Winter 12-20-2009

Town of Ludlow Master Plan. Part I: Envisioning 2030

Rachael Cain
*University of Massachusetts - Amherst*, rcain@student.umass.edu

Euripedes De Oliveria
*University of Massachusetts - Amherst*, euri@larp.umass.edu

Paul W. Gagnon
*University of Massachusetts - Amherst*, pwgagnon@larp.umass.edu

Peter Gillo
*University of Massachusetts - Amherst*, pgillo@larp.umass.edu

Meredith Hill
*University of Massachusetts - Amherst*, mehill@larp.umass.edu

*See next page for additional authors*

Follow this and additional works at: [https://scholarworks.umass.edu/larp_grad_research](https://scholarworks.umass.edu/larp_grad_research)

Part of the [Agricultural and Resource Economics Commons](https://scholarworks.umass.edu/larp_grad_research), [Economics Commons](https://scholarworks.umass.edu/larp_grad_research), [Geography Commons](https://scholarworks.umass.edu/larp_grad_research), and the [Urban Studies and Planning Commons](https://scholarworks.umass.edu/larp_grad_research)

Cain, Rachael; De Oliveria, Euripedes; Gagnon, Paul W.; Gillo, Peter; Hill, Meredith; Kresge, Mark; Larose, Alyssa; Ramsey, Walter; Rickman, Joshua; Smith, Sonya C.; Wallace, Ryan; Williams, Rebecca; Constable, Barbara; Farrell, Helena; Giggey, Brian C.; Jennett, Chris; Kong, Zhujun; Plante, Megan; Webb, Ben Eli; and Zervas, Deborah A., "Town of Ludlow Master Plan. Part I: Envisioning 2030" (2009). *Landscape Architecture & Regional Planning Studio and Student Research and Creative Activity*. 3.
Retrieved from [https://scholarworks.umass.edu/larp_grad_research/3](https://scholarworks.umass.edu/larp_grad_research/3)

This Article is brought to you for free and open access by the Landscape Architecture & Regional Planning at ScholarWorks@UMass Amherst. It has been accepted for inclusion in Landscape Architecture & Regional Planning Studio and Student Research and Creative Activity by an authorized administrator of ScholarWorks@UMass Amherst. For more information, please contact scholarworks@library.umass.edu.
Town of Ludlow Master Plan

PART I: Existing Conditions – Inventory & Assessment

November 2009

Prepared for the Town of Ludlow and the Pioneer Valley Planning Commission
Prepared by the Department of Landscape Architecture and Regional Planning
University of Massachusetts Amherst
Project Team

Pioneer Valley Planning Commission (PVPC)
Jessica Jo Allan, AICP, Senior Planner
60 Congress Street
Springfield, MA 01104
413.781.6045
jallan@pvpc.org

Department of Landscape Architecture and Regional Planning
University of Massachusetts Amherst

Instructors
Elisabeth Hamin, Associate Professor
415 Hills North, Amherst, MA 01003
413.577.4490
emhamin@larp.umass.edu
Michael DiPasquale
Robert Ryan, Associate Professor

Teaching Assistant
Chingwen Cheng

RPL675 Regional Planning Studio Students
Rachael Cain
Euri De Oliveira
Paul Gagnon
Peter Gillo
Meredith Hill
Mark Kresge
Alyssa Larose
Walter Ramsey
Josh Rickman
Sonya Smith
Ryan Wallace
Rebecca Williams

LA609 Landscape Planning Studio Students
Barb Constable
Helena Farrell
Brian Giggey
Yueqin Liu
Chris Jennette
Zhujun Kong
Megan Plante
Ben Webb
Deb Zervas

Cover Photo Credit
Upper left: K. Martin 2007
Lower left: S. Smith 2009
Upper right: P. Gagnon 2009
Lower right: D. Zervas 2009
# Table of Contents

**Executive Summary** ................................................................................................................................. i

1.0 Introduction: Ludlow Then and Now ....................................................................................................... 1
  1.1 Goals and Policies ................................................................................................................................. 6
  1.2 Ludlow’s Current Master Plan ............................................................................................................. 12
  1.3 Community Vision and Master Plan Goals Statement ........................................................................ 14

2.0 Housing .................................................................................................................................................... 16
  2.1 Demographics ..................................................................................................................................... 16
  2.2 Housing Inventory ............................................................................................................................... 23
  2.3 Housing Demand ................................................................................................................................. 29
  2.4 Key Findings ....................................................................................................................................... 38

3.0 Natural Resources and Watershed Protection ......................................................................................... 40
  3.1 Introduction ........................................................................................................................................ 40
  3.2 Hydrology .......................................................................................................................................... 45
  3.3 Geology, Topography, Soils and Forests .............................................................................................. 64
  3.4 Trees and Forests of Ludlow ............................................................................................................... 70
  3.5 Habitat ............................................................................................................................................... 78
  3.6 Farmland ............................................................................................................................................ 89
  3.7 Composite Assessment / Natural Resources Greenway Plan ............................................................ 101

4.0 Cultural and Historic Resources ............................................................................................................ 109
  4.1 Introduction ........................................................................................................................................ 109
  4.2 Inventory and Assessment .................................................................................................................. 128
  4.3 Summary .......................................................................................................................................... 132

5.0 Parks, Recreation and Protected Open Space ......................................................................................... 138
  5.1 Open Space ....................................................................................................................................... 138
  5.2 Existing and Potential Trail Systems .................................................................................................. 149
  5.3 Proposed Parks, Recreation and Protected Open Space Greenway .................................................. 157
  5.4 Conclusion ........................................................................................................................................ 165

6.0 Services and Facilities .............................................................................................................................. 166
  6.1 Laying the groundwork ......................................................................................................................... 166
  6.2 Trends and Data ................................................................................................................................. 168
  6.3 Opportunities and Challenges ............................................................................................................ 174

7.0 Transportation .......................................................................................................................................... 175
  7.1 Introduction ........................................................................................................................................ 175
  7.2 Current Conditions .............................................................................................................................. 177
  7.3 Opportunities and Challenges ............................................................................................................ 179

8.0 Energy and Sustainability ......................................................................................................................... 181
  8.1 Ludlow’s Climate in 2020 and Beyond ............................................................................................... 182
  8.2 Trends and Data .................................................................................................................................. 183
  8.3 Opportunities and Challenges ............................................................................................................ 186

9.0 Land Use .................................................................................................................................................. 188
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>9.1</td>
<td>Historic Inventory</td>
<td>188</td>
</tr>
<tr>
<td>9.2</td>
<td>Current Land Use</td>
<td>190</td>
</tr>
<tr>
<td>9.3</td>
<td>Future Land Use</td>
<td>198</td>
</tr>
<tr>
<td>9.4</td>
<td>Conclusion</td>
<td>206</td>
</tr>
</tbody>
</table>
Master Plan Executive Summary

If it can be hoped that the classic New England town—equal parts industrial, agricultural, and suburban—can not only weather the challenges that the 21st century has brought us—rapid suburban and commercial expansion, diminishing natural resources, shortages of affordable housing, economic hardships, rising energy costs, and climate change—but prosper despite them, Ludlow is poised to be such a community. Overall, the town offers a unique and promising combination of resources and amenities that together make for a very affordable, friendly, attractive, and balanced community in which to live and thrive.

Many of Ludlow’s most pressing challenges are manifested in the town’s great assets. Geographically, Ludlow is poised for growth; it is located to the east of the more highly urbanized metropolitan Springfield area, to the south of the college towns of Amherst and Northampton, and to the west of a soon-to-be constructed casino in Palmer. The Massachusetts Turnpike exits near the densest part of town. Ludlow has an attractive downtown with a diversity of restaurants and businesses and it has large tracts of intact forested and riparian land with high ecological integrity and under-tapped recreational value.

The town’s living history is palpable in the many mill-era buildings in the urban core and in the still thriving, scenic agricultural neighborhoods in the rural north end of town. To date, the town offers a variety of housing options. The people of Ludlow see their community as hard-working, family-oriented, and civic conscious.

Perhaps the most pressing obstacle Ludlow must overcome—a theme that will be repeated in the following chapters—is how to manage the tension between the desire for new growth and economic opportunity and the desire to preserve aspects of the town the way they are. Ludlow wants to be welcoming to new businesses and residents, yet it is concerned about impacts to natural resources, farmland, community character, infrastructure, and traffic. However, old ways of managing these competing interests—traditional zoning regulations and codes, short-
term economic and housing planning, and limited community involvement—are proving to be no longer effective.

Specifically, members of the community have had little control of how Ludlow grows. The town has no Capital Improvements Plan or long term energy plan; its regulatory bylaws are outdated and inadequate for managing its growth. It has only begun to tap into the kind of programs and partnerships necessary for the creation of affordable housing, green energy, and the preservation of farmland, open space, and historic resources. Internal and external pressures on aging town infrastructure and energy sustainability have not been addressed. Finally, although the town does not lack in essential recreational and natural amenities, those resources are concentrated in the least populated parts of town; access is limited or largely absent in the more populous areas. In summary, Ludlow must:

- **Overhaul existing land use regulations**

  Existing land use regulations are inadequate for managing the town's current and future growth and have been unevenly applied. New bylaws must be comprehensive, future-oriented, and equitably enforced.

- **Address its low percentage of affordable housing**

  Ludlow has not met the state standard of 10% affordable housing. Under state law, failure to meet these standards allows developers the right to bypass town zoning bylaws, complicating the application of progressive zoning changes.

- **Increase access to parks and recreation in the downtown areas**

  Recreational open space is lacking in downtown areas. Ludlow needs to create new open space and provide more access to existing open space in the southwest side of town. Likewise, the town needs to do a better job of informing its residents about existing recreational opportunities.
- **Protect natural, historical and cultural resources**

  Ludlow has not taken steps to protect its farmland and historic buildings. Its natural habitat and water resources are in danger of degradation due to under-regulated development.

- **Attend to its infrastructure and finances**

  Without a Capital Improvements Plan, Ludlow cannot prepare for the replacement of vital infrastructure. To meet its ambitious community goals, Ludlow must also expand its capacity to acquire funding through a variety of state, federal, regional and private initiatives and partnerships.

Through the community visioning workshops, the Town of Ludlow Master Plan will address these issues. The chapters below provide an initial overview of these challenges and assets as well as offering some tentative recommendations.
1.0 Introduction: Ludlow Then and Now

Ludlow is a community that is rich in history, culture, resources, and hometown pride. A family-friendly and safe place to live, Ludlow’s community also values its town’s wildlife, wetlands, and agricultural land. With historic cultural neighborhoods and abundant natural landscapes, residents in Ludlow share an enthusiasm towards a common vision for their town’s new Master Plan.

The Town of Ludlow comprises 28 square miles of land in the western portion of Massachusetts. It is surrounded by Belchertown, Granby, Chicopee, Springfield, Wilbraham, and Palmer and is part of the Springfield Metropolitan Area. The town of Ludlow has a rich agricultural history and an industrial past on the Chicopee River. It is still a vital center for industry throughout the region.

