows corresponding photographs for some of these.

Table 4.5.1. Architecturally significant historic buildings in and around the historic district.

Property Name	Street Address	Year Built	Architecture/Description
Simeon Cunningham House	777 Main St.	1831	Federal/Greek Revival
Wright, Allen, and Edes House	763 Main St.	1785	Late Georgian
Goss & Holman House	752 Main St.	1741	Georgian/Federal
Elizabeth Osborne House	749 Main St.	1849	Greek Revival
Holman Inn Annex	746 Main St.	1835	Greek Revival
Bolton Library (picture 1)	738 Main St.	1903	English Revival, completed in 1903 and entirely constructed of local stones
Ellen Winde House	733 Main St.	1880	Italianate, vernacular
Former Holman Harness Shop	727 Main St.	1800	Greco-Italianate
Corporation House (picture 2)	726 Main St.	1840	Greek Revival, a two-and-a-half story double house oriented to the street; first multi-family housing in town
Former General Store	718 Main St.	1820	Federal
Former Fairbanks House. & barn (pictures 3 and 4)	714 Main St.	1826	early Federal, barn late 19th century utilitarian
William Chaplin House.	707 Main St.	1820	Federal
Amos Parker House. (picture 5)	704 Main St.	1800	center-chimney Federal
Joseph Sawyer House (picture 6)	698 Main St.	1760	Georgian
Joseph & Nathan Sawyer House	694 Main St.	1830	late Federal
First Parish Church	673 Main St.	1923	Federal
Town Hall	663 Main St.	1853	Greco-Italianate
Withington House	655 Main St.	1831	Greek Revival
Otis Pollard House	621 Main St.	1850	Greek Revival
Samuel Blood Farm, now Delta Equity Services (pictures 7 and 8)	579 Main St.	1793	Federal/Colonial Revival house, early 20th century large connected dairy barn & stable
Former Baptist Church & Former District #1 School	9 Wattaquadock Hill Rd	1841	Greek Revival

Source: Bolton Historical Properties Survey, 1998



Figure 4.5.1. Historic properties on Bolton's Main Street. From top left; Bolton Library, Corporation House, former Fairbanks House, Fairbanks House barn, Amos Parker House, Joseph Sawyer House, Samuel Blood Farm house, and Samuel Blood Farm barn.

Bolton Center has a variety of institutional buildings that reflect the community's changing needs. A total of four public schools have been built in Bolton. The Center School, built in 1825 at 689 Main Street, is no longer standing. The two-story, Greek Revival Houghton School at 697 Main Street was built in 1849 and is pictured later in this section. It is currently in use as the Police Station. The First Parish Church was built in 1928 on the grounds of the Second Meetinghouse at 673 Main Street. It is a colonial revival structure with a three stage steeple.

There are two historic trails perpendicular to Main Street. The trail to the first meetinghouse can be seen just east of 720 Main Street and dates to 1740 and the 19th century Old Town Road which is a stone wall lined trail mounting the hill east of Town Hall - it may have continued south of Main Street as it lines up with a bridge that crosses Great Brook. Photos 3 through 9 in Figure 4.5.1 show before and after photographs of properties within Bolton's National Historic District.

East End

Entering Bolton from the east, Rte. 117 curves through a forested area within which two commercial developments are located. The large buildings are not completely visible from the road and therefore have minimal impact on scenic quality. As the road curves around, the landscape unfolds to reveal rolling agricultural fields and orchards encircled by stone walls. Bolton Springs Farm Stand is situated across the street from the fields and acts as a marketplace for locally grown produce and apples. In this particular section of Bolton, Rte. 117 follows its historical path and as a result is more characteristic of a winding country road than a major east-west thoroughfare. This portion of the road is narrower with a canopy of mature trees. Just beyond the farm stand there is a series of well-preserved historic homes, including the Jonas Wilder House, the oldest farmhouse in this area and the only structure in Bolton that has a preservation restriction. Situated in the back of Wilder House is the Whitcomb Lime Kiln, an artifact of Bolton's earliest industry. The stone structure is visible from the road and situated next to Lime Kiln and Harris Gift Conservation Areas, which offer trails through pristine woodlands.

The East End of Bolton is a distinct, multi-layered landscape offering exceptional scenic views of working agricultural lands as well as opportunities to explore Bolton's past. Of all the areas along Rte.117, the East End should be recognized as having exceptional landscape character; as it is the only area along the corridor where the farming landscape and the adjoining historic structures are well preserved and can be viewed together. The layering of different landscape types in close vicinity to one another demonstrates the importance of examining the larger landscape. To this end, efforts to preserve the East End as a significant heritage landscape of distinct quality should seek to ensure that land uses along the boundaries of the district are compatible functionally and aesthetically.

The Pan

Situated between Bolton Center and the East End, the area known as the Pan played a significant role in Bolton's economic development with the establishment of a variety of manufacturing related industries along the Great Brook and in the vicinity of West and Little Ponds, including tool manufacturing, brick making, lumber, the milling of grains,

and the cranberry cultivation (Lima, 1998). The Pan was the site of a small glacial lake and as a result the soils in the area are optimal for agriculture; hence forth there were a number of farms located off Long Hill Road, which through the 1850's was the main thoroughfare to Boston. In addition to these cultural sites, there are a number of significant geologic features within the district, including several kettle holes and glacial rock formations.

When approaching the Pan from the east, it becomes quickly evident that this is a different type of landscape. Transitioning from the bucolic east end, Rte.117 assumes a straighter path, moving past several typical suburban homes. While these homes are not unattractive, they have little relationship to their surroundings. Expansive lawns with little screening along the road and structures placed in the center of the lot render these properties very noticeable from the road and detract from the overall scenic quality of the area. Proceeding past Meadow Road, the road becomes wider and straighter as it enters a heavily forested area. Though offering no grand vistas, this area should be considered notable for its rugged beauty. Glacial outcroppings, white pines and irregular topography dominate the landscape, suggesting a much more remote location. Within this area there are two commercial properties, the Skinner Auction House and Great Brooks Farm, a garden center. While the auction house is set back several hundred feet from the road and concealed by a stand of pines, the garden center is prominently placed on a cleared slope which draws a great deal of attention to it. This structure demonstrates that more careful consideration should be given to the siting of commercial structures.

The highest concentration of historic residential structures is located west of Long Hill Road. Many of these residences also had home businesses and for this reason, there are a number of historically significant outbuildings which functioned as workshops. The majority of the structures date to the early 19th century and are aligned facing Rte.117, and often a stone wall or picket fence separates the residence from the road. Traveling on Rte.117, one has the impression that the landscape matured around the buildings, as there are no expansive lawns and it seems as though the woodlands located beyond the structures often migrate forward meeting the road. While there are no fields currently being tended in the area, there are several plots surrounded by stonewalls which appear to have been recently abandoned. Notably, the settlement pattern in this area is less dense than in the east end or Bolton Center.

When crossing the intersection at Hudson Road, Rte. 117 widens to accommodate traffic associated with I-495 and several businesses including Country Cupboard as the woodland recedes behind the buildings. A grass planting strip is the only vegetative border between the street and the parking lot at the front of the building. Opposite this commercial strip is Pan Burying Ground, which has been identified as a significant historic resource. While the Burying Ground is a scenic place, the overall visual quality of this landscape, including the commercial strip is very different from the abutting areas.

Breaking the overall existing pattern of the landscape, this area acts as a gateway to the more suburban business district abutting I-495 on either side. The width of the road dramatically increases to accommodate vehicles moving at increased speeds, rendering

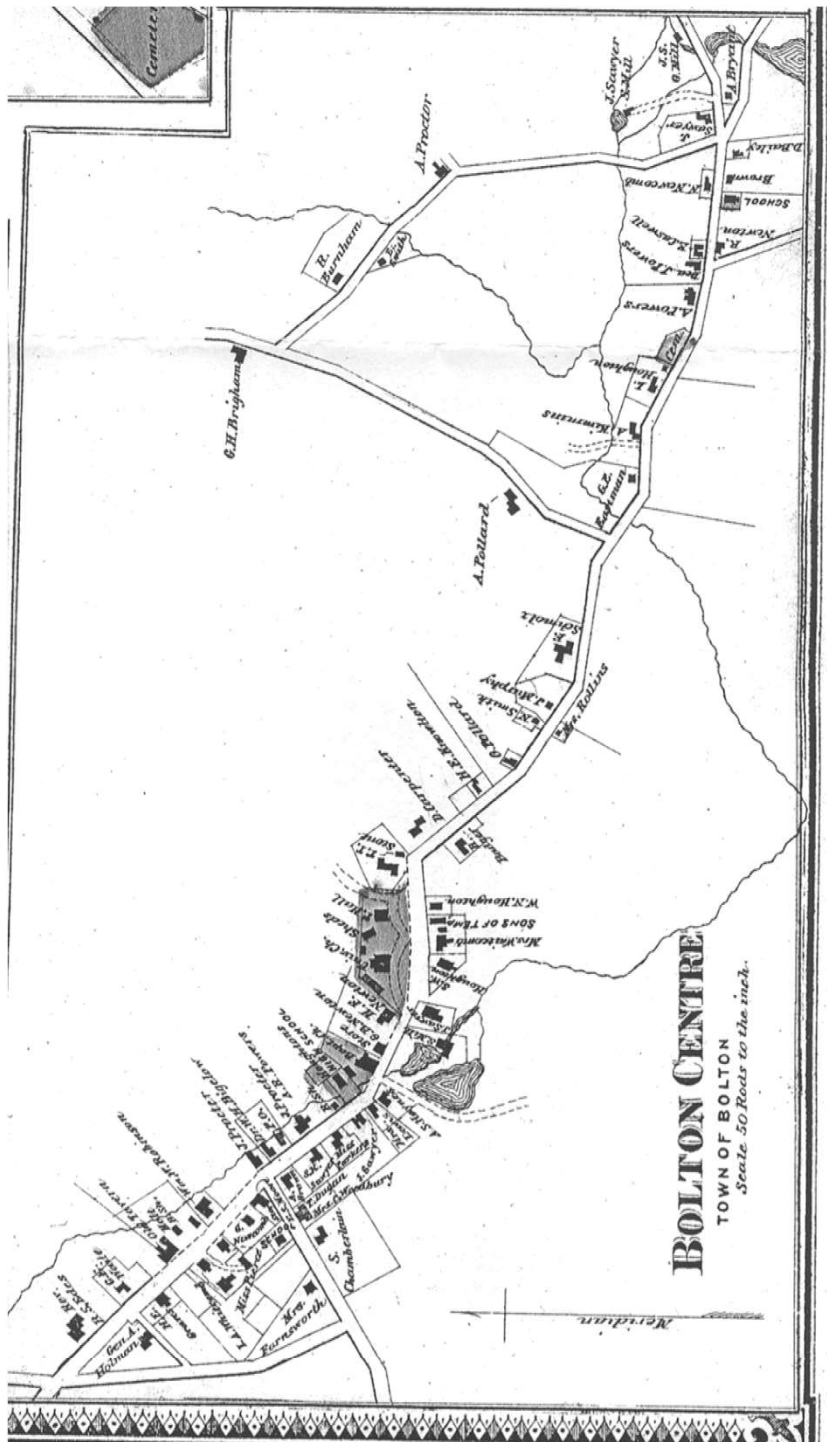
pedestrian movement dangerous. While many of the landscape characteristics remain the same, it is important to note that I-495 bisects Bolton, essentially dividing the Town in to two sections.

Immediately following the interchange, situated on the former agricultural land is an office/commercial building in which a bank, attorney offices and a social service organization is located. It appears that the building was designed to resemble a barn. However, the setbacks and parking layout make it appear more like a suburban shopping center than context-sensitive design. A major corporate office building is located directly on the other side of Rte. 117 as is the Senior Housing Complex. In this area, there is significant wetland habitat which if accessible could be a valuable recreational opportunity. In terms of landscape character, this area is representative of the corporate campus with its sprawling parking lots, sparse vegetation and disjointed relationship to the context of the existing landscape.

Western Bolton

As the meandering path of Rte. 117 straightens just beyond the Bolton Public Library, the character of the landscape shifts to become more wooded and enclosed. While Wattaquodock Road is particularly scenic in this area offering long, scenic vistas, the views along Rte. 117 are limited by dense forest. In contrast with east Bolton, which has a high number of historic properties and agricultural lands, which combined seem to capture the essence of Bolton; Rte. 117 in west Bolton primarily functions to provide access to Lancaster to the west and Rte. 110. Commercial development is dispersed throughout the area though there is a greater concentration of development in the vicinity of Nashoba Regional High School. Compared with the density of the Town Center, there is very limited residential development along Rte. 117. Undoubtedly, the most significant property in the area is Bolton Orchards, a local market and meeting place situated at the gateway to town. Unfortunately, the only agricultural land in the vicinity is located on the other side of a busy intersection. As a result, Bolton Orchards is visually isolated and appears disconnected from its surroundings. However, it should be noted that this intersection has great potential if re-imagined in a manner that is sensitive to the Town context.