Ludlow was located within the boundaries of Springfield until it was incorporated as a town in 1774. In the early years, it was primarily settled as an agricultural village. During the late 1700s, lumber and grist mills and a glass factory were constructed along neighboring brooks to the Chicopee River. With the advent of the industrial revolution in the 19th century, textile, hat, boot, and shoe manufacturing flourished in the town’s downtown along the Chicopee River. At this time, the downtown area was historically known as Jenksville, which was named after the founder of the Springfield Manufacturing Company. In 1783, the first Meeting House and First
Church were constructed in Ludlow Center and were the focus of a radial street pattern that later extended to all parts of the town.

Small mills were gradually replaced with larger mills and factories during the later industrial period in the 19th and 20th centuries. The largest and most well-known mill was the Ludlow Manufacturing Company, which specialized in the production of jute yarn, twine, and webbing. The Ludlow Manufacturing Company was also responsible for constructing major parts of the town’s infrastructure including the East Street trolley line, the Red Bridge Generating Station, the Hubbard Memorial Library, worker housing, schools, playgrounds, banks, churches, and the Post Office. Currently, the clock tower and a portion of the mill buildings remain and provide a major landmark for the downtown area along State Street.

The early 20th century also brought in a large number of immigrants to work in Ludlow’s mills, such as French Canadians, Irish, Scottish, Polish, Italians, Portuguese, and the Ukrainians (McChesney, 265-279). Many families of these immigrants still remain in Ludlow today, with the majority of residents being of Portuguese, Polish, and French Canadian descent.

Much of the community’s ethnicity and traditions are represented today in the town’s neighborhoods, schools, churches, and community centers. There is an annual Portuguese Festival as part of the Our Lady of Fatima Parish as well as the Portuguese School of Ludlow. The Gremio Lusitano Club, Ludlow’s Portuguese club, holds many social and sports activities and houses a semiprofessional soccer team, the Pioneers. The Polish-American club has weekly dances and other events for the community.
Other resources and town amenities currently make Ludlow an attractive place to live and visit. The Lupa Zoo attracts visitors from inside and outside of town. Fall festivals and shopping at Randall’s Farm are another favorite pastime of Ludlow’s citizens. Residents also enjoy walking or jogging around the Reservoir or visiting Facing Rock Wildlife Management Area or Haviland Beach. Ludlow has a very active Senior Center for its senior citizens and a Recreation Center and Randall’s Boys and Girls Club for children and teenagers. Many families, children, and teenagers support Ludlow’s nickname, “Soccer Town USA”, and spend their pastimes playing, watching, and coaching soccer. According to interviews with stakeholders, other activities residents associate with Ludlow include Celebrate Ludlow (festivities and fireworks in July), a Memorial Day Parade, and a Veterans Day celebration.

Other more recent developments have lead to Ludlow’s growth. The development of Westover Air Force Base in 1939, located just to the northwest of Ludlow, formed a surrounding industrial area in the northwest of Ludlow and led to an increase in the demand for housing. The construction of the Massachusetts Turnpike and a turnpike exit (exit 7) in 1957 along the south portion of Ludlow produced a lot of growth in the town, and the town began to get a reputation by some as a “bedroom community” to accommodate commuting workers (Ludlow Master Plan Website, accessed September 29, 2009). These and other pressures from the
growth of surrounding communities have lead Ludlow to experience development pressures and increased traffic congestion. Many residents seem to support growth for Ludlow, but would like their town to grow in a way that maintains the town’s “small town” feel, natural resources, quality services, historic charm, landmarks, and amenities (Stakeholder Interviews, June 2009).

**Structure and Process of the LARP Studio and the Ludlow Master Plan**

The Town of Ludlow’s planning department contracted with PVPC, a regional public planning agency that addresses regional issues and acts as a consultant on other planning-related projects for 43 municipalities in Hamden and Hampshire counties, to assist Ludlow in the development of their Master Plan. A Master Plan Committee was formed of local residents to work with PVPC throughout the planning process. In June 2009, PVPC interviewed approximately 50 of Ludlow’s stakeholders on the community’s goals, policies, and vision for future growth. These stakeholder interviews were summarized in Chapter 1, Goals and Policies.

In October 2009, PVPC released a community survey for Ludlow’s residents in English and Portuguese languages. The results of this survey will inform the final master plan, but sufficient survey responses were not available at the time this report was prepared.

Graduate students in the Department of Landscape Architecture and Regional Planning (LARP) at the University of Massachusetts, Amherst, assisted PVPC with the development of Ludlow’s Master Plan and community vision. This project was completed as a studio project between September 2009 and December 2009. The first part of the Master Plan included both UMass planning and landscape architecture graduate students, who performed a Community Conditions Assessment in September and October 2009. This Community Conditions Assessment includes an overview of past policies, data, trends, some limited recommendations, and a proposal for a greenway corridor to better link Ludlow to the region. The assessment was completed by teams who each worked on chapters related to Natural and Cultural Resources, Watershed Protection, Housing, Open Space and Recreation, Services and Facilities,
Transportation, Green Communities, and Land Use. Findings from this report were presented to the Ludlow MPC in October, 2009.

Between October and December 2009, the UMass LARP Master in Regional Planning studio will prepare scenarios on build out options for Ludlow’s future. The community conditions and build out scenarios will be presented to the community during the “Looking at Ludlow: 2020 Visioning Days” Visioning Workshop in November 2009, during which a community-supported vision for Ludlow’s future will be drafted. The results from the scenarios and the visioning workshop will be written up in a final report to PVPC and the Town of Ludlow. PVPC will then continue the process of master plan preparation through to final approval of a new Ludlow Master Plan.
1.1 Goals and Policies

Ludlow has experienced significant growth and change since its last master plan was created in 1964. Since then some goals and issues have changed, while many others have endured. When creating a new comprehensive plan, it is helpful for a community to review goals of past plans, discarding those that are no longer relevant or desired, building upon those that still hold true, and adding goals that address new issues, concerns, and desires of the community.

To that end, below is a list of Ludlow’s major past plans, followed by a summary of key issues and goals identified in each. Ludlow’s recent initiatives to control and plan for growth, including Ludlow’s current Master Planning process, are then discussed. We conclude this chapter with a draft of a vision statement for the community, and a draft of goals for the comprehensive plan. These both will be revised as the planning process develops.

Ludlow’s Major Past Planning Initiatives

- 1964 Master Plan
- 1991 Ludlow Strategic Plan
- 1995 Economic Development Strategy
- 2006 Open Space and Recreation Plan (update of 1996 plan)

1964 Master Plan

In 1964 Ludlow was already considered a “bedroom” community, and the Master Plan predicted high population growth in the subsequent two decades. The Plan saw growth as positive for the Town, and reinforced the idea that Ludlow was a good place to raise children and call home. Maintaining quality services in the face of growth was a concern, and industrial and commercial development to broaden the tax base was encouraged. “Spot” zoning, allowing businesses to be built in residential areas, was a problem, and industrial parks were recommended to address this issue of incompatible uses.
The Plan recommended a new civic and commercial center just north of the Turnpike, and development in general was expected to occur north of the existing developed areas in the southern portion of Town. A potential future regional shopping center was proposed as a positive addition to the Town. In order to maintain adequate open space and recreation facilities, the plan encouraged the Town to actively purchase land for this purpose, and recommended that new subdivisions be required to incorporate open space and recreation facilities into their design.

Growth and development was welcomed in the 1964 Master Plan. The next major planning effort in Ludlow, the Ludlow Strategic Plan of 1991, showed a marked change in the community’s attitude toward growth and development.

**1991 Ludlow Strategic Plan**

The purpose of the 1991 Ludlow Strategic Plan was to create a growth management strategy to achieve the long term goals of the community. A survey was sent to every household in Ludlow, with a 42% response rate. According to the survey results, the most important features that best defined Ludlow and its quality of life were the downtown area, followed by farmland. The survey results showed that the majority of Ludlow residents felt that growth was adversely affecting the Town. The protection and preservation of natural resources, open space, farmland, and historic districts were prime concerns, and many residents favored a reduction in the rate of growth. Residents also wanted land use conflicts between residential, commercial and industrial areas to be avoided by greater enforcement of zoning regulations.
Four goals were developed based on the surveys and interviews with Town officials:

- to protect Ludlow’s natural resources;
- to enhance Ludlow’s community character and quality of life;
- to provide for the needs of all Ludlow residents; and
- to improve administration of existing laws and regulations.

**1995 Economic Development Strategy**

The objective of the 1995 Economic Development Strategy plan was to create an economic development strategy and vision for the Town to determine ways in which Ludlow could best compete in the regional economy while benefitting low and moderate income residents. Public forums and a survey of local businesses were used to provide input into the plan. The economic well-being of young people and the elderly was a concern to the community, as well as the burden on the Town of providing quality services that remain affordable to local tax payers.

The top priority identified in the plan was to expand the industrial tax base in Ludlow. In order to promote business development, and to create jobs for residents, the 1995 report encouraged establishing a good relationship between the Town and businesses, revising the zoning regulations to make them clearer for developers, and improving the permitting process. A final overarching recommendation was for the community to come to a consensus on land use issues through a comprehensive planning process. The plan stressed that economic development efforts should take place in the context of a larger vision for Ludlow.


2006 Open Space and Recreation Plan

The 2006 update to the Open Space and Recreation Plan, previously updated in 1996, utilized a public visioning session in addition to a survey of residents in forming the open space and recreation goals of the community. The main goals for the community were to use creative development tools to incorporate open space planning into future development, to sustain the general character of the town, and to enhance quality of life and civic pride. Other major goals included:

- assuring accessibility to recreation facilities;
- identifying priority areas for protection and developing procedures for acquiring those areas;
- protecting rivers, streams, ponds, and wetlands; and
- ensuring that sound management practices were used in implementing the plan.

This plan also recommended the development of a community master plan to further build upon the community’s vision.

Recent Initiatives

Ludlow has taken steps in the last few years to become more proactive in planning for the future. Recent Town initiatives include:

- 2003 – Adopted the East Street Revitalization Overlay District “to encourage the preservation and revitalization of the East Street Corridor,” (Town of Ludlow Zoning Bylaws, 5-10). The new overlay district allows for mixed use development where only business uses were previously allowed in the Town’s traditional downtown area.
- 2005 – Adopted a Stormwater Management Bylaw in order to manage land development in a way that controls the adverse impacts of stormwater runoff.
- 2006 – Participated in the Commonwealth Capital Program, a state program where municipalities apply annually for a score that rates their land use planning and
regulatory practices on the basis of producing livable communities and providing for clean energy. Ludlow received a score of 42 out of a maximum of 140.

- 2007 – East Street Revitalization Project completed. This project focused on the East Street Corridor and included façade improvements, reconstruction of sidewalks and roads, new crosswalks, benches, trees, signage and light fixtures, and improvements to water lines.

- 2007 – Hired its first Town Planner to help facilitate further initiatives relating to growth and development.

- 2008 – Board of Selectmen endorsed the Pioneer Valley Clean Energy Plan, created by the Pioneer Valley Planning Commission and the Franklin Regional Council of Governments. This is the first regional clean energy plan in the State, and outlines strategies and tools for reducing energy consumption and for siting clean and renewable energy generation facilities.

- 2008 – Participated in the Commonwealth Capital program for the second time, receiving a score of 80 out of a maximum of 140. This is almost a 100% increase over the score in 2006, showing that much had been accomplished in a few years, demonstrated by the initiatives in this list.¹

- 2009 – Passed a Right to Farm bylaw, which allows anyone to conduct agricultural or horticultural business in town, subject to review of the Conservation Commission. This bylaw helps protect farmers from being sued for nuisance-related issues, such as odors,

---

¹ Between 2006 and 2008, Massachusetts changed the way in which the Commonwealth Capital application is scored, which likely partially accounts for Ludlow’s higher score in 2008.
that may arise when other development is in close proximity. It shows that the Town is supportive of local agriculture.

- **2009** – The Town is currently working with the Pioneer Valley Planning Commission on studying the potential for a 40R Smart Growth Overlay District at the Ludlow Mills site. The district would allow for concentrated housing and mixed use development at the mill, with at least 20% of the housing set aside as affordable. The State provides financial incentives to towns for adopting 40R districts, and the Town’s Commonwealth Capital score would also go up with the adoption and subsequent development within the district.

- **2009** – The Town applied for and is now receiving technical assistance in meeting the State’s criteria for becoming a Green Community, which would make the Town eligible to receive grants for renewable energy projects. Currently the Town meets two criteria, and is working with the Pioneer Valley Planning Commission on developing an action plan to meet the remaining three criteria within the next year.

- **2009** – Once funding is secured, the Pioneer Valley Planning Commission will be assisting Ludlow with a housing assessment, which will provide a housing needs assessment, overview of existing constraints and opportunities, and an action plan to achieve housing goals in Ludlow.

Finally, this Master Plan is a testament to the community’s current goal of shaping its future growth in an environmentally, socially, and economically sustainable way.
1.2 Ludlow’s Current Master Plan

The Town of Ludlow is currently working with the Pioneer Valley Planning Commission on writing its first master plan since 1964. Public participation is essential in developing a master plan that truly reflects the goals of the community. In June of 2009, PVPC conducted community stakeholder interviews with fifty community members. These interviews, along with a review of past plans, show that some goals have changed in the community since the last master plan, and some remain relevant today. PVPC grouped comments from the interviews into categories such as “growth and development,” and “open space and recreation,” and then into sub-categories based on specific topics. Review of each category revealed broader themes and issues about how respondents felt about the general growth and development of Ludlow. Those themes and issues most relevant to this master plan are summarized below.

Maintaining affordable and quality services continues to be a goal and concern for the Ludlow community. Ludlow residents value their schools, police and fire services, but worry about being able to afford the necessary expansion of these services as population grows. This is especially true for older residents who fear they may be forced out of their homes if taxes are raised. There are differing opinions on whether to promote industrial development, though there is agreement that it should be separated from residential areas. Some people felt that traffic, already a large issue, would become worse with more industrial development, while others commented that traffic is good for town businesses. Disagreement and a lack of communication among Town boards were cited in the interviews as obstacles to implementing a plan due to a lack of enforcement of existing regulations. Proactive planning was highly desired by the respondents.

The loss of open space and farmland, and the degradation of natural resources is a much larger concern now than in the past, as awareness of environmental issues has grown over the years. Additionally, Ludlow residents are progressive in their views on renewable energy. Many of
those interviewed commented enthusiastically about the potential for wind and solar energy production in Ludlow, and the importance of energy efficiency in Town buildings, especially schools.

One major change since the last master plan is the community’s attitude towards growth and development. While many people still support growth, the majority felt that development should be planned, paced, and of high quality. There is tension between wanting to grow, but without incurring some of the negative impacts already experienced in Ludlow due to growth, such as loss of open space, an increase in traffic, and an increase in the costs of providing community services. People are concerned that the perceived fast pace of development has altered the character of the community. Sprawling residential development and commercial strip development were both seen as ugly and undesirable in many comments. In contrast, interviewees desired a more pedestrian friendly, walkable environment downtown and in residential neighborhoods.

The type of growth that is desired, however, varies among those who were interviewed, and comments made about the Ludlow Mills redevelopment project help to illustrate this. Of all the comments addressing the mill, three expressed a desire for business and industrial development in the mill, three comments specifically stated their should be no commercial or industrial development, one comment called for a mix of housing, live/work space, and industry, and two more comments advocated for housing at the mill above all else. Other comments not explicitly stating an opinion about the use of the building expressed a desire for access to the Chicopee River, an outdoor skating rink, and walkways, while some took an economic development
perspective, seeing the project as a “boom to the area,” and an opportunity to raise the tax base.

Overall, Ludlow residents value the family-oriented, safe, close-knit, and hard-working character of their community. The community wants to be able to control future development in a way that protects and enhances existing assets, while allowing for necessary change. In general there is consensus that quality, controlled growth is desirable, but how that translates into actual development is still unclear. The results of the community survey will help to further determine Ludlow’s existing goals, and the visioning session will bring the community together to communicate their ideas, culminating in a vision for Ludlow’s future.

1.3 Community Vision and Master Plan Goals Statement

Based on the stakeholder interviews, a tentative community vision for Ludlow might be:

Over the next ten years, Ludlow will continue to be a family-oriented, safe, close-knit community. We will protect our natural and cultural resources while providing good jobs in the community and housing that is affordable to all residents. We will encourage quality development through our regulations and policies, and will promote energy efficiency and renewable energy production in Town. Increased recreational opportunities will be available to all residents, and Town services will continue to be of high quality. In short, Ludlow will work together as a community to protect and enhance its existing assets, while addressing those issues that pose a threat to Ludlow’s quality of life and sustainability.

The public participation process, including the community survey and visioning workshop currently underway, will guide the revision of this statement into one that more fully reflects the community’s hopes and dreams.
Based on this, a preliminary goal statement for the Master Plan for the Town of Ludlow is as follows:

To shape Ludlow’s future with regulations and policies that reflect the community’s goals to retain its unique character; protect natural resources, preserve open space, and promote energy efficiency and renewable energy production; provide a high level of services; promote quality residential and commercial development; maintain affordability for residents and a balanced tax base with appropriate industrial and commercial development; provide access for all residents to recreational facilities; and to foster a continued sense of community and civic pride.
2.0 Housing

"These pleasant lands were all our own
And where we chose we made our home.
No prowling foe our track besought
Nor cruel wrongs our vengeance taught."

—Mr. Fisk/ Noon, A .The History of Ludlow, Massachusetts

2.1 Demographics

Population

Ludlow has an estimated population of 21,209 according to the United States 2000 census. The 2000 population density of the town was 780 people per square mile, which is slightly higher than the Hampden countywide average of 738. Rapid population growth began in the 1950’s, and lasted for several decades. More recent census data shows population leveling off (see Table 2.1 and Figure 2.1). This trend adjusted forecast projecting a slight decrease in population into the current decade and future may be due to the aging of the baby boomer population and increase in their mortality rates. It may also mean that the traditional pattern of housing migration, characterized by more urban residents moving to Ludlow to seek “greener pastures” may be leveling off.

<table>
<thead>
<tr>
<th>Year</th>
<th>Ludlow Total Population</th>
<th>Growth %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>20,563</td>
<td>-2</td>
</tr>
<tr>
<td>2010</td>
<td>21,012</td>
<td>-1</td>
</tr>
<tr>
<td>2000</td>
<td>21,209</td>
<td>13</td>
</tr>
<tr>
<td>1990</td>
<td>18,820</td>
<td>4</td>
</tr>
<tr>
<td>1980</td>
<td>18,150</td>
<td>3</td>
</tr>
<tr>
<td>1970</td>
<td>17,580</td>
<td>27</td>
</tr>
<tr>
<td>1960</td>
<td>13,805</td>
<td>59</td>
</tr>
<tr>
<td>1950</td>
<td>8,660</td>
<td>6</td>
</tr>
<tr>
<td>1940</td>
<td>8,181</td>
<td>-8</td>
</tr>
<tr>
<td>1930</td>
<td>8,876</td>
<td>0</td>
</tr>
</tbody>
</table>

Mean: 14

Source: US Census Bureau, PVPC Population Projections
Table 2.2 below compares the Town of Ludlow to the county, state and surrounding communities. Over the past several decades, the Town of Ludlow’s growth has increased tremendously. Trends from 1980 to 2000 show that the town of Ludlow experienced a 17% increase in population, which is significantly higher than surrounding towns with the exception of Wilbraham. The county population increased by 3% and the increase for all of Massachusetts was 11%.
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ludlow Town</td>
<td>18,150</td>
<td>18,820</td>
<td>21,209</td>
<td>17</td>
</tr>
<tr>
<td>Chicopee City</td>
<td>55,112</td>
<td>56,632</td>
<td>54,653</td>
<td>-1</td>
</tr>
<tr>
<td>Wilbraham Town</td>
<td>12,053</td>
<td>12,635</td>
<td>13,473</td>
<td>12</td>
</tr>
<tr>
<td>Springfield City</td>
<td>152,319</td>
<td>156,983</td>
<td>152,082</td>
<td>0</td>
</tr>
<tr>
<td>Hampden County</td>
<td>443,018</td>
<td>456,310</td>
<td>456,228</td>
<td>3</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>5,737,037</td>
<td>6,016,425</td>
<td>6,349,097</td>
<td>11</td>
</tr>
</tbody>
</table>

Source: US Census Bureau, Decennial Census

**Population Distribution by Age Group**

Overall, Ludlow currently has a population that is older than the average in its region or the Commonwealth. Curiously, while there are a slightly higher percentage of people in prime childbearing years (25-44), this has not translated to a high percentage of children (Figure 2.2). This may be due to the Ludlow Prison facility, which holds roughly around 2,000 inmates counted in the US census. Instead, Ludlow families tend to be small, and have a fairly low birth rate. A positive condition for the community is that there is very low rate of birth among very young mothers (age 15-19), according to the US census American Community Survey 3-year estimates.