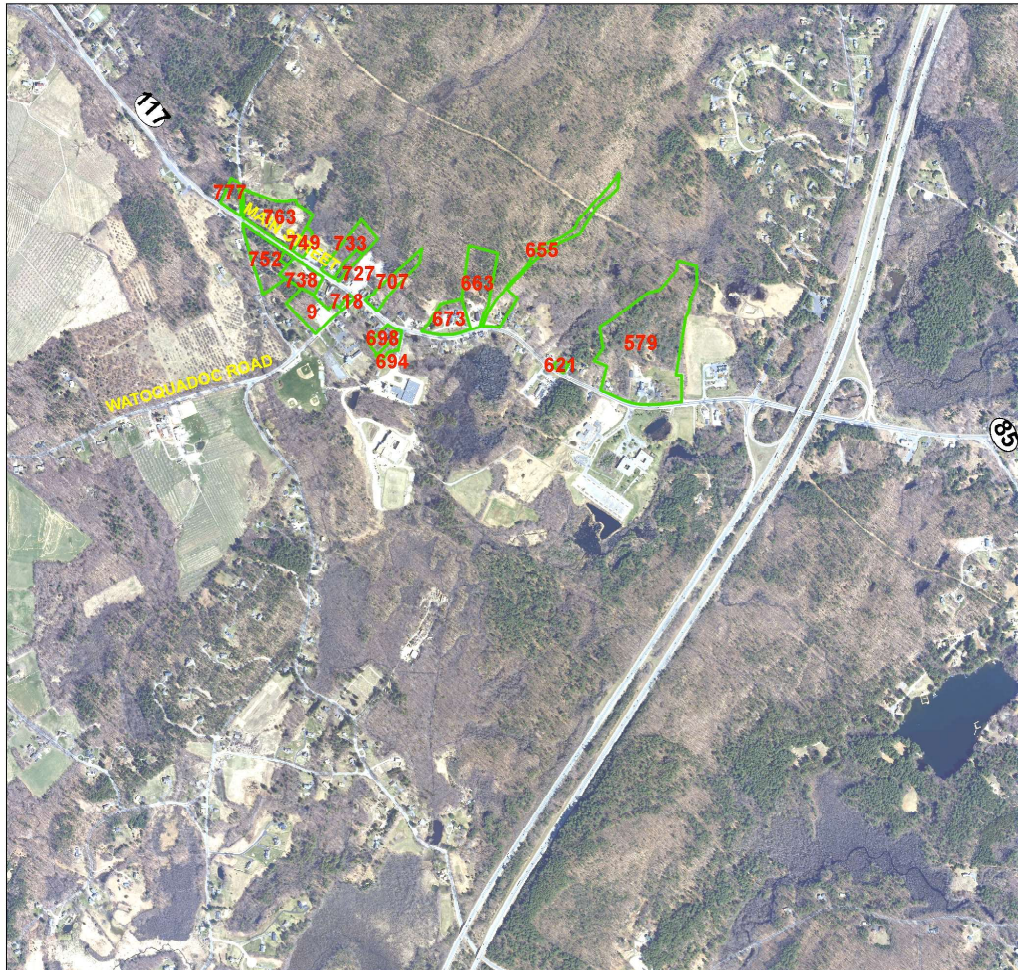
Map 4.5.1: Map of Bolton Centre, c. 1870




Source: Beers Atlas

Map 4.5.2

Bolton Center Historic Properties



Legend

-  Historic Properties
-  Street Number



Source: Bolton Historical Properties Survey, 1998

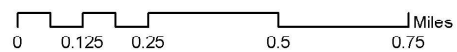


Figure 4.5.2: General Store, 718 Main Street, early 20th century



Source: Bolton Historical Society

Figure 4.5.3: 718 Main Street today



Source: Photograph by authors

Figure 4.5.4: Old Post Office, 711 Main Street, c. 1930



Source: Bolton Historical Society

Figure 4.5.5: 711 Main Street today



Source: Photograph by authors

Figure 4.5.6: Houghton High, c. 1904



Source: Bolton Historical Society

Figure 4.5.7: Houghton Building today



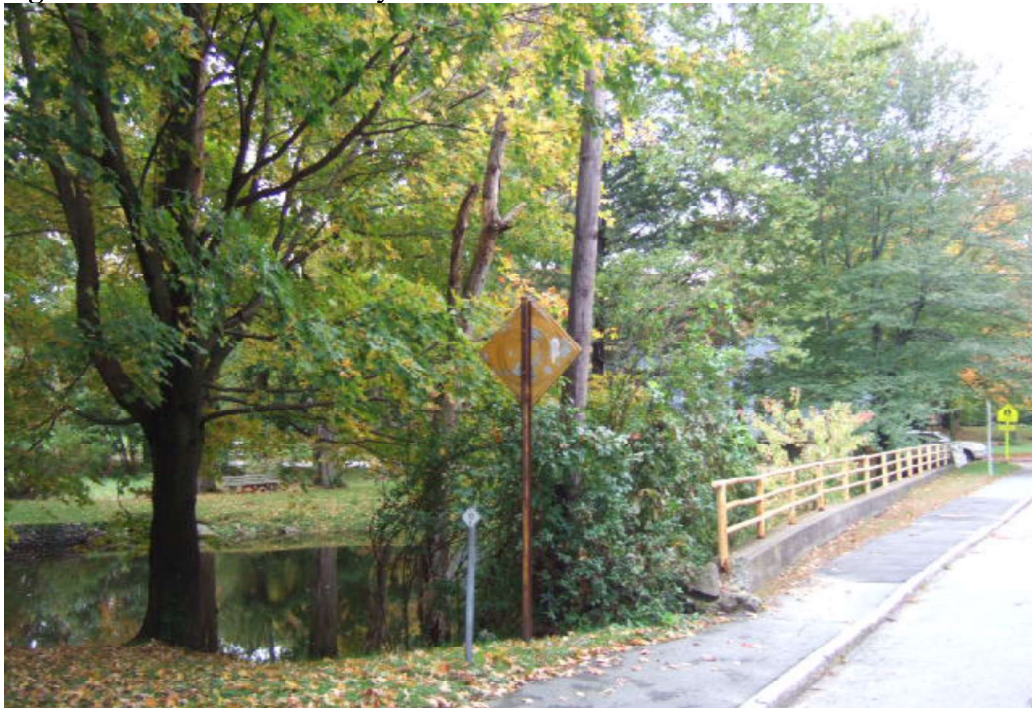
Source: Photograph by authors

Figure 4.5.8: Pond Park pre-1905



Source: Bolton Historical Society

Figure 4.5.9: Pond Park today



Source: Photograph by authors

Figure 4.5.10: 694 Main Street, Sawyer mill remnants, pre-1905



Source: Bolton Historical Society

Figure 4.5.11: 694 Main Street today



Source: Photograph by authors

Figure 4.5.12: First Congregational Church, c. 1903



Source: Bolton Historical Society

Figure 4.5.13: First Church today



Source: Photograph by authors

Figure 4.5.14: View of Bolton Shoe Co., 664 Main Street, c. 1904



Source: Bolton Historical Society

Figure 4.5.15: View of 664 Main Street today



Source: Photograph by authors

4.6 Economics

Bolton is situated within the 495/MetroWest Corridor, one of the most economically productive regions in the state of Massachusetts. This region is expected to continue to experience growth over the next twenty years. Composed of 32 municipalities located in the “Arc of Innovation” region along Interstate 495, the 495/MetroWest Corridor supports most of Massachusetts’ largest and fastest growing companies and is home to more than 500,000 residents (MetroWest Economic Research Center, 2007).

According to a 2007 report conducted by the MetroWest Economic Research Center on economic and demographic indicators, the region experienced a 56% increase in employment between 1980 and 2005, with most of these jobs concentrated in the Trade, Transportation and Utilities (21%), Professional and Business Services (18%), and Manufacturing industry super-sectors (16%). Not only is the region becoming a net

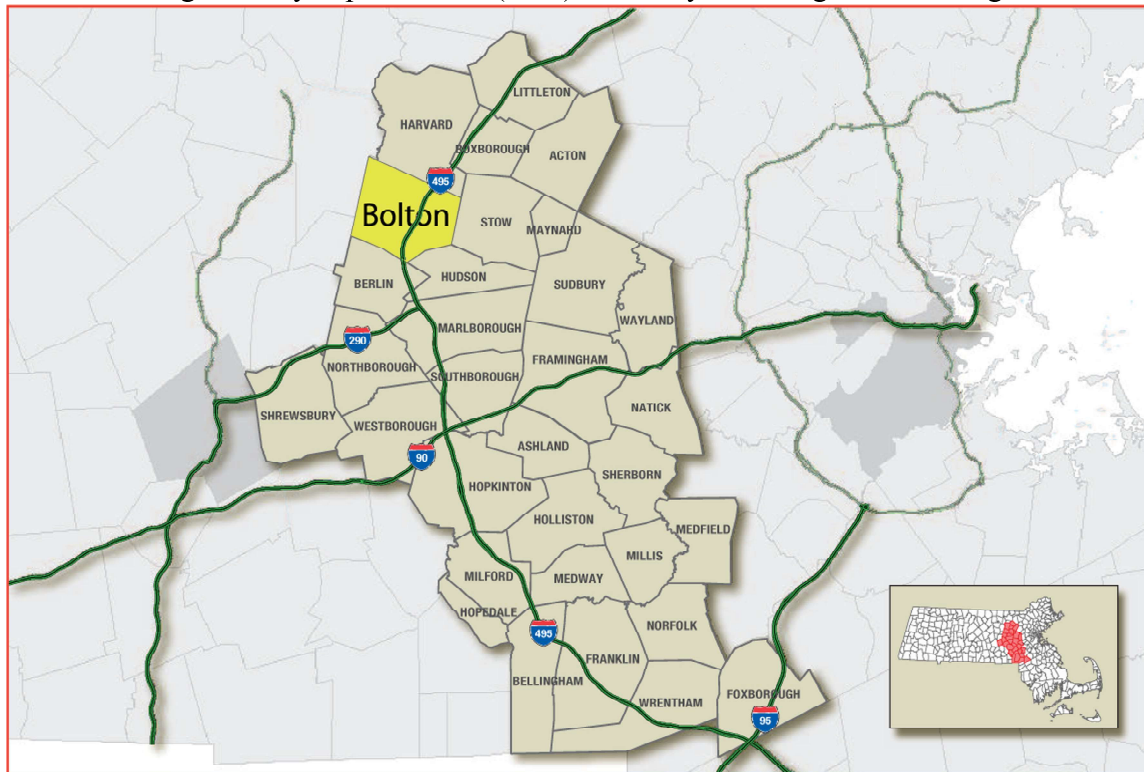


Figure 4.6.1. Bolton is situated within the Arc of Innovation along I-495.

Source: <http://www.arc-of-innovation.org/>

importer of jobs, its population is also growing dramatically. Between 1990 and 2000, the region experienced a 12.1% increase in population, which is double that of the Commonwealth for this time span.

4.7 Business in Bolton – A Market Profile

Business Types

There are a total of 200 businesses in Bolton (Massachusetts Business Directory 2007-2008 Edition). Many businesses in Bolton are located along Main Street/Route 117 while

others are dispersed in the whole town. When categorized by businesses type, there are 81 commercial businesses, 80 offices, 26 industrial and 13 others. The commercial businesses are comprised of 12 food places, 19 retail stores, 2 golf courses and 47 service places. Office businesses include government departments, schools, organizations, clericals, consultants and professional offices, such as lawyers, dentists, chiropractors, architects, and accountants. There are 31 home-based businesses in Bolton, most of which are offices (Reference USA). Table 4.7.1 notes the various business types that are found within town.

Table 4.7.1: Businesses by Type in Bolton

	Commercial	Office	Industrial	Others	Total
Number	81	80	26	13	200

(1) Massachusetts Business directory 2007-2008 Edition (2) Reference USA

Major employers and public companies

Among Bolton and its seven surrounding towns, Clinton and Hudson stand out as having a greater number of major employers and public companies. Others have 230 businesses more or less. Although Bolton is at the lower end of the scale in this respect, four large employers exist in Bolton (see Table 4.7.2 and Map 4.7.1).

Table 4.7.2: Major Employers and Public Companies in Region

	Bolton	Berlin	Boxborough	Clinton	Harvard	Hudson	Lancaster	Stow
Number of Business	200	148	231	547	282	846	231	286
Major Employers and Public Companies*	4	0	4	10	0	16	6	3

*: Businesses over 100 employees and publicly-traded companies

Data Source: Massachusetts Business directory 2007-2008 Edition

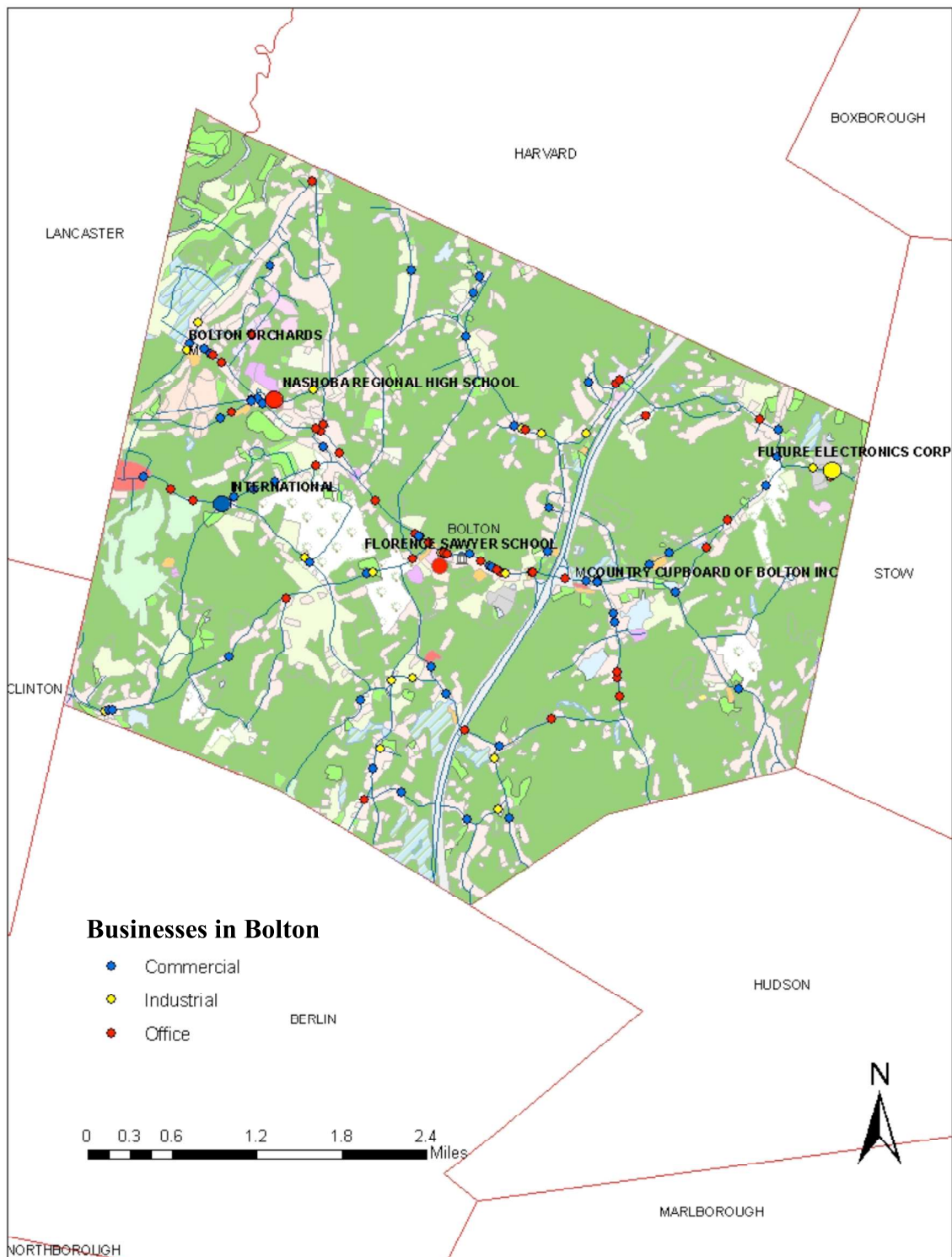
Within Bolton, Florence Sawyer School, Future Electronics Corp, International (International Golf Course) and Nashoba Regional High School have 100 or more employees or are publicly traded.

There are some vacant buildings in Bolton because the previous businesses in those buildings have gone. GenRad Inc, which at one time conducted electroplating operations no longer operates at its former location on Route 117. The site has undergone investigation and cleanup under a hazardous waste closure plan issued by the Massachusetts DEP. When Skinner Inc. relocates to Marlborough next year, Bolton will lose some of the reputation it attained as the longtime home of a leading fine art auction house. Skinner is relocating because it is expanding and its current parcel in Bolton has too many environmental constraints.

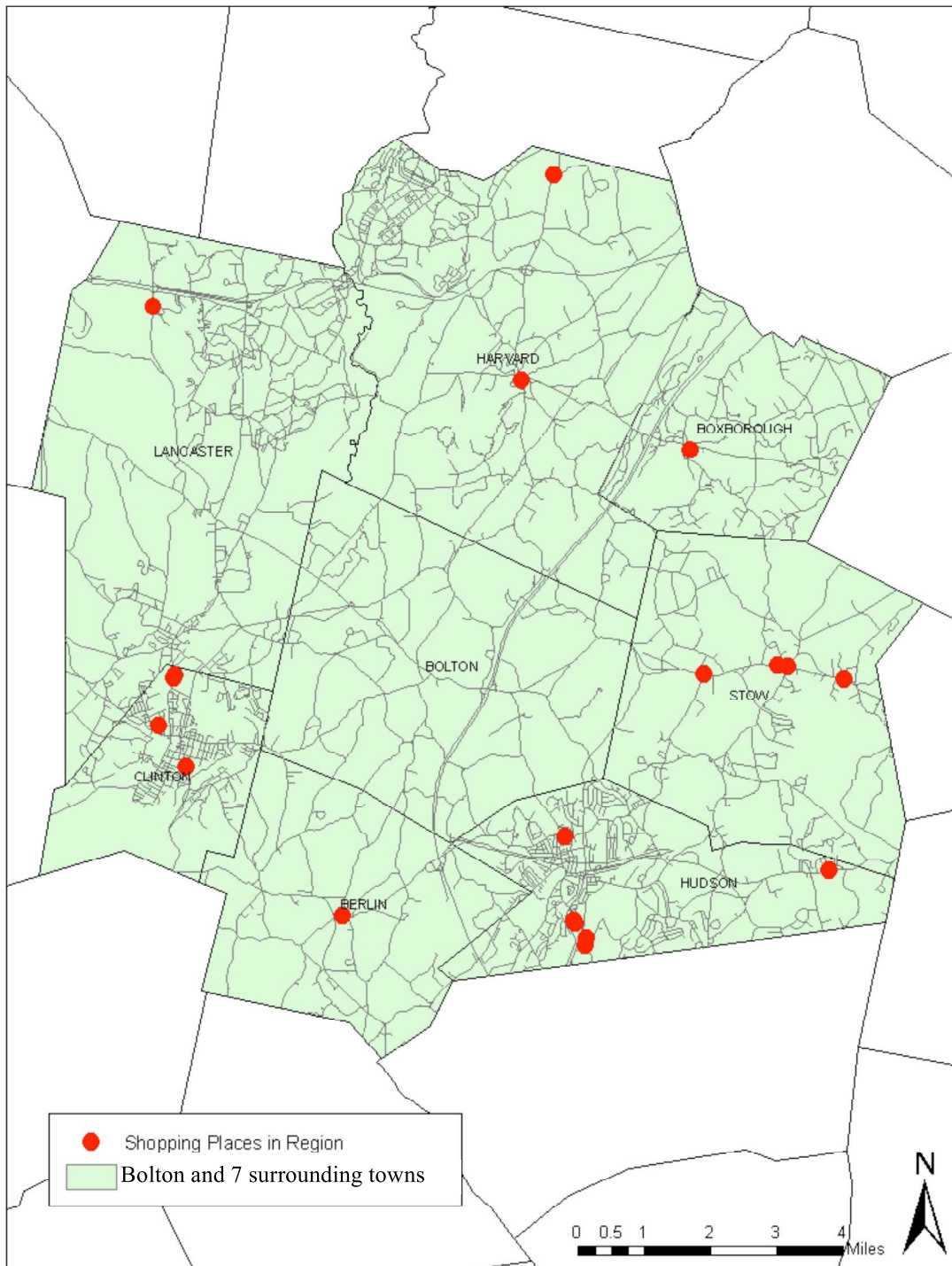
Shopping Places in the Region

Bolton residents often do their shopping for basic goods in other towns, mainly Clinton and Hudson. The opportunities for grocery shopping in Bolton are Country Cupboard (a convenience store) and Bolton Orchards' farm stand. Map 4.7.2 highlights the shopping opportunities in the region. Please see Appendix 1 for a comprehensive list of shopping places in the region listed by town.

Map 4.7.1



Map 4.7.2



4.8 Transportation

Bolton's transportation network is highly automobile dependent. Of 351 towns and cities in Massachusetts, Bolton ranked 8th in automobiles per household in 1990 (1990 Census). By 2006, its rank had increased to 5th (2006 Census). Nine-tenths of one percent (0.9%) of Bolton residents walk to work and 85.4% commute alone by automobile. Heavy reliance on private automobiles results in decreased air quality, decreased opportunities for exercise, dangerous streets, and decreased mobility especially for young people, the elderly, and anyone on a fixed income.

Bolton's auto dependence probably results from a variety of factors: Bolton residents don't have any access to public transportation. Sidewalks are limited to the center of town and bicycle facilities are nonexistent. The location of I-495 makes Bolton a convenient cut-through to access this major thoroughfare. Traffic count data (see Appendix 2) makes it clear that Bolton's roads are used as a cut-through for non-residents. The design of these roads often enables and encourages such unwanted behavior. A main contributor to the traffic problem is Interstate 495, which receives 93,383 average daily trips (ADT) (www.CTPS.gov). In fact, Route 117's ADTs double in volume just west of Interstate 495 (Figure 4.8.1). Public commentary consistently ranked heavy and high-speed traffic along Route 117 as a primary concern.

High volume traffic on Route 117 (including large amounts of multi-axle vehicle) occurs during morning commuter hours in Bolton from 6am-9am. This is followed by a

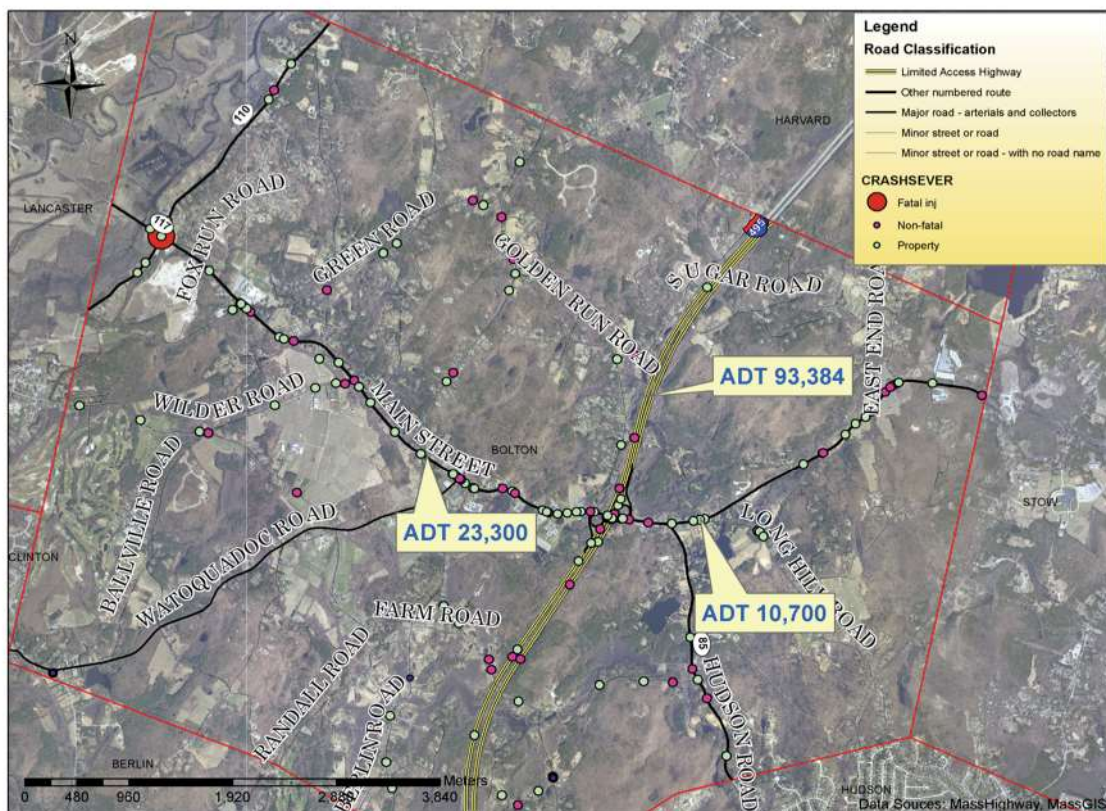


Figure 4.8.1. Average Daily Trips (ADT) at selected locations in Bolton

significant decrease in eastbound traffic, which remains consistent until 3pm when westbound traffic along Route 117 spikes sharply. During this time, eastbound traffic remains low then spikes the next morning. Taken together with the average daily trip information in Figure 4.8.1, this pattern indicates that a substantial number of commuters are coming from the west and using Route 117 through Bolton to access Interstate 495. Please see Appendix 2 for a more detailed analysis of several of the busiest intersections in Bolton.