When compared to county and state statistics as shown in Figure 2.2, the town of Ludlow is heavily concentrated in the later years. The two age categories of (65 to 84) and (85 and above) hold a larger percentage of population in the town of Ludlow than the county and state. The aging of population in the town may create different housing needs in the coming decades.
According to the 2000 census, The Town of Ludlow is a racially homogenous community with 95% of its residents being Caucasian (Table 2.3). This is higher than the percentages for the Hampden county (79%) and the state (83%) but similar to surrounding towns with the exception of Springfield. Diversity in town is concentrated more in language, since the community is home to a very large Portuguese-American population. Census data on language spoken in the home show that out of 20,900 people who can speak a language, 19% (3,890) speak a language other than English or Spanish.
Table 2.3 Race & Ethnicity

<table>
<thead>
<tr>
<th></th>
<th>Ludlow</th>
<th>Hampden County</th>
<th>Massachusetts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimate</td>
<td>%</td>
<td>Estimate</td>
</tr>
<tr>
<td>Total:</td>
<td>21,961</td>
<td>458,549</td>
<td>6,437,759</td>
</tr>
<tr>
<td>White alone</td>
<td>20,827</td>
<td>95</td>
<td>364,333</td>
</tr>
<tr>
<td>Black or African American alone</td>
<td>388</td>
<td>2</td>
<td>37,136</td>
</tr>
<tr>
<td>American Indian and Alaska Native</td>
<td>15</td>
<td>0</td>
<td>659</td>
</tr>
<tr>
<td>Asian alone</td>
<td>0</td>
<td>0</td>
<td>7,486</td>
</tr>
<tr>
<td>Native Hawaiian and Other Pacific Islander</td>
<td>0</td>
<td>0</td>
<td>158</td>
</tr>
<tr>
<td>Some other race alone</td>
<td>387</td>
<td>2</td>
<td>40,808</td>
</tr>
<tr>
<td>Two or more races:</td>
<td>344</td>
<td>2</td>
<td>7,969</td>
</tr>
<tr>
<td>Two races including Some other race</td>
<td>46</td>
<td>0</td>
<td>2,574</td>
</tr>
<tr>
<td>Two races excluding Some other race, and three or more races</td>
<td>298</td>
<td>1</td>
<td>5,395</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, 2005-2007 American Community Survey

**Household Income**

Level of household income is one sign of financial security in a town, and Ludlow is overall doing very well. The 2005-2007 Annual Community Survey by the US Census Bureau estimates show $65,284 to be the town of Ludlow’s median household income while state of Massachusetts median was $61,785, as shown in (Figure 2.3) below. Ludlow’s average household income has grown faster than the state or the county. Over the 17-year period from 1980 – 2007, Ludlow grew an annual average of 4.71%, while the state only grew 3.95% and the county a much slower 2.81%. The result of this is that Ludlow has come to exceed even the state’s average household income.
This data shows that the Town of Ludlow is one of the more affluent communities in the state of Massachusetts. A constant increase in median household income for Ludlow is significantly higher than surrounding cities is shown in (Table 2.4).

<table>
<thead>
<tr>
<th></th>
<th>Ludlow Town</th>
<th>Chicopee City</th>
<th>Springfield City</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>$65,284</td>
<td>$41,039</td>
<td>$32,319</td>
</tr>
<tr>
<td>2000 Adjusted</td>
<td>$47,002</td>
<td>$35,672</td>
<td>$30,417</td>
</tr>
<tr>
<td>1990 Adjusted</td>
<td>$36,247</td>
<td>$28,905</td>
<td>$25,656</td>
</tr>
</tbody>
</table>

Source: US Census, Decennial Census American Community Survey

**Poverty Rates**

Consistent with the increase in incomes seen above, overall poverty rates have dropped in Ludlow. The current poverty rate in the Town of Ludlow is 6% according to the 2000 census. Figure 2.4 presents data on individuals below poverty levels in Ludlow in comparison over the
last two decades. The 2000 census indicates that of the number of people who are below the poverty level by age has dropped with those who are of working age since 1990. Ludlow went from (63%) of 1,073 individuals that are of working age (18 to 64) below poverty level in 1990 to (46%) of 1,238 in 2000. The county and state as a whole also experienced the Town’s decrease. The percentage of individuals of working age below the poverty level in the Hampden County dropped from 63% to 50% and the state dropped from 65% to 57% over the same time period. Population ages of groups under 18 are pooled into households of working age who are living below the poverty status according to the US census.

Figure 2.4: Age of those Below Poverty Level in Ludlow, 1990-2000

Educational Attainment

The Town of Ludlow has solid results for high school education and associate degrees, but lags the region and state in higher education (Table 2.5). The moderate education but high overall income figures are likely an outcome of Ludlow’s identity as an industrial and trade work center, with high union wage jobs.
Table 2.5 Educational Attainment

<table>
<thead>
<tr>
<th></th>
<th>Ludlow</th>
<th>Hampden County</th>
<th>Massachusetts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Estimate</td>
<td>%</td>
<td>Estimate</td>
</tr>
<tr>
<td>Total:</td>
<td>15,827</td>
<td>299,443</td>
<td>4,355,378</td>
</tr>
<tr>
<td>Less than high school graduate</td>
<td>3,349</td>
<td>21</td>
<td>51,187</td>
</tr>
<tr>
<td>High school graduate (includes equivalency)</td>
<td>5,496</td>
<td>35</td>
<td>101,847</td>
</tr>
<tr>
<td>Some college or associate's degree</td>
<td>3,966</td>
<td>25</td>
<td>75,242</td>
</tr>
<tr>
<td>Bachelor's degree</td>
<td>2,082</td>
<td>13</td>
<td>44,602</td>
</tr>
<tr>
<td>Graduate or professional degree</td>
<td>934</td>
<td>6</td>
<td>26,565</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, 2005-2007 American Community Survey

2.2 Housing Inventory

Housing Units

As shown in Table 2.6, Ludlow had a total of 8,122 housing units in 2007 (American Community Survey 2005-7). This showed a nearly 4% increase from 2000 - a rate of unit growth of about 0.5% yearly. While these trends are similar to those seen in the state as a whole, they are markedly greater than unit growth rates for Hampden County, which averaged about 0.2% per year over this seven-year period.

Table 2.6 Total Housing Units

<table>
<thead>
<tr>
<th></th>
<th>Massachusetts</th>
<th>% Increase</th>
<th>Hampden County</th>
<th>% Increase</th>
<th>Ludlow</th>
<th>% Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007 Total</td>
<td>2,708,108</td>
<td></td>
<td>188,504</td>
<td></td>
<td>8,122</td>
<td></td>
</tr>
<tr>
<td>2000 Total</td>
<td>2,621,989</td>
<td>3.28%</td>
<td>185,876</td>
<td>1.4%</td>
<td>7,841</td>
<td>3.58%</td>
</tr>
</tbody>
</table>


Unit Tenancy

Of Ludlow’s current housing stock, 78% are owner occupied units, while roughly 21% are renter occupied (American Community Survey 2005-7). In general, communities containing less than
30% rental stock indicate a rental need (PVPC Belchertown Housing Assessment Draft, 2009). As shown in Table 2.7, the number of rental units in Ludlow is consistently lower than state or county percentages.

Table 2.7 Percent Total Housing Units by Tenure 2000-2007

<table>
<thead>
<tr>
<th></th>
<th>Massachusetts</th>
<th>Hampden County</th>
<th>Ludlow</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Owner</strong></td>
<td>62%</td>
<td>65%</td>
<td>62%</td>
</tr>
<tr>
<td><strong>Renter</strong></td>
<td>38%</td>
<td>35%</td>
<td>38%</td>
</tr>
</tbody>
</table>


**Unit Type**

According to US Census data, most housing units in Ludlow are single-unit, owner-occupied structures. Furthermore, percentages of owner-occupied, single-unit housing units in Ludlow are well above county and state trends. In general, Ludlow also demonstrates lower percentages of multi-unit housing than the county and state. Most renters are concentrated in the multi-family units (see Figure 2.5).

**Figure 2.5: Units in Ludlow Structures by Tenure**

Source: American Community Survey 2005-7
**Occupancy and Vacancy**

The Town has maintained a healthy housing market (American Community Survey 2005-7). Owner occupied units have only a 2-3% vacancy rate, and rental units demonstrate a 4-5% vacancy rate (PVPC, 2009); these numbers are near the structural vacancy built into the market as units change occupancy. Ludlow’s vacancy rates are much lower than the state or the county (see Table 2.8). This tight market is likely to have a disproportionate effect on special populations such as the elderly or low-income families.

### Table 2.8 Occupancy Status

<table>
<thead>
<tr>
<th></th>
<th>Massachusetts</th>
<th>Hampden County</th>
<th>Ludlow</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Occupied</strong></td>
<td>90.5%</td>
<td>93%</td>
<td>96%</td>
</tr>
<tr>
<td><strong>Vacant</strong></td>
<td>9.5%</td>
<td>7%</td>
<td>4%</td>
</tr>
</tbody>
</table>

Source: American Community Survey 2005-7

Of the few Ludlow units that are vacant, more are being held for sale than in the rest of the state or county (see Figure 2.6)
Figure 2.6. Percent Vacant Units for Rent and Sale

Source: US Census 2000

Age of Housing Stock

According to the US Census, the average age of housing structures in Ludlow as of 2007 was 1965. The average age of both owner and renter occupied units decreased between 2000 and 2007, by 4 and 6 years respectively (see Table 2.9). This is unlike state and county trends, most of which show an increase in median structure ages during this period. This data demonstrates both the effects of Ludlow’s development boom in single family houses during the early 2000s and the construction of a significant number of rental units during this period.
Table 2.9 Median Year Housing was Built, by Tenure

<table>
<thead>
<tr>
<th></th>
<th>Massachusetts</th>
<th>Hampden County</th>
<th>Ludlow</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Owner Occupied</strong></td>
<td>1958</td>
<td>1959</td>
<td>1956</td>
</tr>
<tr>
<td><strong>Renter Occupied</strong></td>
<td>1951</td>
<td>1948</td>
<td>1956</td>
</tr>
</tbody>
</table>


Ludlow’s percentages of units in different age cohorts also demonstrate a slightly newer stock of housing than the state and county (see Table 2.10). For instance, twenty percent of Ludlow’s housing stock was built between 1950 and 1959; Massachusetts and the county showed largest housing stock age cohorts from 1939 or earlier. These trends reflect the recent growth experienced by Ludlow in comparison to the state and county.

Table 2.10 Percent Ludlow Housing Stock by Year Built

<table>
<thead>
<tr>
<th></th>
<th>Massachusetts</th>
<th>Hampden County</th>
<th>Ludlow</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1990-March 2000</strong></td>
<td>8%</td>
<td>6%</td>
<td>10%</td>
</tr>
<tr>
<td><strong>1980-1989</strong></td>
<td>11%</td>
<td>9%</td>
<td>12%</td>
</tr>
<tr>
<td><strong>1970-1979</strong></td>
<td>13%</td>
<td>13%</td>
<td>13%</td>
</tr>
<tr>
<td><strong>1960-1969</strong></td>
<td>12%</td>
<td>14%</td>
<td>16%</td>
</tr>
<tr>
<td><strong>1950-1959</strong></td>
<td>12%</td>
<td>18%</td>
<td>20%</td>
</tr>
<tr>
<td><strong>1940-1949</strong></td>
<td>8%</td>
<td>10%</td>
<td>8%</td>
</tr>
<tr>
<td><strong>1939 or Earlier</strong></td>
<td>34%</td>
<td>30%</td>
<td>21%</td>
</tr>
</tbody>
</table>

Source: US Census 2000
**Household Composition**

Ludlow’s household composition demonstrates several distinct trends, according to the US Census. First, family households are the most common household type overall. Ludlow’s percentages of family and married couple households are higher than those of both Hampden County and the state of Massachusetts. Furthermore, Ludlow has fewer nonfamily residents (occupied by single or non-related individuals) than the county or state. Most renter occupied units in Ludlow contain nonfamily households; this may suggest that there is an unmet need for family-oriented renter housing.