Parking will be an important consideration in designing an easily accessible village center. Parallel parking is allowed on Route 117, but the high volume traffic and travel speeds inhibit people from safely entering and exiting vehicles. Currently, there is no public parking lot in the Town.

Bicycle & Pedestrian Transportation

Historically, Bolton has been an agricultural community and many residents still remember when Route 117 was unpaved and citizens could walk down the road to visit neighbors or go to school. With the growth of the Boston Metro West area, the paving of roads and changes in the economy, Bolton's streets have become specialized for almost exclusive use by motorized vehicles. This has had a detrimental effect on Bolton's quality of life and public comments show support for providing more transportation options on the Town's public roadways. Currently, Bolton has only a few short stretches of narrow sidewalks that are limited to the area around the Town Hall on Route 117 and no accommodations for bicycling although some rural routes in town are navigable by bike.

Sidewalks and Pedestrian Crossings

Today, Bolton's only sidewalks consist of a few short stretches of asphalt paving along Route 117 near the Town Hall. These walkways are almost too narrow for two people to pass on, are uneven and cracked, and are difficult if not impossible for a disabled person to use. Their usability is further impaired by the lack of buffer from Route 117 combined

with the high speed and volume of traffic on that road. Moreover, the current network serves only a tiny proportion of the total miles of roadway in the Town.



Figure 4.8.3. Route 117 in Bolton center.

Crosswalks across Route 117 are relatively rare. Although they are marked with signs both alongside and in the road, these few crosswalks are not adequate to ensure pedestrians a safe crossing much less foster a vibrant pedestrian area.

Trails

Bolton has a strong and growing trail network but most are used primarily for recreation (see Open Space and Recreation section for details). The development of a pedestrian-friendly village center will provide greater reason for residents to use trails as a means of transportation.

Local Bicycle Network and Facilities

Providing on-road accommodations for bicycles provides similar but complementary benefits to providing a strong pedestrian network. Encouraging and providing for bicycle travel can draw people from a further distance than sidewalks alone and has a greater potential to reduce car trips. While many pedestrians will drive to a parking lot, park, and then get out to use the sidewalk, the speed and efficiency of using a bicycle means that most bicycle users will not congest roads by driving to a parking lot but will rather cycle directly from one destination to another, leaving their car at home. Further, bicycles require only minimal parking area compared with vehicles. Bicycles offer a more practical option than walking for the purposes of running errands or commuting over a mile as they are faster and can comfortably carry items like groceries.

While multi-use paths are excellent for recreational use, they typically do not provide a viable transportation option because they lack connections to destinations. For the purposes of sustainability and reducing vehicle trips, on-road bicycle facilities are generally much more practical.

Regional Bicycle Routes

Recent developments in regional bicycle transportation planning put Bolton at an almost-crossroads of two planned regional bicycle routes: the Bay State Greenway and the Mass Central Rail Trail.

The Bay State Greenway (BSG) is a mixed on- and off-road route beginning at the border with New Hampshire. It travels along the Nashua River, through Worcester and through the Blackstone River Valley into Connecticut, Rhode Island and ultimately to the Cape. In Bolton, it is slated to follow Harvard Road to Green Road, cross 117 and continue southwest along Forbush Mill Road. Significant portions of the Greenway are already established in Ayer, Groton and Pepperell to the north as well as in Worcester, Milbury and large portions in Connecticut and Rhode Island (Commonwealth of Massachusetts. Executive Office of Transportation, 2008).

The Mass Central Rail Trail is envisioned as an off-road multi-use path built on an abandoned rail bed that runs east-west across the state from Boston to Northampton. Portions of the Mass Central Rail Trail have also been built. The Mass Central Rail Trail grazes the southern border of Bolton at South Bolton Road.

These two major routes present Bolton with a unique opportunity to connect them through the Town.

Key Findings

- Bolton's residents are heavily dependent on automobiles: 85.4% commute to work alone and 0.9% walk to work.
- Commuters from the west are using Route 117 to access I-495
- Facilities for pedestrians and cyclists are very minimal.
- There is an opportunity to make a bicycle and pedestrian connection between two major regional multiuse trails

4.9 Housing

Housing growth is probably the single most important factor that will determine how Bolton looks in the future. Housing not only affects the Town's appearance, but also the integrity of Bolton's agricultural and environmentally sensitive lands as well as the tax rate. Between the years of 1990 and 2000, Bolton's housing stock grew by over 20%. As of 2006, 97% of Bolton's housing stock is single-family homes. Bolton has eleven multifamily homes and 55 homes with more than one kitchen, which usually indicates an accessory apartment. Currently, Bolton has only 3.6% affordable housing which impacts the community in a number of ways, including impacts from state regulations and changing community character.

Chapter 40B

When under 10% of a town's housing stock is affordable, state law Chapter 40B (also known as the Comprehensive Permit law) allows developers to file a comprehensive permit and may not be required to comply with all local bylaws so long as the proposed development provides at least 25% affordable units. The required 25% affordable units does not go far towards reaching the overall goal of 10%, and communities generally prefer that their bylaws are complied with, so these "40B developments" are often viewed by communities as a threat. Up until January of 2009, Bolton has greater control over 40B developments since the Town has a state-accepted Affordable Housing Plan and had increased its affordable housing stock at the state-mandated rate of 0.75% (or 11 units) per year. Some 40B projects have been built in Bolton in recent years, but were for the most part in cooperation with the Town.

What is Affordable Housing?

According to the U.S. Department of Housing and Urban Development, "The generally accepted definition of affordability is for a household to pay no more than 30% of its annual income on housing". In order for housing to qualify as affordable for the purposes of Massachusetts Chapter 40B, it needs to cost less than 30% of the household income of a family that is making 80% or less of the median income for an area. It also needs to be deed-restricted to ensure affordability for at least 30 years. Bolton is considered to be part of the Boston Metropolitan Statistical area, where the median income is \$68,500 per year. Table 4.9.1 shows Bolton and area median incomes and corresponding housing costs. Only those housing costs highlighted in yellow qualify as affordable.

Table 4.9.1: Median Income and Affordable Housing Costs

	Median regional income†	80% median regional income	50% median regional income	Bolton median income
Yearly Income	\$68,500	\$54,800	\$34,250	\$127,937
30% monthly income	\$1,712	\$1,370 qualifies as “affordable”	\$856 qualifies as “affordable”	\$3,198
Home Price*	\$270,000	\$216,000	\$135,000	500,500

*Home price values are calculated assuming a 30-year mortgage with a 15% down payment and a 1.25% tax rate. Homeowner's insurance and utilities are not accounted for although these do factor in to the state's calculation of affordability. Bolton median income is estimated by adjusting the 1999 Bolton median income from the 2000 U.S. census for inflation using the consumer price index.

†Bolton is part of the Boston Metropolitan Statistical area. Housing affordability is defined by the state using these income figures.

Why Build Affordable Housing?

Aside from the benefits of affordable housing that come from Chapter 40B, there are many other ways in which developing a diverse housing stock benefits the community. A diverse housing stock supports a population diverse not only in income but in age, career choice and lifestyle. Most employees of the Town of Bolton, such as teachers and policemen, cannot afford to live in the town they serve. Young adults who grew up in Bolton are forced to move away due to high housing costs. Retirees are unable to find smaller, lower maintenance housing in Bolton. Single people of any age or families with a single income are unlikely to be able to afford housing in Bolton. With increased affordable housing these groups who are already part of the community could afford to remain. In addition, affordable housing often happens to attract young professionals and retirees, whose impact on the Town's tax revenue tends to be positive.

The Bolton Affordable Housing Partnership

In response to the community's need for more affordable housing, the Town founded the Bolton Affordable Housing Partnership (BAHP) in 2002. The BAHP drafted an Affordable Housing Plan in 2003 which was accepted by the state in 2004. Currently, Bolton is in the process of drafting a new Affordable Housing Plan. Some of the Town's major goals that are reflected in the current Affordable Housing Plan and Master Plan include:

- Maximize local control over affordable housing development, mostly by achieving the 10% affordable housing goal mandated in Chapter 40B
- Achieve 8% affordable housing by the end of 2008
- Target of 35% affordable housing per project
- Seek affordable housing that is inclusive, diverse and evenly distributed throughout all of Bolton
- Provide affordable housing for targeted segments of the population including retirees and active adults over 55, families, young professionals, town employees and people with special needs
- Require affordable housing projects to be designed in accordance with the standards typical in Bolton and that are fitting with Bolton's culture and character

- Require that affordable housing projects provide for both moderate (80% of median) and low-income (50% of median) households

The Affordable Housing Trust was formed in 2004 to hold funds reserved for the development of affordable housing. It receives voluntary donations from developers and funds resulting from the Inclusionary Zoning bylaw (see description below under “strategies to date”).

Strategies to Date

Gaining state acceptance of the Affordable Housing Plan was a great positive step for the Town, and affordable housing has increased significantly from 0.9% at its inception to 3.6% today. Although the Town fell short of the goal of 8% by the end of 2008, this progress is a particularly significant accomplishment when you consider that affordable housing development has actually had to outpace non-affordable housing development to reach this point. This was accomplished mainly through the BAHF’s negotiations with developers on new housing projects, both 40B and otherwise. Up until the end of 2007, the Town managed to increase affordable housing at a rate of 0.75% (or 11 units) per year, and by doing so was able to maintain greater control over 40B developments. In 2007 the Town fell short of the required 0.75% and as a result has lost some control over 40B’s. At the same time, due to the recent economic downturn, development is occurring at a slower pace. The required affordable housing growth rate was recently reduced to 0.5% (or six units) per year, which should also be easier to achieve.

The town has made other efforts to increase the availability of affordable housing by passing the Inclusionary Housing Bylaw in 2003, which requires that at least one of every eight housing units built (12.5%) be affordable. As an alternative, developers may pay \$200,000 to the Bolton Affordable Housing Trust per affordable unit not built. While this bylaw will not greatly increase the proportion of affordable housing, it helps to ensure that affordable housing is spread throughout the Town and can generate funds for affordable housing.

The Community Preservation Act (CPA) would provide matching funding from the state for affordable housing, but would require a 2-3% real estate transfer tax. The Affordable Housing Plan and the 2006 Master Plan call for passage of the Act, but the CPA failed at Town Meeting for a second time in 2007.

Strategies under Consideration

Accessory apartments are allowed in Bolton and some smaller, older homes may be priced within the affordable range, but only count toward affordable housing if they are deed-restricted. The Affordable Housing Plan provides strategies to trade tax abatements or zoning relief to owners of such properties in exchange for deed restricting their property as affordable housing. Another strategy named would be for the Town to purchase smaller homes and re-sell them with a deed restriction, called a “buy-down”. Neither of these strategies has yet been written into the town bylaws.

Density bonuses for developers have also been considered as a way of increasing affordable housing and have been used in neighboring towns. In the Town of Lincoln, developers are allowed to develop more densely as long as 50% of the denser housing is affordable.

Smart growth incentives 40R and 40S

The state's Smart Growth Incentive program, Chapters 40R and 40S of the Massachusetts General Law, provide financial incentives to communities for adopting smart growth overlay districts. These zoning districts allow as-of-right mixed use and residential development with a minimum density requirement. These density requirements may be reduced for small towns like Bolton. Under a 40R smart growth overlay, 20% of all residential units are required to be affordable. Chapter 40S provides compensation on a per-pupil basis for education costs incurred as a result of any increase in school enrollment that occurs due to increased housing availability through a 40R smart growth overlay district, one of Bolton residents' principal concerns with increased growth.

Chapters 40R and 40S provide an excellent opportunity for a town in Bolton's position to increase affordable housing and centralize growth at the same time. Funds received from the state as a result of the 40R district could be used to further develop Bolton's waste water treatment capabilities, which could further support a denser village center.

4.10 Land Use

Much of Bolton's culture and visual qualities are reflected in its land use. Historically, Bolton has been an agricultural town with a large amount of forested area. In recent times, however, significant portions of Bolton's agricultural lands have been converted to residential land use. This trend is apparent in the statistics in Table 4.10.1.

Land Use	Bolton Land Use in acres						
	1971	1985	1999	% change 1971 to 1999	% change 1985 to 1999	% of total 1999	% of total 1985
Forest	8,539	8,160	8,061	-6%	-1%	63%	63%
Agriculture/Open	2,546	2,375	1,844	-28%	-22%	14%	18%
Wetland	384	384	341	-11%	-11%	3%	3%
Industrial/Commercial	297	384	388	30%	1%	3%	3%
Residential	806	1,247	1,892	135%	52%	15%	10%
Recreation	307	319	351	14%	10%	3%	2%
Total	12,878	12,878	12,878				
Total Undeveloped	11,775	11,247	10,598				
Percent Open	91%	87%	82%	-9%	-5%		

Table 4.10.1. Bolton Land Use

Source: 2005 Bolton Open Space Plan

Relative to other towns in the region, Bolton still maintains a higher percentage of land in agricultural use. At the same time, the rate at which Bolton's agricultural land is being lost (22% from 1985 to 1999) is greater than neighboring towns' loss of 13% and the state's loss of 9% (see Table 4.10.2).