In contrast to much of the country, Ludlow’s average household size has, as a whole, increased since 2000 (see Table 2.11). While single-occupant and five-person households experienced decline between 2000 and 2007, all other categories of household size showed increases. Most marked were the increases in households with 6 or more residents; while households with between two and 4 people showed moderate growth (see Table 2.12). This increase in household size was concentrated in owner-occupied units; average household size in rental units declined in this period.

<table>
<thead>
<tr>
<th>Table 2.11 Change in Average Ludlow Household Size</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
</tr>
<tr>
<td><strong>Owner</strong></td>
</tr>
<tr>
<td><strong>Rental</strong></td>
</tr>
</tbody>
</table>

Table 2.12 Percent Change in Ludlow Household Size

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2007</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total:</strong></td>
<td>7,659</td>
<td>7,789</td>
<td>2</td>
</tr>
<tr>
<td>1-person household</td>
<td>1,854</td>
<td>1,828</td>
<td>-1</td>
</tr>
<tr>
<td>2-person household</td>
<td>2,520</td>
<td>2,655</td>
<td>5</td>
</tr>
<tr>
<td>3-person household</td>
<td>1,377</td>
<td>1,379</td>
<td>1</td>
</tr>
<tr>
<td>4-person household</td>
<td>1,278</td>
<td>1,335</td>
<td>4</td>
</tr>
<tr>
<td>5-person household</td>
<td>475</td>
<td>405</td>
<td>-15</td>
</tr>
<tr>
<td>6-person household</td>
<td>137</td>
<td>158</td>
<td>15</td>
</tr>
<tr>
<td>7-or-more person household</td>
<td>18</td>
<td>29</td>
<td>61</td>
</tr>
</tbody>
</table>


2.3 Housing Demand

Building Permits

A total of 482 residential building permits have been issued in Ludlow between 2000 and 2008 (US Census). Building permits were quite strong through the economic downturn beginning in 2007, but have declined drastically since then, as seen in Table 2.13. This is similar to regional and state downturns in building permits during this period.

Table 2.13 Ludlow Privately-Owned Residential Building Unit Permit Estimates

<table>
<thead>
<tr>
<th></th>
<th>2008 Permits</th>
<th>2000 Permits</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Single</strong></td>
<td>23</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td><strong>Two</strong></td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>3 and 4</strong></td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>5+</strong></td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>25</td>
<td>53</td>
<td>-53%</td>
</tr>
</tbody>
</table>

**Housing Sales**

Across tenure types, from 2000 to 2005, the average listing and sale prices steadily increased; since then, they have been flat to slightly declining. Not surprisingly, the time on the market has also lengthened (See Table 2.14). Ludlow’s housing market recent downturn trends occurred after the economic downturn of 2007 and are similar to regional and state downturns. Foreclosure rates in Ludlow have historically ranged from 0-3 a year. While Ludlow reached a high of 4 foreclosures last year and has had 3 so far this year, these numbers are very manageable and are less drastic than some surrounding communities’ during this economic downturn and signify the stability of Ludlow's housing market (Hampden County Registry of Deeds.)
Table 2.14 Ludlow Housing Sale Trends (2000 – September 2009)  
(As of Sept 2009)

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CONDOMIUM</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sold Listings</td>
<td>24</td>
<td>16</td>
<td>19</td>
<td>11</td>
<td>19</td>
<td>19</td>
<td>19</td>
<td>22</td>
<td>31</td>
<td>11</td>
</tr>
<tr>
<td>Average List Price</td>
<td>$119,563</td>
<td>$114,558</td>
<td>$126,342</td>
<td>$164,027</td>
<td>$159,613</td>
<td>$205,047</td>
<td>$212,305</td>
<td>$217,048</td>
<td>$217,506</td>
<td>$189,324</td>
</tr>
<tr>
<td>Average Sale Price</td>
<td>$119,368</td>
<td>$112,352</td>
<td>$122,663</td>
<td>$161,918</td>
<td>$153,445</td>
<td>$205,047</td>
<td>$215,900</td>
<td>$215,169</td>
<td>$214,888</td>
<td>$179,932</td>
</tr>
<tr>
<td>Average Market Time</td>
<td>201.54</td>
<td>47.06</td>
<td>28.21</td>
<td>28.18</td>
<td>44.16</td>
<td>25.53</td>
<td>65.79</td>
<td>95.82</td>
<td>148.71</td>
<td>59.45</td>
</tr>
<tr>
<td><strong>MULTI-FAMILY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sold Listings</td>
<td>7</td>
<td>15</td>
<td>8</td>
<td>10</td>
<td>7</td>
<td>12</td>
<td>8</td>
<td>6</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Average List Price</td>
<td>$126,343</td>
<td>$154,018</td>
<td>$154,525</td>
<td>$170,640</td>
<td>$193,500</td>
<td>$199,275</td>
<td>$247,350</td>
<td>$247,500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Sale Price</td>
<td>$122,271</td>
<td>$149,833</td>
<td>$151,588</td>
<td>$160,600</td>
<td>$183,583</td>
<td>$237,931</td>
<td>$197,833</td>
<td>$247,500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Market Time</td>
<td>91.14</td>
<td>84</td>
<td>36.75</td>
<td>121</td>
<td>54.71</td>
<td>91.00</td>
<td>50</td>
<td>88</td>
<td>103</td>
<td>34</td>
</tr>
<tr>
<td><strong>SINGLE FAMILY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sold Listings</td>
<td>99</td>
<td>121</td>
<td>136</td>
<td>139</td>
<td>130</td>
<td>135</td>
<td>136</td>
<td>131</td>
<td>117</td>
<td>75</td>
</tr>
<tr>
<td>Average Listing Price</td>
<td>$144,912</td>
<td>$149,012</td>
<td>$166,503</td>
<td>$188,775</td>
<td>$210,330</td>
<td>$250,535</td>
<td>$246,794</td>
<td>$220,302</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Sale Price</td>
<td>$139,948</td>
<td>$145,243</td>
<td>$163,856</td>
<td>$183,765</td>
<td>$205,519</td>
<td>$243,885</td>
<td>$240,839</td>
<td>$211,151</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Market Time</td>
<td>72.06</td>
<td>73.4</td>
<td>71.79</td>
<td>63.28</td>
<td>58.62</td>
<td>74.48</td>
<td>97</td>
<td>120</td>
<td>119</td>
<td>119</td>
</tr>
</tbody>
</table>

Source: MLS Listings
Ludlow’s typical single-family home starts at about $132,501, though less expensive vacant “fix-me-uppers” are available for sale. Figure 2.7 showcases where differently priced homes were sold within the last year, with the “fix-me-uppers” and more affordable homes mostly centered downtown and closer to the Springfield (Indian Orchard) border and the most expensive homes being in the eastern area of the Town.

Figure 2.7: Ludlow Housing Sales By Price (Jan 2008 – September 2009)

**Home Value and Rent**

As of 2007, the median home price appraisal value for Ludlow was $218,500 (American Community Survey 2005-7) and the median monthly rent (without utilities) was $649 (see Table 2.15). As a whole, median rent and home value have both increased significantly since 2000.
The median value of homes and rent in Ludlow consistently falls short of the state averages (as well as regional affluent communities of Wilbraham and Longmeadow) while remaining above county averages. This could explain some of Ludlow's growth trends in recent decades and regional popularity as people move to Ludlow for lower housing costs and commute elsewhere. The median value of homes and rent in Ludlow falls short of state averages while remaining above county averages, which could indicate a rental need.

**Table 2.15 Median Home Value and Rent**

<table>
<thead>
<tr>
<th></th>
<th>MA</th>
<th>County</th>
<th>Ludlow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Rent</td>
<td>828</td>
<td>582</td>
<td>649</td>
</tr>
<tr>
<td>Median Home Value</td>
<td>366,200</td>
<td>190,800</td>
<td>218,500</td>
</tr>
</tbody>
</table>

Source: American Community Survey 2005-7

**Affordable Housing**

There are two meanings of the word affordability that are both relevant when considering housing in a community. The first is whether there are many official low-income or subsidized housing options for resident. And the second is whether there is a good match between current incomes in the community and the cost of housing.

According to the Department of Housing and Community Development, Ludlow has 7 developments on the Subsidized Housing Inventory (SHI) and a total of 182 units (See Table 2.16) which are primarily located in the downtown area (See Figure 2.8.) This makes up approximately 2.24% of Ludlow’s total housing stock, a percentage well below the 10% affordability mandate of Massachusetts state law Chapter 40B. 40B encourages municipalities to increase percentage of affordable units by allowing developers to bypass local zoning when building a project with a sufficient component of affordable housing in communities below the 10% requirement; this is called a comprehensive permit development.
### Table 2.16 Units on Ludlow's Subsidized Housing Inventory

<table>
<thead>
<tr>
<th>Project Name</th>
<th>Address</th>
<th>Type</th>
<th>Total SHI Units</th>
<th>Affordability Expires</th>
<th>Subsidizing Agency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chestnut Street Development</td>
<td>39 Chestnut Street</td>
<td>Rental</td>
<td>34</td>
<td>Perpetuity</td>
<td>DHCD</td>
</tr>
<tr>
<td>Colonial Sunshine Manor</td>
<td>114 Wilson Street</td>
<td>Rental</td>
<td>48</td>
<td>Perpetuity</td>
<td>DHCD</td>
</tr>
<tr>
<td>Colonial Sunshine Manor</td>
<td>114 Wilson Street</td>
<td>Rental</td>
<td>28</td>
<td>Perpetuity</td>
<td>DHCD</td>
</tr>
<tr>
<td>State Street Development</td>
<td>State Street</td>
<td>Rental</td>
<td>40</td>
<td>Perpetuity</td>
<td>DHCD</td>
</tr>
<tr>
<td>n/a</td>
<td>Scattered sites</td>
<td>Rental</td>
<td>10</td>
<td>Perpetuity</td>
<td>DHCD</td>
</tr>
<tr>
<td>John Thompson Manor</td>
<td>Benton/Butler Street</td>
<td>Rental</td>
<td>6</td>
<td>Perpetuity</td>
<td>DHCD</td>
</tr>
<tr>
<td>DMR Group Homes</td>
<td>Confidential</td>
<td>Rental</td>
<td>16</td>
<td>n/a</td>
<td>DMR</td>
</tr>
</tbody>
</table>