Town Name	Percent Land Use by Type – 1985 to 1999					
	Agri/Open	Forest	Wetland	Industrial/ Commercial	Residential/ Urban	Recreation
Acton	-4%	-12%	1%	0%	22%	-26%
Bedford	-40%	-2%	-15%	3%	14%	-6%
Bolton	-22%	-1%	-11%	1%	52%	10%
Boxborough	-3%	-14%	0%	-1%	82%	-62%
Carlisle	-14%	-5%	-13%	-28%	26%	-15%
Concord	-8%	-4%	0%	2%	11%	-5%
Hudson	-22%	-19%	-1%	14%	22%	60%
Lexington	-8%	-4%	0%	2%	4%	-1%
Lincoln	-12%	-4%	0%	-1%	12%	1%
Littleton	-14%	-8%	0%	1%	32%	12%
Maynard	-15%	-9%	-1%	9%	11%	11%
Stow	-8%	-7%	0%	-30%	27%	22%
MAGIC totals	-13%	-7%	-2%	2%	20%	2%
Massachusetts Totals	-9%	-5%	0%	8%	23%	3%

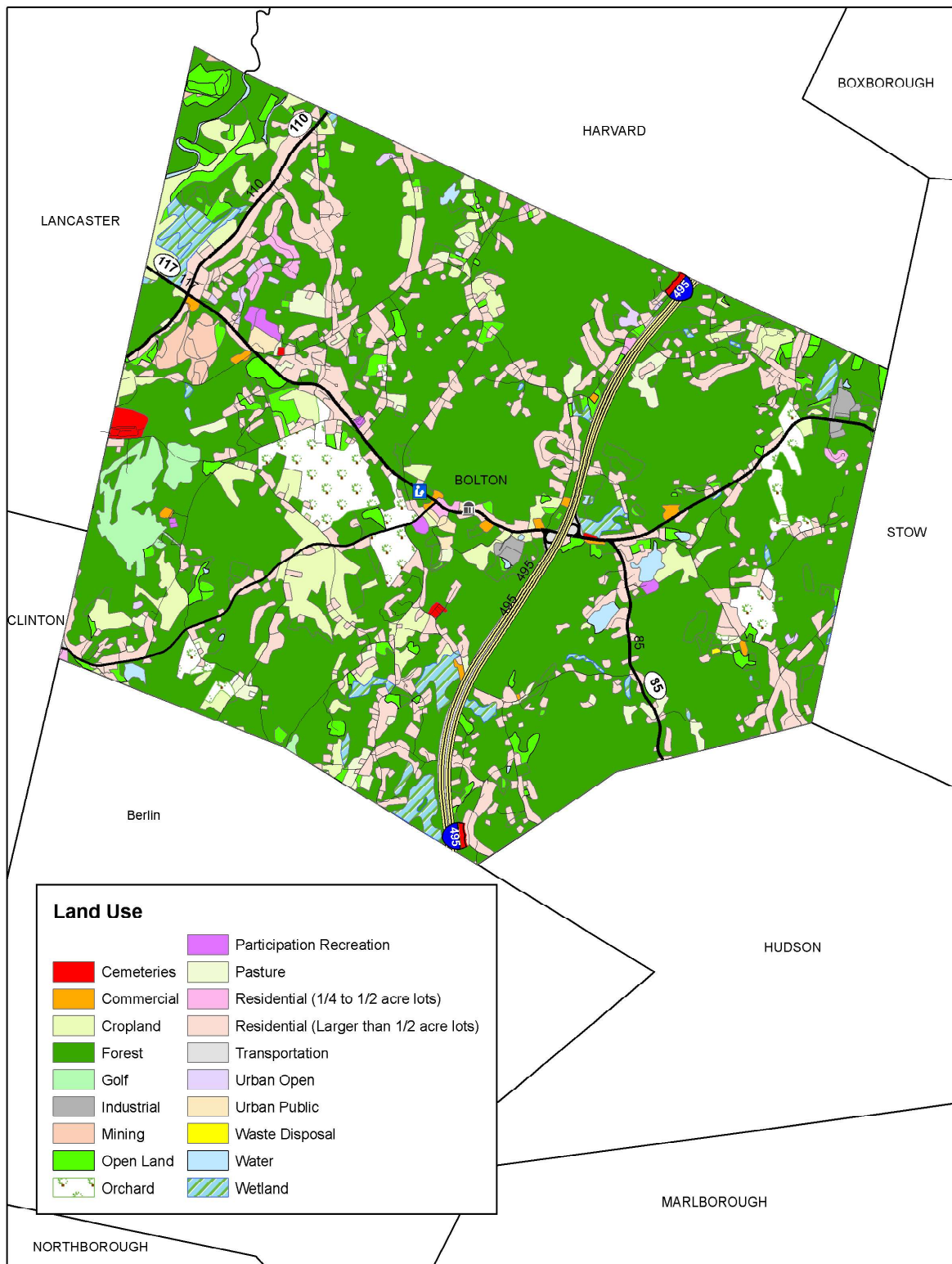
Table 4.10.2. Land Use in Surrounding Communities

Source: 2005 Bolton Open Space Plan

Bolton has been actively attempting to maintain its rural character in reaction to the Town's loss of forested and agricultural land. From 1971 to 1999, 702 acres of agricultural/open space land was lost to development, representing more than a quarter of existing 1971 farmland (see Table 4.10.1). Much of this loss came from residential housing development of single-family homes. The loss of these lands is alarming, especially for those lands that were prime agricultural soils, because once developed, those soils are destroyed forever. The very elements that made Bolton unique and appealing to new homeowners – open space, rural character and farms – continue to be under serious pressure from development.

Map 4.10.1 shows Bolton's land use as of 1999. This map makes apparent the large proportion of land that remains forested. Eighteen percent of the land area is in agricultural use. Not only is this a significant amount of land area, but much of the agricultural land is located near roads where residents see it every day. This helps to explain why agriculture is such an important element of Bolton's character. Map 4.10.1 also shows residential land, which in 1999 comprised 10% of Bolton's land area. The types of soils and topography suited for residential development are the same attributes that make good farmland. For this reason, farmland is often converted to residential land use.

Map 4.10.1. Land Use in Bolton, 1999. Data source: Town of Bolton.



4.11 Drinking Water and Wastewater

Wastewater treatment and development

One of the key factors in land development planning is wastewater treatment and disposal. Improper disposal of wastewater contributes excess pathogens and nutrients to surface and ground waters, endangering drinking water supplies, wildlife habitat, and surface water bodies. Some 60% of the lakes, rivers and streams in Massachusetts have been affected by pollution from inadequate planning of wastewater treatment plants, septic systems, and stormwater drains (Mass. DEP). With its abundant water resources and challenging landscape and soils, decision makers in the Town of Bolton will have to address the often conflicting needs from new growth and development. In addition to the tug-and-pull in local growth-management decision making, there are strong regulations and incentives for protecting water resources at the state level that impact these decisions as well. This section of the report will attempt to address the wastewater needs for a proposed Village Center.

Theory of Treatment

A properly functioning decentralized wastewater treatment system must provide both adequate *treatment* and *disposal* of sewage. Historically, the primary function of decentralized (septic) systems was to eliminate pathogens and dispose of sewage to ensure that it did not break out onto the ground nor backup to the house or business that generated the wastewater. The first public efforts to control sewage emphasized this approach. For example, the percolation test, invented by Henry Ryon in 1924, was designed to measure how quickly sewage could be applied to the ground, not to measure any rate of treatment. Because of environmental and public health concerns, most regulations today emphasize the need to treat sewage before it reaches the groundwater or surface water. (Source: *American Planning Association PAS 542*)

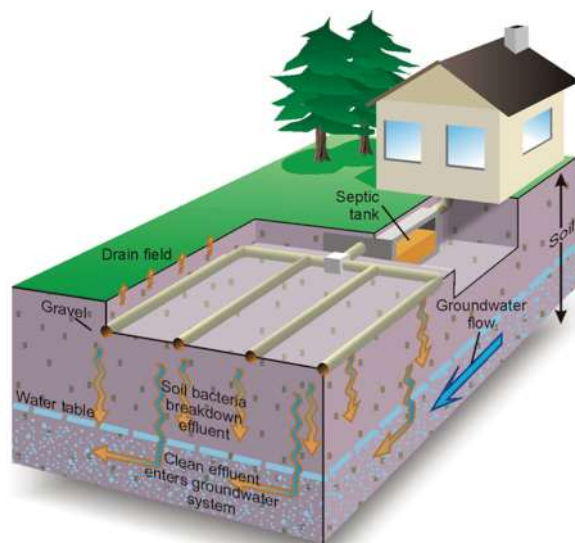


Figure 4.11.1. Septic system.

Image source:

http://geoscape.nrcan.gc.ca/h2o/bowen/quality_e.php

Generally, there are two types of wastewater treatment solutions: a decentralized approach, which consists of on-site treatment and disposal, usually in the form of a septic system (see Figure 4.11.1) or a centralized approach, which comprises a collection sewers and pipes connected to a wastewater treatment plant. Growing communities usually depend on a combination of both. Larger municipalities rely on a large network of pipes that are connected to a centralized treatment plant, where new development can simply “plug-in” to the existing network and wastewater is treated off-site for a fee.

Not all municipalities have such a network, as is the case with Bolton. Nor is there a need to build such a large-scale system, as described in Bolton’s Master Plan (2006) and its Affordable

Housing Plan (2003). With few exceptions, nearly every home and business in Bolton has to operate and maintain a private on-site septic system.

Title V

The overarching wastewater treatment regulation in Massachusetts is Title 5 of the State Environmental Code. The purpose of Title 5 is to “provide for the protection of public health, safety, welfare and the environment by requiring the proper siting, construction, upgrade, and maintenance of on-site sewage disposal systems and appropriate means for the transport and disposal of septage” (310 CMR 15.000). This state regulation provides municipalities minimum guidelines for the design and installation of wastewater disposal systems. Title 5 is enforced by the state and by a local municipality's Board of Health. A Board of Health can issue guidelines that exceed the minimum requirements of Title 5.

Bolton's Board of Health guidelines exceed Title 5 with a primary focus on protecting the Town's abundant ground, surficial and wetland water resources from insufficiently treated septic effluent. Title 5 regulations are available at Massachusetts's Department of Environmental Protection's website under “Water, Wastewater & Wetlands” (2008).

Package Wastewater Treatment Facility in Otis, Massachusetts.

Otis qualified for Rural Utility Service funding from the Department of Agriculture, which provided sewer for a portion of the community. The system is owned and operated by the municipality as part of a distributed network of wastewater infrastructure. The system has a compact footprint, minimizing impact on surround land and water resources. The project was permitted under Massachusetts Ground Water Discharge Standards requiring a level of treatment that would preserve the life of the drain field and reduce nutrient loading to the groundwater. (Source: Aquapoint.com)

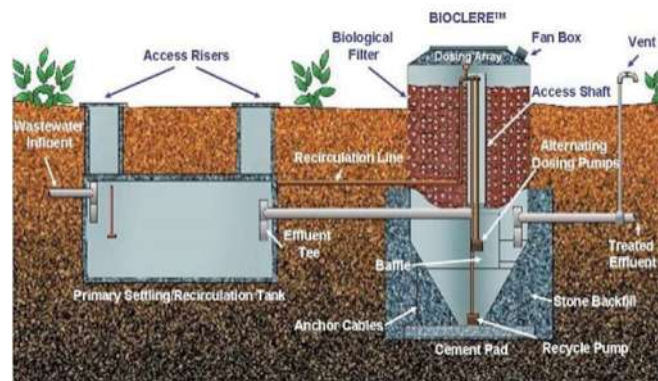


Figure 4.11.2. Package wastewater treatment system.

Source: aquapoint.com

Calculating Wastewater Needs in Bolton

Systems that produce less than 10,000 gallons per-day (gpd) can be located on-site as a septic system. Systems that produce over 10,000gpd are usually connected to some form of centralized system, which must be approved by both the Board of Health and MassDEP. For smaller communities that do not have an existing centralized wastewater treatment infrastructure, such as Bolton, alternative systems exist. Alternative and Innovative systems (A/I) must also be approved by the Board of Health and MassDEP. For new developments in small towns that generate more than 10,000 gpd, package treatment plants are popular options.

A package treatment plant straddles the infrastructure line between a septic system and a full blown sewer system. Essentially a shared septic-septic system with secondary treatment for the

water, most package treatment plants in Massachusetts are located on-site or at least very close to the buildings connected to it. They serve industry, commercial and residential developments and can be expanded as demand increases in the community.

The Town of Bolton owns and operates a package treatment system that serves two schools and a few municipal buildings. The system has the capacity to serve current business and residences when their septic systems need to be replaced and it should encourage additional compact development (Five Town Action Initiative, 2007).

Table 4.11.1 Thumbnail of Title 5 Standard Gallons Per Day

Residence	150gpd	Per bedroom
Retail	50gpd	Per 1,000sqft
Office	75gpd	Per 1,000sqft

There are several Board of Health regulations that affect the planning, siting and design of a Village Center. Most of these regulations can be accommodated in the normal course of development. Design guidelines for the pipes, tanks and pumps, for instance, are straight forward (Table 4.11.1). However, there are policy constraints to build a Village Center:

- Zoning by-laws. A mixed-use zoning by-law that accommodates development of a Village Center could make it easier for infrastructure to built or expand. See section xx for further discussion of zoning.
- Set back requirements of the septic system. The setback requirements for septic systems can impede the location and extent of any new wastewater treatment facility.
- Leach field and reserve leach field. The leach field for a septic or package treatment must be able to accommodate the wastewater from the development. If the system(s) should fail, Bolton's Board of Health regulations require a reserve area that can accommodate equal capacity of the existing leach field. Additionally, no permanent structures can be built on this reserve area.

The landscape in Bolton has extensive ledge with minimal soil coverage, wetlands and heavy clay soil, finding a percable spot on a two-acre parcel while observing all required setbacks can be difficult.

Table 4.11.2. Bolton's Package Treatment Plant

Facility	Water treated per day (gallons)
Elementary School Campus	15,000
Public Safety Building	650
Public Library	1,000
Town Hall	420
Houghton Building Police Dept. (697 Main St.)	300
Fire Station (now closed)	150

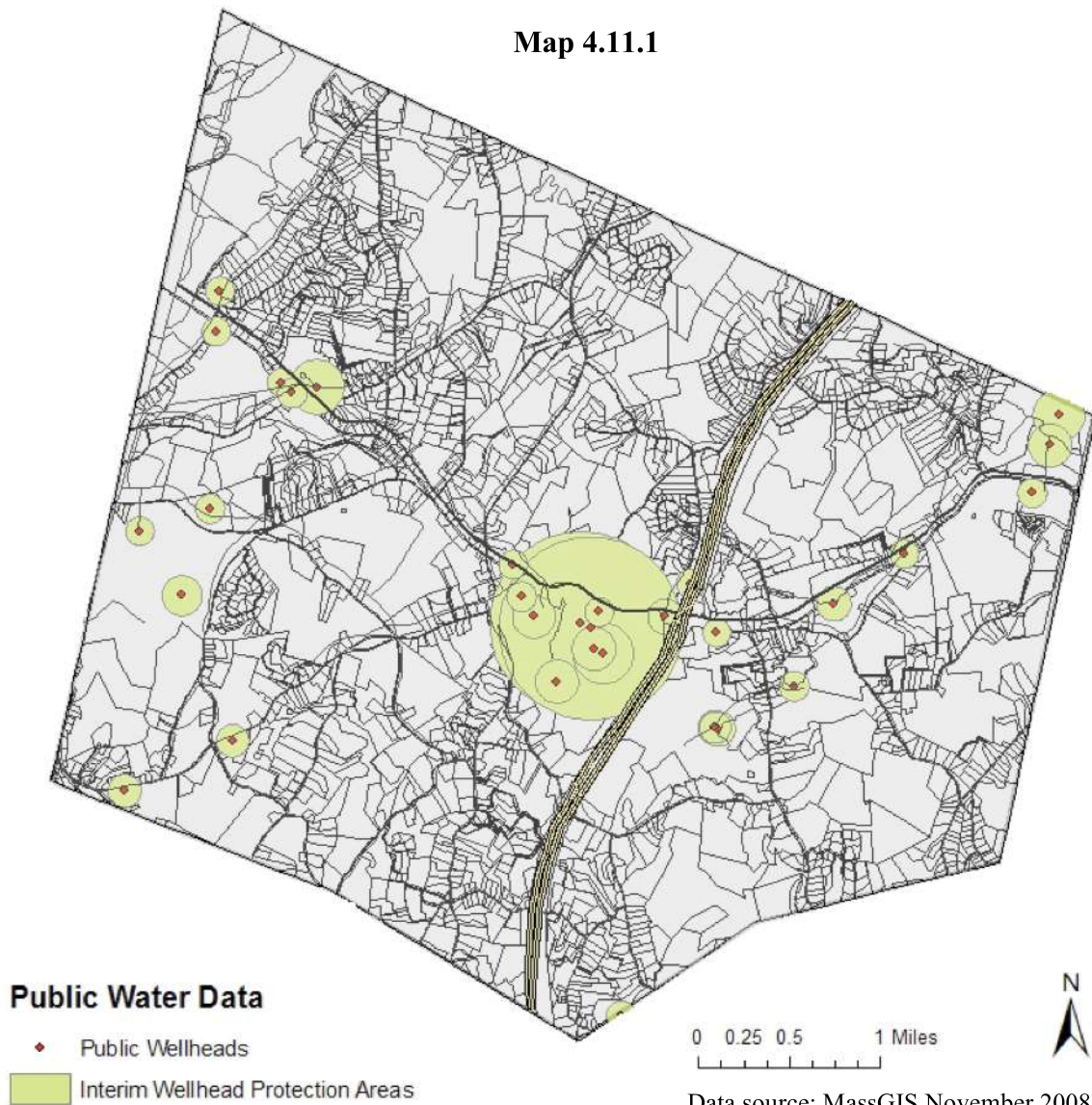
Source: Onsite Engineering

Bolton's package treatment plant is located behind the Emerson and Florence Sawyer schools at 100 Mechanic Street. The plant treats 17,520 gallons of water per day (Table 4.11.2). It can handle up to 38,000 gallons of water per day. This excess capacity can be tapped for the Smith Property neighborhood, and potentially for our proposed residential NSA neighborhood.

Bolton's Public Water Supply

Bolton has numerous public wells and many are in the center of town on Route 117 (See Map 4.11.1) To protect the recharge of these public water supplies, the Department of Environmental Protection (DEP) has defined areas as interim wellhead protection areas (IWPA) (See Map 4.11.1) These IWPA's have not been studied for their hydro-geologic structure, but they do have certain land uses that are prohibited and restricted (MassGIS).

Map 4.11.1



4.12 Zoning

The majority of land in Bolton is zoned residential. Only single-family homes or accessory apartments are allowed, with duplexes and multi-family units prohibited. Construction of a new dwelling requires a lot with a minimum area of 2 acres and minimum frontage of 200 feet. Backland zoning allows reduced frontage (50 feet) and requires a minimum lot size of 4.5 acres, including 1.5 acres not contained within an area of environmental concern. Agriculture and forestry uses are allowed within lots of at least twenty acres that are either in active use or have restrictions in place. Home occupations are allowed in residential zones, as well as in business, limited business, commercial, and industrial zones.

The intention of the Farmland and Open Space Planned Residential Development bylaw is to preserve Bolton's historic rural character by protecting agricultural land and open space. It does this by providing landowners with an alternative to traditional subdivisions that allows houses to be built in ways more suitable with local site conditions. The total number of dwellings that can be built is equal to the number that could be built under a conventional subdivision plan. Preference is given to farmland but other open space is eligible, especially if contiguous to existing or proposed open space. At least one third of the area of the subdivision must be protected. No more than 25% of this area can be within a Wetland Resource Area or Flood Plain District and only 5% can be covered by farm-related buildings.

A Planning Board special permit is required for a FOSPRD development (this is different from a regular special permit). The problem with the FOSPRD bylaw is that although it provides an alternative to regular subdivisions, it does not offer landowners an incentive to comply, such as greater density. However, the Planning Board may require a FOSPRD for subdivisions of more than fifteen acres and six dwellings if it so chooses.

A pre-existing non-conforming residential use may be altered provided that this does not increase the non-conforming nature of the structure. Pre-existing duplex or multi-family housing is thus grandfathered in. Lots in residential districts which do not meet the minimum area required may be eligible for single-family construction if the lot was in existence before 1973 and other conditions are met. Pre-existing non-conforming business uses in residential zones desiring a new sign not conforming under the bylaws may apply under the general Bylaw.

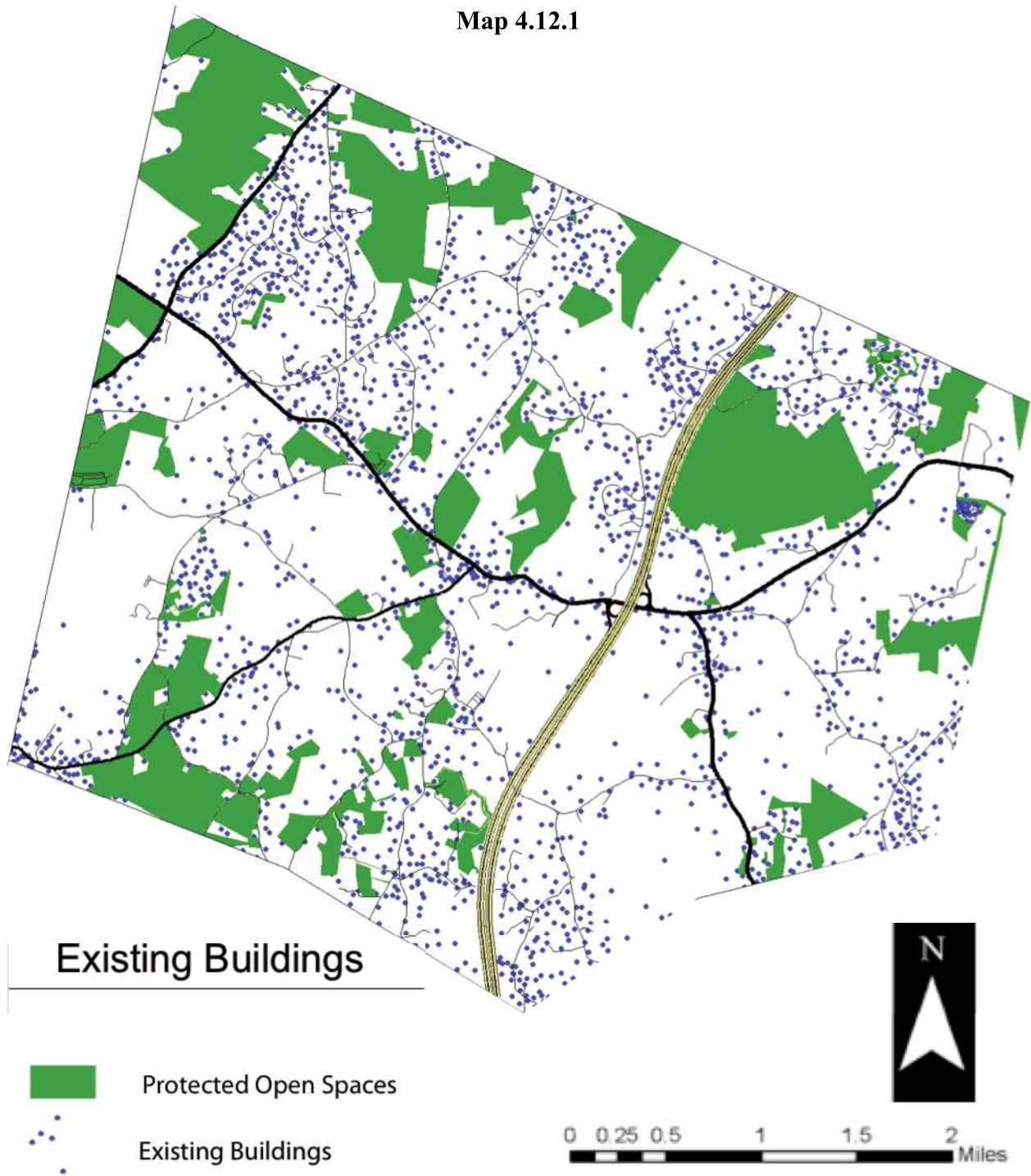
There are both Business and Limited Business districts in town. Office buildings are allowed in business districts by-right. All other uses in business or limited business districts are allowed by special permit only, including: restaurants; retail, service, and wholesale businesses (which are permitted to operate outdoors in limited business); indoor health clubs; and assisted living communities (which are allowed in limited business only). Preferred business uses within business and limited business zones are cafés, magazine stands, veterinarian's offices, and function spaces. Parking must be at least equal to three times floor area for retail and at least equal to building area for other business or commercial uses. Parking areas should not come within thirty feet of the edge

of the street paving. Signage can be no taller than eight feet and must be setback at least 20 feet from the road (there are currently obvious exceptions in town).