Source: Department of Housing and Community Development 2009

### Overall Affordability

Affordable housing is federally defined as costing no more than 30% of a household's income and households that spend more than 30% of income on housing are considered housing cost burdened. One of Ludlow's strengths is that there is a relatively good match between the local incomes, which tend to be fairly high, and local housing prices, which are not bad for the state of Massachusetts. Based on Ludlow's annual and monthly household income averages, the sales price of an affordable home (where costs are below 30% of monthly income) of would have to be around $210,000 (See Table 2.15). The actual average home value for units in Ludlow is $218,500. While this demonstrates a slight discrepancy between what the average citizen can afford and the average home value, as a whole housing prices remain affordable for many. Furthermore, Ludlow's affordability rates are average within the county and lower than the state as a whole (American Community Survey 2007).
Even though current conditions are still fairly affordable in Ludlow, housing is not affordable for some. Approximately 16% of homeowners, and around 30% of renters spent more than 30% of their income on housing costs. It should be noted that the single income of the average Ludlow teacher (See Table 2.17) would not be sufficient to purchase a home of average value in Ludlow. Not surprisingly, the poor and renters are more likely to be cost burdened, of the Ludlow households that earned under $35,000, 52% of homeowners and 57% of Ludlow’s renters were spending more than 30% of their income on housing. This suggests that in the future, Ludlow may need to examine ways to maintain its current affordability, especially for renting or lower-income populations.
Table 2.17 Calculating Ludlow’s Housing Affordability

<table>
<thead>
<tr>
<th>Maximum Sale Price of a House that a Household Earning the Median Household Income Could Afford to Purchase</th>
<th>Maximum Sale Price of a House that a Household Earning the Average Teacher’s Salary in the Ludlow Public School System Could Afford to Purchase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Household Income</td>
<td>$65,284</td>
</tr>
<tr>
<td>Monthly Household Income</td>
<td>$5,440</td>
</tr>
<tr>
<td>Target Monthly Housing Cost (30% of Monthly Income)</td>
<td>$1,632</td>
</tr>
<tr>
<td>Sales Price</td>
<td>$210,000</td>
</tr>
<tr>
<td>5% Down Payment</td>
<td>$10,925</td>
</tr>
<tr>
<td>Mortgage</td>
<td>$199,500</td>
</tr>
<tr>
<td>Interest Rate</td>
<td>4.87%</td>
</tr>
<tr>
<td>Amortization</td>
<td>30</td>
</tr>
<tr>
<td>Monthly P&amp;I Payments</td>
<td>$1,055</td>
</tr>
<tr>
<td>Ludlow Tax Rate</td>
<td>$14.28</td>
</tr>
<tr>
<td>Monthly Property Tax</td>
<td>$250</td>
</tr>
<tr>
<td>Hazard Insurance</td>
<td>$70</td>
</tr>
<tr>
<td>PMI</td>
<td>$130</td>
</tr>
<tr>
<td>Condo/HOA Fees (if applicable)</td>
<td>$100</td>
</tr>
<tr>
<td>Average Ludlow Teacher Income</td>
<td>$55,841</td>
</tr>
<tr>
<td>Monthly Household Income</td>
<td>$4,653</td>
</tr>
<tr>
<td>Target Monthly Housing Cost (30% of Monthly Income)</td>
<td>$1,184</td>
</tr>
<tr>
<td>Sales Price</td>
<td>$178,125</td>
</tr>
<tr>
<td>5% Down Payment</td>
<td>$8,906</td>
</tr>
<tr>
<td>Mortgage</td>
<td>$69,219</td>
</tr>
<tr>
<td>Interest Rate</td>
<td>4.87%</td>
</tr>
<tr>
<td>Amortization</td>
<td>30</td>
</tr>
<tr>
<td>Monthly P&amp;I Payments</td>
<td>$895</td>
</tr>
<tr>
<td>Ludlow Tax Rate</td>
<td>$14.28</td>
</tr>
<tr>
<td>Monthly Property Tax</td>
<td>$212</td>
</tr>
<tr>
<td>Hazard Insurance</td>
<td>$70</td>
</tr>
<tr>
<td>PMI</td>
<td>$110</td>
</tr>
<tr>
<td>Condo/HOA Fees (if applicable)</td>
<td>$100</td>
</tr>
</tbody>
</table>

Source: American Community Survey 2005-7, PVPC, Mass.gov

Figure 2.8, below, shows the locations of the currently disclosed subsidized housing units as well as single family homes sold within the last year that fall below the maximum affordable sale price (indicated in orange.)
Zoning Bylaws + 40R Smart Growth Zoning

The Ludlow Zoning Bylaw establishes nine zoning districts, three of which are specific to residential uses. Town bylaws also include regulations and requirements for the following categories: Water Supply Protection, Moderate Density Agriculture, Aircraft Flight and East Street Revitalization with overlay districts. The three Residential zoning districts (Residential A, A-1, and B) account for 17.4% of the total acreage with 3,060 allocated acres with the Agricultural zones covering the majority (73.7%) of the town with 12,954 acres. Single Family homes are permitted in all three of the Residential zones with new two family home building being permitted only in the Residential B zone and Multi-Family homes only being permitted in
Residential B zone through special permit/site plan approval by the Planning Board. Current residential dimensional requirements require all residential lots to have a minimum rear yard of 20 ft, side yard of 10 ft, and front yard of 30 ft (save for dwelling for more than 4 families who must have minimum front yard of 40 ft.) Like yard requirements, the lot size minimum requirements are similarly unrestrictive, requiring single-family lots to be 15,000 sq. ft. large (1/3 of an acre,) two-family to be 21,780 sq. ft., three family to be 30,000 sq. ft. and four or more family to be 43,560 sq. ft (an acre.) Overall, Ludlow’s Zoning Bylaws and special permit exceptions allow for flexibility with the size and type of housing located throughout the town. Additionally, Chapter 40R of Massachusetts General Laws established the Smart Growth Overlay District Act and through grant incentive based zoning option encourages municipalities to develop dense, mixed use and affordable housing options. Ludlow’s proposed Mills development site is a current possible location for Ludlow to utilize this dual benefit of: smart growth design options which may not be easily available without the pains of difficult zoning reform and state funding.

2.4 Key Findings

- Overall, housing in Ludlow is doing very well – it is growing at a fairly steady pace, housing values are steady, vacancies are low, and the prices are reasonably affordable given local incomes.
- While current projections suggest that Ludlow’s population growth has leveled off, given the availability of open space and its beneficial regional location, this may not prove to be true. Ludlow should plan housing developments and goals mindful to growing elderly concerns and in anticipation that their regional desirability will continue to provide a growing steady housing demand.
- One of Ludlow’s biggest challenges may be to maintain their current level of affordability and extend it to both to prevent potentially conflicting comprehensive permits permitted under Chapter 40B and to provide accessible housing for the elderly, low-income families, and municipal workers such as teachers.
• With the potential for continued expansive development in the agricultural zone and the growing pricing disparity between homes located in the town center and those located on the eastern outskirts of town in mind, Ludlow should seek to support a variety of housing options throughout town. One effective way to maintain control of this development would be to work with a variety of available state initiatives.
3.0 Natural Resources and Watershed Protection

3.1 Introduction

The town of Ludlow has a wealth of natural resources in the forms of waterbodies, wetlands, forest, agricultural land, wildlife habitat, topography, and soils. Combined, these natural resources make Ludlow unique – few urban centers have so many natural resources nearby. However, pressure from residential development is slowly consuming these natural resources and Ludlow’s unique character. If left unchecked, development -- in the form of low-density residential and sprawling commercial uses -- could slowly devour all of the remaining unprotected land (Figure 3.1.1), transforming Ludlow to a homogenous landscape of low-density development, which would have devastating impacts to water quality, wildlife habitat, and the unique rural character and scenic beauty of Ludlow. In this chapter, we plan to explore, analyze, and assess the natural resources that make Ludlow a special place and provide its residents with water to drink, food to eat, forests to hike, and wildlife to watch. It is our contention that these natural resources work together best when they are connected to one another, which facilitates animal movement, hydrological integrity, and human recreation (Ahern, 1995).

We have therefore developed a greenway network, based on our composite natural resource assessments, which will serve to strengthen the connections between important patches of highly valued natural resources – protecting, preserving, and enhancing, wildlife habitat, rural agricultural character, water resources, and scenic vistas. With a clear vision, Ludlow has the potential to create a natural resources greenway, which links together its disconnected resources and create an integrated system of ecological services, beneficial to the people, plants, and wildlife of Ludlow. This greenway will allow for human recreation, movement of wildlife between patches of habitat, promote the protection of water and forest resources (thereby enhancing their quality), and aid in maintaining the rural character that the town values so highly.
Figure 3.1.1

Ludlow Developed and Undeveloped Land

Legend
- Ludlow
- Developed / Built
- Undeveloped and Recreation
- Agricultural Land
- Open Water
- Wetlands

Source: MassGIS, 2009
A green infrastructure greenway is “an interconnected network of natural areas and other open space that conserves natural ecosystem values and functions, sustains clean air and water, and provides a wide array of benefits to people and wildlife” (Benedict, 2006). Greenways provide multiple benefits to both people and the environment — more than just recreational value and habitat for plants and animals. Greenways connect populated areas, historic and cultural places and recreational resources while providing valuable space for habitat, wildlife, and ecosystem services.

Greenways complement and provide alternatives to built infrastructure often requiring fewer capital dollars to construct and maintain. Among the many ecosystem services provided are: clean water – making it safe to drink the water and swim in the ponds; reduced greenhouse gasses – forests scrub the air of CO2 and sequester carbon; reduced need for traditional piped storm water systems – forests and wetland buffers infiltrate and detain water before it has a chance to enter the piped stormwater system.

Key to our natural resources greenway plan is the protection of the ponds, rivers, streams, and wetlands. Approximately 13% of Ludlow is comprised of waterbodies and wetlands (Figure 3.2.2), which are protected by the Wetlands Protection Act and the Massachusetts Rivers Act. However, these acts still allow much development to occur within sensitive areas. Water is an integral part of every living creatures needs, including humans; the need for clean, fresh water is paramount. The largest waterbody in Ludlow, the Springfield Reservoir, has large amounts of protected forested land right up to shoreline, which provides valuable ecological services such as recreation, wildlife habitat, and water quality. See section 2 of this chapter for a detailed analysis and assessment regarding water related natural resources.

Ludlow is located within the Connecticut River Watershed Basin. The Connecticut River Mega Basin is comprised of six major watershed basins. Ludlow straddles two of these major basins, the Connecticut River Watershed and the Chicopee River Watershed. The
Northwestern part of Ludlow drains northwesterly into the Middle Connecticut River Watershed while the rest of the town drains southwesterly into the Chicopee River Watershed (Figure 3.2.1) (MassGIS, 2009). Streams are the roads of our greenway; they connect the wetlands, ponds, rivers, forests, and agricultural land and lay the foundation of the greenway.