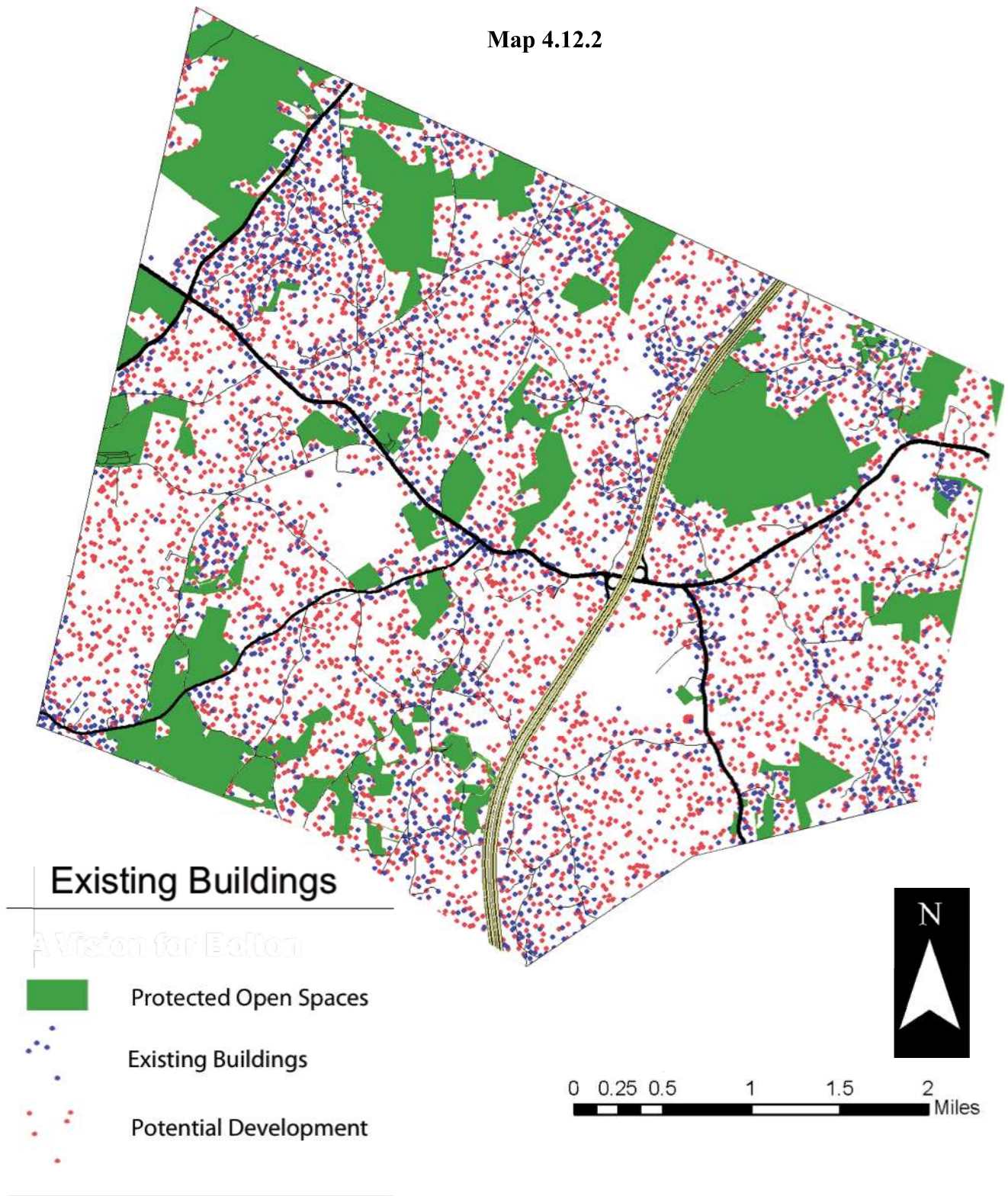
Special permits, unless otherwise stated, are issued by the Zoning Board of Appeals. The Zoning Board of Appeals makes determination based on possible environmental, economic, fiscal, traffic, public facility, visual, and social consequences. Special permits expire after two years if not acted upon. Site plan review, conducted by the Board of Selectmen with the advice of the Planning Board, is required for all new construction and expansion in the business and limited business districts. The Building Inspector may only issue a Certificate of Occupancy after all conditions specified in the site plan process have been met. Applicants may file multiple plans if necessary to incorporate comments from the boards. Site plans are judged based on the following criteria: demand place on nearby infrastructure and town services; protection of adjacent properties from environmental hazards; parking and circulation; waste disposal; and visual appearance. Such categories as visual appearance are vague and could be used arbitrarily. However, it is good for many reasons to give the Zoning Board flexibility in making its decisions.

The current number of built-on parcels in Bolton's residential zones is 2,346. Based upon the number of acres of unbuilt privately-owned land, the total number of parcels with dwellings on them in town could increase to approximately 6,500. Multiplying by a factor of .8 gives a more realistic estimate of approximately 5,100 parcels (an increase of approximately 2,750 dwellings). Current residential dwellings and dwellings under full build-out conditions are shown in Maps 4.12.1 and 4.12.2 respectively.

Map 4.12.1



Map 4.12.2



4.13 Assessment Summary

An understanding of Bolton's unique character is essential to crafting appropriate planning and design recommendations. The work presented in this chapter is intended to form a body of knowledge used to guide the planning and design process. The content consists of background information about Bolton's past and present, as well as projections about its future.

Bolton's rich soils led to its development as an agricultural town, while its distance from major waterways meant that industry remained a smaller portion of the economy. Its hilly topography has helped to conserve significant tracts of forest. To this day, Bolton has maintained much of its original rural character. With the construction of I-495, Bolton became more accessible and more people discovered what makes it an attractive place to live. This led to an increase in population, and with it, development pressure on agricultural land has increased. Since public water and sewer services are limited, residential growth has necessarily been dispersed which has led not only to the consumption of farmland, but also to a high cost of housing. The cost of housing is a particular hardship for young people, retirees, and town employees, such as teachers and policemen. The town has responded to these problems by taking measures like instituting the FOSPRD bylaw and taking a proactive approach to developing affordable housing.

Bolton's accessibility by car has also caused traffic to become a nuisance, especially on the main road through town, Route 117. As a result, Bolton's roadways have become unsafe for residents to bike or walk along. While more people live in Bolton today than ever before, there are very few local businesses to serve their needs. Bolton's current zoning and lack of water and sewer service make it difficult for potentially beneficial businesses to locate there.

Through the research presented here, the UMass study team was able to gain an understanding of Bolton's natural and historical context, its people and its future needs. Map 7.1.1 on page 90 was compiled using information gathered from this section and shows the physical constraints to development in Bolton. In combination with information gleaned from the public, this understanding formed the basis for the planning and design ideas presented in the latter portion of the report.

5. PUBLIC PARTICIPATION

Much of this study was structured around and informed by information and feedback from Bolton residents. Students interacted with residents on many levels to gather data for this report. An online surveys, visual surveys, comment boards, mapping activities, one-on-one interviews at the Bolton Fair and the transfer station, three public meetings at Town Hall, and extensive interaction with business owners within the community all helped to inform the Team's understanding of what current residents want to see in their town. This section of the report describes the public participation process and how it helped to guide our work.

5.1 Public Outreach: Understanding Residents' Goals and Values

The Bolton Fair and Transfer Station

Several students attended the Bolton Fair on opening night, Thursday, September 28, 2008. On Saturday, October 4, 2008, students interviewed Bolton residents at the transfer station from 9:45am to 2:45 pm. For each event, a booth was set up offering multiple activities including; a visual preference survey, a special- and frequently-visited places map, comment boards with questions, and a mental mapping exercise. Many residents participated in the activities, and were especially engaged with the visual preference survey where they indicated their preferences for village center images. Students facilitated the activities while discussing residents' preferences as well as the goals of the Village Center project. In addition, participants and some non-participants were made aware of the upcoming public meeting and online survey verbally and by distributing a flier.



Figure 5.1.1. Public outreach at the transfer station.

First Public Meeting

Bolton residents were invited to participate in the Bolton Village Center Planning Study Public Meeting on Thursday, October 23, 2008 at 7:00 pm at the Bolton Town Hall. Since public input was a critical component, the majority of the meeting was focused on gathering the ideas, comments and opinions of residents. Students first presented the scope and goals of the project. Attendees were then asked to take part in the visual preference survey. Following the survey, participants were broken up into small groups of four to five and took part in a mapping exercise where they were asked to draw what they consider to be the current village center in Bolton. These maps were used to help inform the Team's recommendation for the village center boundary. They were also asked to share with the Team what they would like to see in a village center in Bolton in terms of architecture, open space, businesses, etc. Afterward, groups were asked to share their findings with the larger group. Finally, students presented the Team's findings from

other public participation activities thus far. Before, during and after this meeting, the visual preference survey, special places and frequently-visited places map, comment boards with questions, and mental mapping exercise were made available for completion by participants.

Web-based Survey

Students collaborated with the planning board to design a survey to better understand residents' shopping patterns and their sense of what types of businesses and services would be appropriate in a Village Center in Bolton. The online survey also included the visual preference survey that had been available at the in-person events. The survey was designed using the online survey site, [surveymonkey.com](https://www.surveymonkey.com). A link to the survey was provided on the Town's website. It was also advertised in fliers distributed at the in-person events and supplemented with a printed questionnaire for non-internet users at the Town Hall and the Senior Center.

5.2 Public Outreach Findings

Findings from In-Person Events

Talking to people at the Bolton fair and transfer station revealed strong attachments that residents of Bolton have to farmland as well as their commitment to supporting local agriculture. Many respondents indicated that they would like to see fields, orchards and open spaces maintained into the future. When asked what they would like to see in the village center for businesses respondents preferred a co-op grocery store, a place that stocked local foods and local products like pottery. Many residents shop at the local farm stands and stores. Overwhelmingly respondents were positive about the potential for a small village center that would offer restaurants, coffee shops, co-ops and places to gather.

Table 5.1.1. Comment board questions and responses

<i>What aspects of Bolton would you like to see retained 25 years from today?</i>	<i>What might you like to see changed in Bolton in 25 years?</i>	<i>Where do you take your friends when they come to visit in Bolton?</i>
Farms and orchards	Safe place to walk and bike	Ball fields
Woods, open space	Manage traffic on 117	Orchards
Lots of green space	More restaurants	Walks through the woods
K-8 schools	Good coffee shop	Conservation trails
Small town atmosphere	Public sewer & water	Boston
Historic homes and buildings	Bike trails connected to others through town (recurred several times)	Nashoba winery (recurred several times)
Farms	Nice gathering spots	
Townshend Farm	Bistro	
Cornfields & orchards	A true town center with a town common	
	More business-friendly	

At the Bolton Fair and the transfer station, participants were asked to respond to three questions designed to elicit key elements of their vision for Bolton's future. Table 5.1.1 shows the questions and the responses, some of which recurred several times.

Figure 5.2.1 is the special- and frequently-visited places map displayed at the Fair, the transfer station, and the first public meeting. Residents were asked to place stickers on places they go most often and they considered special. Concentrations were in the historic town center at 117 & Wattaquadock, Bolton Orchards and the Nashoba Winery. Hiking trails and ponds were also popular, though by their nature are more dispersed on the map.

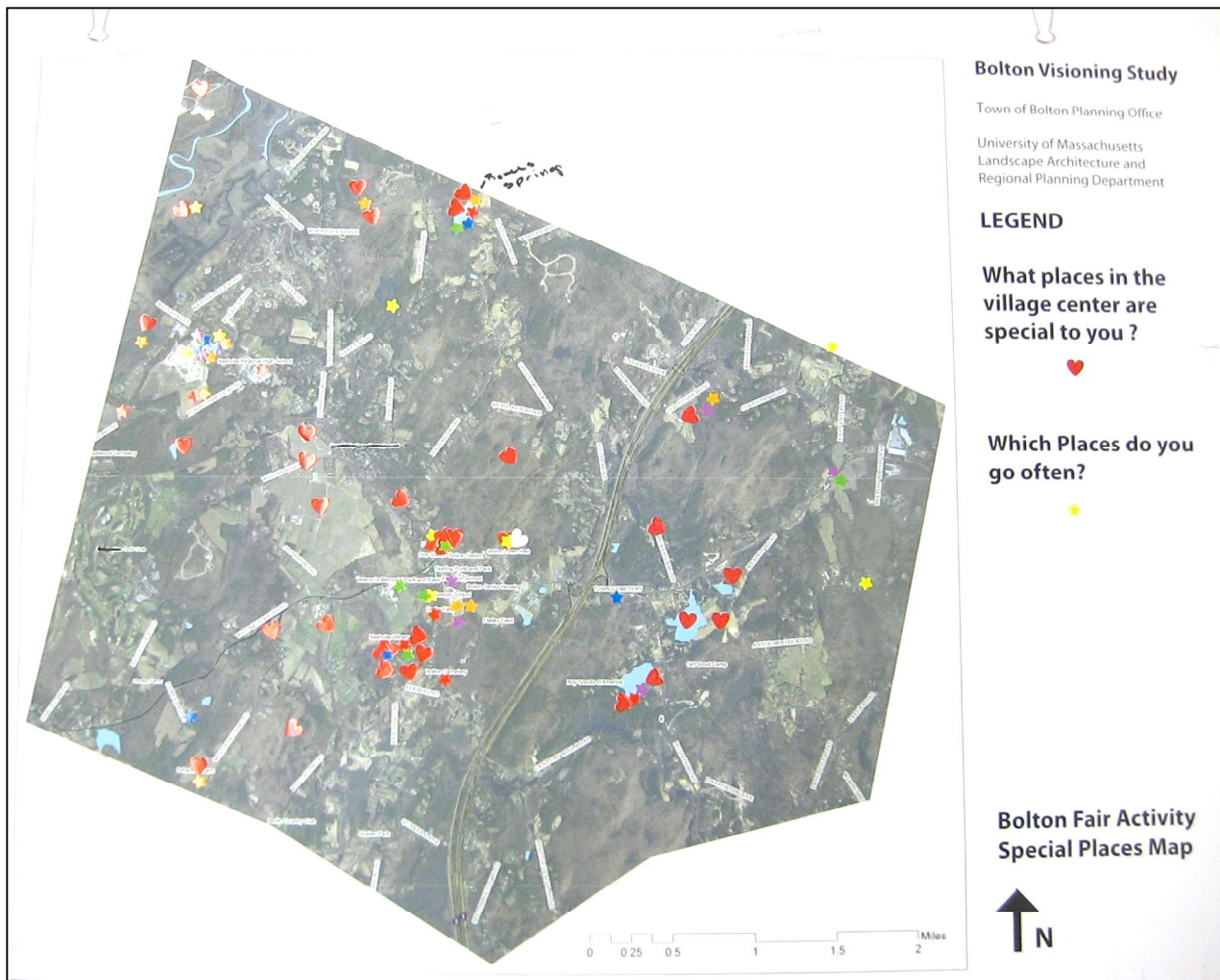


Figure 5.2.1. Special- and frequently-visited places map.