Building on the hydrological foundation, the geology, soils, and topography also determine the shape the greenway. As the most suitable areas for building (nearly flat, well-drained, stable land) are already built upon, the development pressure is on the area remaining. There is now considerable pressure to build new residential developments on greenfield lands in areas of town with steep topography. The areas with the steepest topography and relatively high elevations figure prominently into our protection strategy. These areas are highly prone to erosion when improperly developed (clearcut) and are visual beacons to the town’s residents and visitors, which announce town’s character for all to see. One only needs to look locally to see many bad examples of hillside development – Rt. 9, Belchertown, Bear Hill, Northampton, and East St, Easthampton to name but a few.

Forests occupy a majority of the land in Ludlow and provide many of the ecological services that the town relies on; yet they are mostly unprotected and threatened by development. There are few large patches of forest in the town and many small patches that would be strengthened by being connected to a larger system. As these forests are developed they become more fragmented and the ecosystem services that they provide are reduced. Ludlow is approximately 54% prime forestland (MassGIS, 2009). These forests are more than just wood reserves, they provide habitat (flora and fauna), recreational opportunities, improve water quality, prevent flooding, and sequester carbon (a major component of the greenhouse gas, carbon-dioxide). Section 3 explores the geology, topography, soils, and forests in Ludlow.
There are a variety of habitat types in Ludlow with varying ecological integrity. There is even habitat in the urban center; however, the best quality habitat is in the undeveloped places which are or will be threatened by development which will seriously degrade the value of the habitat. The undeveloped forests combined with the wealth of wetlands and freshwater ponds and streams are vibrant ecological resources capable of supporting a variety of diverse species such as Bald Eagles, Blue Heron, Black Bear, Blue Spotted Salamanders, Wood Turtles, and Eastern Box Turtles (OSRP, 2006, Conversation with Local Resident, 2009). Much of the forestland and wetlands provide valuable wildlife habitat and excellent recreational opportunities for the residents and visitors to Ludlow and as such plays an important role in determining which land should be part of the greenway. For a detailed analysis of the habitat areas in Ludlow, turn to section 4.

The final piece of the natural resource greenway is the agricultural heritage and working farmland. The town of Ludlow developed as a farming community well before the economy shifted towards the industry of mills and worker housing. The advent of the industrial revolution resulted in the consumption of agricultural land for other purposes; this trend has continued through today. There is a critical number of farms needed for a farming community to be successful. Currently there are barely enough farms to support a successful farming community. Therefore, the remaining agricultural lands, which are an important part of the heritage and character of the town, should be preserved as working farmland to ensure the long-term survivability of farming in Ludlow, to protect the town’s food security needs, and to maintain its rural character. Section 5 analyzes and assesses the farmland in the town in order to create a hierarchical rating system of each farm parcel based on long-term viability.

The town’s wealth of natural resources make Ludlow a unique place. However, development is slowly devouring these natural resources and Ludlow’s character. Left unchecked, development will slowly consume all of the remaining unprotected land
with devastating impacts to water quality, wildlife habitat, and the unique rural character and scenic beauty of Ludlow. Through the careful analysis and assessment of the Town’s natural resources and regional open space, we developed a Greenway Plan (Section 6) for the town that protects and preserves the most important natural resources in Ludlow and connects them to regional open space and important regional trail systems while allowing room for future development and growth. Greenways serve as a framework for conservation and development by acknowledging the needs of people to live, work, eat, and recreate without biasing nor at the expense of nature. “This differs from conventional approaches to land conservation and natural resources protection because it looks at conservation in concert with land development and man-made infrastructure planning” (Benedict, 2006).

3.2 Hydrology

Of Ludlow’s total area of 18,000 acres, approximately 2,415 (13%) are comprised of wetlands and water bodies (MassGIS). These resources are spread throughout the town of Ludlow, providing valuable ecological services, as well as aesthetic appeal and recreational opportunity for residents. They include many ponds, one of the most well used being Haviland Pond, home to a swimming beach where many sports and local activities are hosted. Additionally, there are a number of protected water supplies within Ludlow, the largest being Springfield Reservoir in the town’s Northeastern corner, which is open for public passive recreational use. The sheer number of water bodies and wetlands within the town boundary is clearly an asset in many respects, but it also presents the community with a challenge in terms of their monitoring, maintenance and protection.
Watershed

As stated previously, the town of Ludlow falls within the boundaries of two major watersheds - the Connecticut River Watershed and the Chicopee River Watershed. Geographically, the southern border of the town is formed by the Chicopee River, which originates in Palmer to the East, and flows for 17 miles to the West until its confluence with the Connecticut River in the city of Chicopee (Ludlow Open Space Plan, 2006). In Ludlow, there are a number of tributaries that run south through the town to join the Chicopee River, such as Broad Brook, Higher Brook and Minechoag Brook. The Chicopee River itself is the largest tributary of the Connecticut River, and averages a flow of approximately 581,644,800 gallons per day. It is currently suffering from impairment, however, due to the presence of pathogens, a result of Combined Sewer Overflow (CSO) discharges into the river (Chicopee River Watershed Water Quality Assessment Report, 2003).
Figure 3.2.1

Regional Watershed Context

Legend
- Ludlow
- Lakes and Ponds
- Rivers and Streams

Major Watershed Basins
- Chicopee
- Connecticut
- Quinebaug
- Westfield

Source: MassGIS, 2009
Despite this impairment, Chicopee River segment MA 36-24, from the Wilbraham Pumping Station to Chicopee Falls has been designated by the EPA as a Class B river, and ranked as supportive of aquatic life, as well as primary and secondary contact. All of these support uses are listed with alert status, however, due to the presence of CSOs along the river. There is currently one CSO remaining in Ludlow, as four of the five that were originally permitted in 1985 have since been blocked. The one remaining outfall, located near Hubbard Street, remains physically connected to the river, though it is currently scheduled to be eliminated (Chicopee River Watershed Water Quality Assessment Report, 2003).

The fact that the Chicopee River, into which many of the tributaries originating and flowing through Ludlow direct their water, is impaired only by a CSO problem is both a positive and a negative indicator for the watershed. It is a sign that the surface water in Ludlow flowing into the river is not the cause of any serious contamination, which is a clear positive. It does, however, reflect a potential situation involving stormwater control within Ludlow, and suggests the need to look for additional best management practices to address runoff and excess water entering the storm system.

**Surface Water Conditions**

The glacial drainage pattern that can be seen in Ludlow has resulted in quite a large number of tributaries, ponds and wetlands distributed throughout the town. Tributaries flowing southward to the Chicopee River include Harris Brook, Minechoag Brook and Higher Brook (which becomes Fuller Brook at the Chicopee border). Additionally, Stony Brook flows northward through Granby, as part of the Connecticut River watershed.
Figure 3.2.2
Legend
- Ludlow
- Waterbodies
- Forested Wetland
- Non-Forest Wetland

Ludlow Hydrological Features

Source: MassGIS, 2009
The largest ponds in Ludlow are Haviland Pond, located near the center of town and home to the only swimming beach in town, Lyon Pond near the Granby border at the edge of Facing Rock wildlife management area, and Minechoag Pond, south of Interstate 90 at the intersection of East and Chapin Streets. Separate from the numerous ponds, the largest surface water resource within Ludlow is the Springfield Reservoir. Currently a backup water supply owned by the Springfield Water and Sewer Commission, the site is maintained as an area for passive recreation and is one of the more well-used resources within Ludlow.

In addition to the open water, there are also a significant number of additional water resources located within Ludlow, including a significant number of wetlands and vernal pools. Of these, the largest are located in Westover Wildlife Area, as well as along Second Pond and Minechoag Brook (Ludlow OSRP, 2006). There are also four confirmed vernal pool sites within Ludlow, two in the center of Ludlow on either side of route 20, and two in the southeastern corner, on either side of Interstate 90 (MassGIS). These wetlands and vernal pool sites are critically important ecological areas, particularly in terms of species habitat (Ludlow OSRP, 2006). Additionally, the number of wetlands within Ludlow provides a level of capacity for holding floodwaters, something that is quite beneficial to the town.

**Flood Hazard Areas**

There are a number of FEMA Q3 flood hazard areas that have been identified within the town of Ludlow (MassGIS). As can be seen in Figure 3.2.3, the two largest of these are found at the Chicopee River, forming the southern boundary of town, and the Westover Wildlife Management Area, consisting of several large wetlands and ponds (Ludlow Natural Hazard Mitigation Plan, 2008). Through an aerial photographic analysis, it has been concluded that there are, as of 2007, approximately 167 structures in Ludlow that are within or near 100-year floodplain areas (Ludlow Natural Hazard Mitigation Plan, 2008).
Figure 3.2.3

Water Bodies and FEMA Q3 Flood Zones

Legend
- FEMA Designated Flood Zones
- Streams
- Rivers

Source: MassGIS, 2009
According to the town’s Natural Hazard Mitigation Plan, there are approximately 1,167 acres of land within the FEMA designated 100-year floodplain area, and a further 278 acres within the 500-year floodplain area (Ludlow Natural Hazard Mitigation Plan, 2008). Proportionally, this is quite a large amount of floodplain land, and the town has taken steps in its Mitigation Plan to address concerns about development within these areas. The Mitigation plan urges that unwavering adherence should be paid to building and land use codes, such as the Wetlands Protection Act, and that new construction should not be allowed in flood prone areas. Additionally, the plan stipulates that natural water storage areas such as the existing wetlands, farmland and open space within Ludlow should be protected, so as to provide flood storage capacity and minimize the amount of impervious surface, as well as to provide other benefits, such as erosion and sedimentation control, water pollution control, wildlife habitat, and recreation values - all deemed important by the community in the town’s 2006 Open Space Plan (Ludlow Natural Hazard Mitigation Plan, 2008).

**Assessment**

There are two main areas of concern in terms of Ludlow’s hydrological resources. Firstly, a large number of them lack adequate riparian vegetated buffers. This is especially true of Haviland Pond, located near the town center. Looking at orthographic photography of the site, one can observe that there is almost no buffer zone around the entire pond. Given that this pond is where many Ludlow residents swim, sport, and recreate, this seems quite inadequate. The level of development, and the amount of impervious surface surrounding the pond (Figures 3.2.4 and 3.2.5) signify a condition that is quite concerning for its long-term health. If left un-buffered, urban runoff from the surrounding developed parcels and roads could potentially contaminate the pond.