Findings from the Visual Preference Survey

The visual preference survey proved very popular, with many participants commenting that it was fun and a final participant count of 156. Respondents were asked to rate and comment on images of different styles of village centers (see Figure 5.2.3). They were asked to take into consideration scale, parking, sidewalks and streetscape, mix of uses, greenery, public gathering spaces and community character.

Images that proved popular held a number of characteristics in common. These images featured trees and public greenspace prominently, showed buildings closer to the street with varying rooflines and architectural details, and included generous sidewalks.

Images that received poor ratings from participants tended to have parking and roadways prominently featured (e.g., strip malls or small buildings along a wide road). Similarly, images lacking greenspace and trees also rated poorly. The appearance of utility wires had a negative effect on ratings. Monotonous architecture affected ratings negatively as well. Examples include; large-scale repeated patterns, buildings with vast walls with few or small windows, and buildings with flat façades. Images with dense housing rated poorly as well, though this may in part be attributed to the fact that the denser housing pictured often had monotonous architecture.

Respondents' verbal and written comments were very helpful in understanding what residents were responding to in the images. Complaints about traffic on 117 and requests for better bicycle and pedestrian facilities were common, as were comments asking for more public gathering spaces and the preservation of community character. Along those lines, some comments indicated residents' strong preference against large-scale retail.

Findings from the Web-Based Survey

One hundred ninety-seven residents participated in the online survey, indicating a high level of interest from residents and providing the Team with reliable data to help inform the planning and design process. Full survey results are included in Appendix 6, and a summary is provided here.

A substantial majority of respondents, 81.4%, favor the development of a village center in Bolton with 80.7% favoring mixed-use development. Elements that are important to residents in a village center are; aesthetically pleasing buildings with landscaping around them, availability of parks and open space nearby, safe walking and biking paths, convenient shopping and dining opportunities, a local farmers' market, and the use of

environmentally-friendly building materials and practices.

Respondents felt that department stores and affordable housing were not important to a village center in Bolton. In terms of affordable housing, this indicated to the Team that residents may not have a full understanding of the regulatory implications of failing to provide a minimum of affordable housing. Therefore the Team tried to raise awareness of this in subsequent public meetings.



Figure 5.2.2. One of the most highly rated images

The survey asked questions addressing what specific types of goods and services are most desired and viable in a village center in Bolton. Currently, residents leave Bolton for banking and restaurants, but also for pharmacies, gas stations, auto repair, package shipment, clothing stores, hardware, and department stores. These, however, are not necessarily part of residents' vision for Bolton's village center. Respondents told us that they would like to see; a bank, after-school programs, restaurants (especially coffee shops and breakfast places), more farm stands, and small craft/artisan shops in Bolton's village center. Some of these businesses already exist in Bolton and are integral parts of the town's character.



Figure 5.2.3. Visual Preference Survey images as displayed at the transfer station and the online survey

5.4 Talking with Business owners

Two important questions arose during the public participation process were, “Why is it that businesses do not come to Bolton?” and “What is the business climate within the Town?”. To answer these questions students talked to business owners within the community. The students interviewed seven local business owners and realtors. There was broad support for a Village Center and the majority suggested restaurants, coffee shops and more services. When asked what their major constraints were, one realtor explained, “Business will not come where they are not welcome” and that zoning hindered location. Other issues were lack of parking, fast traffic along Route 117 and weak sewer infrastructure were also recurrent constraints expressed.

Taken together with results from other public outreach efforts, the final analysis is that residents want more business and services within the Town but would also like to see these managed in a way that is compatible with the community character of Bolton. The major issues of zoning, traffic and parking, and the demands on the water and sewer system continued to be a recurrent theme throughout the public participation process.

5.5 Design Presentation and Feedback

Second Public Meeting: Feedback on the Preliminary Design

Bolton residents were invited to participate in a second Bolton Village Center Planning Study Public Meeting on Tuesday, November 18, 2008 at 7:00 pm at the Bolton Town Hall. At this public meeting, the students presented a 30 minute slide show that highlighted design work based on public participation feedback. Students also presented results to date on the visual, online and public meeting surveys and discussions. The students discussed the current constraints and assets in the Town as well as the probable Village Center boundary. They discussed various opportunities within different areas of that boundary, as well. Roughly 25 residents attended the presentation and provided important feedback. Specifically, residents asked the Team to scale down the design in terms of building height. Overall, the residents seemed happy with progress of the student's work. There was also a brief discussion regarding support for commercial development within the village boundary.

Third Public Meeting: Final Presentation to the Town

The final public meeting took place on December 16, 2008 at 7:00 pm at the First Parish Church next door to Town Hall. Bolton residents were invited to attend the presentation of the final planning and design recommendations for a Village Center for Bolton and offer comments. Students made a 30-minute presentation to the attendees showing visual representations of design recommendations and recommended regulatory approaches the Town can use to achieve the successful development of a village center.

5.6 Public Participation Findings Summary

The public participation process revealed much about Bolton residents and what they value in their town. Bolton's landscape is of primary importance to residents. It appears that it isn't only farms themselves or just the forests that appeal to individuals, but rather the unique mix of landscapes in Bolton that residents are attached to. In keeping with this, residents favor farmland and open space preservation as well as trail development. Similarly, Bolton's historic character and small town feel is important to residents, but at the same time people feel that it is threatened by development. Walkability stood out as a characteristic that was both important to residents, but also viewed as lacking. Bolton residents indicate they would like more public open spaces and greater opportunity to socialize with neighbors. Although residents are concerned about inappropriate commercial development in town, they would still like to see a number of new types of businesses in town. Restaurants, grocery stores/farm stands, and a bank all ranked highly.

The development of a village center in Bolton could help support what residents value in Bolton as well as satisfying many of their stated needs. Presumably, Bolton residents agree, since 81.4% of them favor village center development in Bolton.

6. SUSTAINABILITY FOR BOLTON

The word “sustainable” contains the idea of something that is “continuous, prolonged, steady, and perpetual” (Delleur 2003). The Brundtland commission defines sustainable development as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It goes on to say that adverse impacts on the quality of air, water, and other natural elements are minimized to sustain the ecosystem’s overall integrity (World Commission 1987). The Brundtland Commission’s *Our Common Future* links human survival with the survival of the ecosystems supporting life on earth. That inherent connection, in conjunction with advances in understanding ecosystems, is inspiration for our planning and design approaches that seek to create a harmonious union between the people of Bolton and the ecological, social and economic systems of which they are part.

Resilience is a dominant principle of sustainability. A system’s resilience can be defined as its ability to adapt to change. The ability to adapt is optimized by both ecological and economic diversity. Ecological diversity implies a variety of plants, animals and microorganisms to support the ecosystem. A variety of investment strategies or business types speak to economic diversity. According to Walker in *Resilience Thinking* (2006):

“Resilient socio-economic systems have the capacity to change as the world changes while maintaining their functionality. Resilient systems are more open to multiple uses while being more forgiving of management mistakes.”

The dynamic complexity of resilient systems reflects the integration of lessons learned from ecological and human processes. “Design solutions using this model no longer optimize components of a system in isolation of the rest of the system” (Walker 2006). Design with resiliency in mind is especially important when considering the consistent flux of social and ecological ecosystems.

Enfolded within the meaning of resilience is the concept of non-equilibrium. Non-equilibrium is a metaphor that describes a system’s ability to adapt and adjust to changing internal or external processes. Ecological systems are inherently open. Energy inputs, outputs and disturbances create a constant flux. Humans influence the function of these fluctuating systems (Walker 2006). Recognizing and adopting the principles of resilience and its non-equilibrium underpinnings liberates cities and towns from the maintenance heavy obligation of keeping a system, be it plant, or hydrologic, in balance. Design with a resilience and non-equilibrium ethos seeks to emulate natural process and design that can respond to fluxes and change with less human maintenance than conventional solutions. For example, with climate change and emergence of new weather patterns, bioswales offer a low-input option for handling stormwater. Compared to engineered solutions like a pipe, cost will be lower in the long run and also help to ensure recharge of the public drinking water supply.

In Bolton, resiliency may also translate to pedestrian networks that accommodate bicycles and other forms of non-motorized transportation. It can mean mandating that buildings be created with adaptive reuse in mind. Adaptive re-use design enables easy remodeling of buildings, such as residential turned commercial. Adaptive re-use can ensure that a minimum of inputs will be required for retrofits.

Many concerns that relate to sustainability were raised by Bolton residents throughout this planning process – reasonable growth, a way for the community to connect, protecting natural resources, sustaining local business. After consideration of the community feedback, as well as the regional economy and Bolton’s natural and social resources, the studio team defined sustainability as it applies to Bolton. This definition includes encouraging diversity and adaptability within ecological, economic and community systems. For Bolton, this manifests as expanding housing options, supporting local businesses, creating gathering spaces, proposing infill development, enhancing natural ecological systems and expanding pedestrian connectivity.

Community gathering spaces provide opportunities for social interaction. They can draw people together, create a sense of place for residents and visitors, and encourage residents to invest in their neighborhood. Community spaces imply spaces for people of all ages and interests to have their needs met. This includes day care to senior activity opportunities, as well as spaces for town events.

Infill will encourage reuse of currently underutilized structures and spaces to create a consistent village center fabric. This will encourage integrating new development within the existing community character. Focusing development through infill increases density and consolidates infrastructure needs. This consolidation places less pressure on the Town’s services as well as rural character.

Communities that are pedestrian oriented offer numerous benefits: decreasing auto dependence and air pollutants, increasing human health and creating more opportunity for community interaction. Designing for walkability means creating a neighborhood where residents can live, work and shop. Also, it implies a village center that offers multiple destinations. People can easily drive, park once and utilize several services or shops.

Affordable and moderate-income housing provides a diversity of housing options for people who might not be able to afford the housing market in Bolton. Including all levels of social demographics enriches the community and allows for elderly who may want to downsize, or young families who are starting out to remain in or choose Bolton as a place to live.

Local business is also a critical component to creating a resilient Bolton. Local economies keep cash local and can help with taxes, employment and personal connection to one’s community. The people of Bolton in our study overwhelmingly favored supporting local farm stands and the establishment of local small businesses to support their town’s economy and community.

Ecological sustainability encourages the use of green infrastructure in its many forms. Green infrastructure is most aptly described as the opposite of conventional (gray) infrastructure; the system of pipes, roads and wires that allow for the movement of sewage, stormwater, utility services and vehicles to and from where people live, work and play. Elements of green infrastructure include stormwater quality and quantity, habitat and ecosystem protection, mobility, recreational opportunities, and energy and waste management. Respecting and incorporating Bolton's natural resources is augmented by the use of green infrastructure techniques.

Lastly, people are an essential component of sustainability and resilience. A strategy for sustainability in Bolton would be the enfranchisement of people into a system that protects and enhances ecological processes for their benefit. Education and understanding of the human role within a larger ecological process will guide people to sustain these processes. By making hidden processes like storm water conveyance observable, people have a better understanding and personal commitment to ensuring that water is not wasted and is clean before it re-enters the watershed. Thayer (1993) writes:

Each concrete action to make a specific landscape more functionally sustainable will involve several outward, symbolic dimensions: reinforcement of personal values; maintenance of self, place and community, influence on attitudes and behaviors of one's peer group; and evidence of political feasibility or economic viability.

Sustainability is a goal that designers, planners and ecologists will strive for, but may never fully attain. The measure of success is resilience. Ultimately, resiliency and a site or a region's ability to adapt and evolve is the most powerful manifestation of sustainability. By incorporating walkability, community gathering, support for a local economy, affordable housing and green infrastructure, Bolton can become a model of resiliency for its region and a demonstration for other small towns faced with the prospect of development that does not reflect their values.