Taking a closer look at the sub-watershed where Haviland Pond is located, it becomes clear that residential development has consumed most of the surrounding area. In fact, according to a report by the Massachusetts Department of Fisheries and Wildlife, the
approximately 1 mile of shoreline surrounding the pond was 85% developed even as far back as 1993 (Massachusetts Dept. of Fisheries and Wildlife, 1993). Given the growth that Ludlow has been experiencing in recent years, and from analysis of the recent orthographic imagery, we can infer that this number is likely nearing 100%. Degradation of the edge condition around Haviland Pond is also a concern, as most of the residential properties lack an adequate vegetated buffer, increasing the potential for contaminants to enter the water. The current state of the buffer zone around the pond is similar to the image on the left, below. A more desirable edge condition can be seen in the image to the right, wherein there is adequate vegetation to slow down and filter the water before it enters the pond. Buffer zones that are more substantial, such as the one depicted on the right in the image below can also provide important connective habitat for wildlife species.

Inadequate buffer condition. This is the edge condition that is currently seen along the shoreline of Haviland Pond.

Desirable buffer condition. Note the diversity of vegetation, and the substantiality of the buffer zone, imparting a level of protection between the surfaces that will produce runoff, and the pond itself.
A second concern is that many of the water resources within the town of Ludlow lay in unprotected areas that are being threatened by impinging development. Looking at the levels of protected open space within the town, we can observe that the only major water resource within a permanently protected area is the Springfield Reservoir. As can be seen in Figure 3.2.6, many of the wetlands, ponds, and smaller tributaries within Ludlow are currently within swaths of land that are largely unprotected and at risk of future development. The Wetlands Protection Act and the Massachusetts Rivers Act provide a measured level of protection for these resources - as can be seen in Figure 3.2.7, the land use analysis within 200’ of the wetlands and waterbodies. Within Ludlow, approximately 68 percent of the land within 200’ of these resources is currently classified as forest, and approximately 10 percent is residential, followed by smaller percentages of cropland and public/institutional space (MassGIS). In addition to the Wetlands Protection Act, the wetlands within Ludlow are protected by a 25’ no disturb zone, which is hardly enough of a buffer to provide the protection that the town has stated an interest in, given the pressure for expanding residential development in Ludlow.
Figure 3.2.6

Legend

Legend

Waterbodies and Wetlands, with Open Space Protection

Source: MassGIS, 2009
Figure 3.2.7

Legend
- Agricultural
- Commercial/Industrial
- Transportation/Mining
- Natural Land
- Open/Undeveloped
- Residential
- Urban Open/Inst. Recreation
- Water
- Forested Wetland
- Non-Forest Wetland
- Salt Water Wetland

UMass Department of Landscape Architecture and Regional Planning
Source: MassGIS, 2009
Looking at the impervious surface maps (Figures 3.2.8 & 3.2.9), we can see that the impervious surface within Ludlow is largely concentrated around the town center, in the southwestern portion of town. This is encouraging for the hydrological conditions in the rest of Ludlow, but would seem to indicate that the water resources within this more highly developed part of town are suffering from the effects of a concentration of impervious surface (increased surface runoff pollution, increased sediment load, etc). The impact of this disparity is currently difficult to measure in Ludlow, however, as there is relatively little data being collected regarding the quality of the many wetlands, waterbodies, and tributaries within the town.

Based on the information in Table 3.1 below (Massachusetts DEP Integrated List of Waters, 2008), we can see that for the waterbodies within Ludlow for which information has been collected, there is indication of good hydrological health. With the exception of a few ponds that have been impaired by an excess of noxious aquatic plants, or an excess of nutrients, most of the water resources tested in Ludlow are healthy and capable of supporting a variety of functions. For an explanation of categories, please see Appendix A.

**Table 3.1 Massachusetts DEP Classifications for Ludlow Water bodies**

<table>
<thead>
<tr>
<th>Name</th>
<th>Size (Acres)</th>
<th>Class</th>
<th>2008 Integrated List Category</th>
<th>Known Impairments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alden Pond</td>
<td>4</td>
<td>B</td>
<td>5</td>
<td>Nutrients, Noxious Aquatic Plants</td>
</tr>
<tr>
<td>Haviland Pond</td>
<td>25</td>
<td>B</td>
<td>2</td>
<td>n/a</td>
</tr>
<tr>
<td>Murphy Pond</td>
<td>6</td>
<td>B</td>
<td>3</td>
<td>n/a</td>
</tr>
<tr>
<td>Minechoag Pond</td>
<td>21</td>
<td>B</td>
<td>4a</td>
<td>Noxious Aquatic Plants</td>
</tr>
<tr>
<td>Springfield Reservoir</td>
<td>393</td>
<td>A</td>
<td>2</td>
<td>n/a</td>
</tr>
<tr>
<td>Higher Brook</td>
<td>n/a</td>
<td>B</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Chicopee River</td>
<td>n/a</td>
<td>B</td>
<td>5</td>
<td>Pathogens</td>
</tr>
</tbody>
</table>
Figure 3.2.8

Impervious Surface in Ludlow

- Rivers
- Waterbodies & Wetlands
- Impervious Surface

UMass Department of Landscape Architecture and Regional Planning
Source: MassGIS, 2009
Figure 3.2.9
Impervious Surface within 200’ of Waterbodies & Wetlands

Legend
- Impervious
- Rivers
- Waterbodies & Wetlands

UMass Department of Landscape Architecture and Regional Planning
Source: MassGIS, 2009
Figure 3.2.10

Town of Ludlow, Water Quality Assessment

Legend

- NHESP Certified Vernal Pools
- Waterbodies & Wetlands
- Impaired

Source: MassGIS, 2009
The town has a stated goal of protecting the rivers, streams, ponds and wetlands of Ludlow, and the watersheds that sustain them (2006 OSRP). With this goal in mind, there are a few things that the town of Ludlow can pursue to move toward ensuring the safety of its water resources into the future. Firstly, Ludlow could leverage the existing enthusiasm of its residents through a watershed awareness campaign. By engaging members of the community, and getting them involved in the monitoring and maintenance of the town’s water resources, Ludlow could create an invaluable water resources support system. For instance, the town could begin engaging with environmental science and ecology programs at local schools, and providing them with testing equipment in return for their ongoing monitoring of the various ponds and wetlands within Ludlow. Additionally, the town could encourage residents to participate in the Massachusetts Weed Watchers program, monitoring the presence of invasive species and helping to keep them at bay within Ludlow. The first step toward ensuring the safety of Ludlow’s water resources is to get an accurate picture of their health, and the current data gathering that is being done by the town and the Massachusetts DEP is not comprehensive.

Additionally, re-vegetating buffers around the ponds in Ludlow’s more urbanized town center, such as Haviland Pond, would greatly enhance their health by reducing the amount of runoff and contaminants entering the water. We would also recommend that the town take a further look at improving the level of protection that is currently stipulated for its wetland resources. Given the prevalence of wetlands within Ludlow, it is understandable that they are under considerable pressure from development. However, the current 25’ no disturb zone around wetlands as stipulated in the town by-law is little protection, and we would recommend the town evaluate options for increasing this buffer to at least twice its current size. Increasing the buffer would help to ensure the health of these resources, allowing them to provide valuable ecosystem services (wildlife and plant habitat, floodwater storage, water filtration) into the future.
With a concerted effort toward their management and protection, and with a particular eye toward linking them with the critical wildlife habitat areas, as well as potential recreational opportunities, these hydrologic features could become an even greater resource for the town of Ludlow.
3.3 **Geology, Topography, Soils and Forests**

The overall landscape character of Ludlow is similar to many of the communities within the Pioneer Valley. The town is home to a multitude of landscape features and natural resources - with one such feature, the Chicopee River, forming the southern boundary of the town. The variety of local landscapes within Ludlow is important—and must be part of a comprehensive plan for the town to ensure the long-term integrity of these resources. The natural resources within town are critical for maintaining the rural character of Ludlow and providing for species habitat and possible future recreational use.

**Geology**

Ludlow’s geologic history is characteristic of that of much of New England and its landscape is greatly attributed to the effects of the Laurentide ice sheet which was formed 120,000 years ago (Klekowski, 1997). At its maximum extent, approximately 21,000 years ago, ice covered most of Canada and significant portions of the northern United States (Klekowski, 1997).

The bedrock beneath Ludlow is the remnants of an ancient mountain chain that was extensively re-formed because of the movement of the Laurentide ice sheet. The bedrock is the eroded core of the massive chain of mountains which extended from Long Island Sound, through western New England and all the way up to Quebec (Ludlow OSRP 2006). All of the bedrock hills and mountains in Massachusetts have been glacially modified, leaving few substantial remaining ranges, other than the Berkshire Hills and the Blue Hills (www.sec.state.ma.us/cis/).

As the ice sheet repeatedly advanced and retreated across the region, it left a layer of glacial till deposited across the New England landscape. Glacial till is created “beneath and within glaciers as rocks are carried and ground up by the flowing ice” (Klekowski, 1997). In New England, till is typically found upon the bedrock layer. For more detail regarding bedrock lithology, see Appendix B.
The use of geological information can be helpful in the analysis of “water-quality characteristics of surface water and shallow ground water, and soil and stream sediment characteristics based on bedrock lithogeochemistry” (MassGIS). The significant geological bedrock features depicted in Appendix B have potential to influence stream sediment and soil composition, which ultimately can affect water quality.

**Topography**

The topography of Ludlow varies from the lowlands along the Chicopee River to the highpoint of 720 feet in Ludlow State Park (Ludlow OSRP 2006). The lowest point in town, sitting at 230 feet, is the historic town center (Ludlow OSRP 2006). Another important landscape feature is the Springfield Reservoir, which has an elevation of 373 feet above sea level (Ludlow OSRP 2006).

The lower elevations located in the western part of town are made up of both “dry and marshy lowlands” (Ludlow OSRP 2006). Travelling though the town, one can gain an understanding of Ludlow’s roots as an agricultural community. Working farms are still present and dot the local landscape. Mildly sloping tracts of pasture and farm land make up part of Ludlow’s historic landscape character.

Contrastingly, the eastern part of town has more intense topography with average elevations of 400-650 feet (Town of Ludlow: Local Natural Hazards Mitigation Plan, 2008). See Figure 3.3.1. This portion of town, with its steep slopes is much less developed and is characterized by tracts of dense woodlands. Two of the most prominent topographical features include Minnechaog Mountain in Ludlow State Park and Facing Rock in Facing Rock Wildlife Management Area. Facing Rock Wildlife Management Area is home to three hills in excess of 450 feet: High Hill, Jefferson Peak and Facing Rock (Town of Ludlow: Local Natural Hazards Mitigation Plan, 2008). The topography of the region has clearly influenced development within the town. Much of the built area in Ludlow is along the southwestern border. Highlands and areas
Figure 3.3.1

Ludlow Topographical Analysis

Legend

- Ludlow
- Waterbodies & Wetlands

Slope (%)
- 0 - 5
- 5 - 10
- 10 - 15
- 15 - 25
- 25+

Source: MassGIS, 2009
bordering wetlands are significantly less dense, but in many places are under threat of development.

**Soils**

Ludlow soils vary widely in color and character. The soil ranges from the sandy loam of western Ludlow to the stony glacial till of the eastern uplands (MHC Reconnaissance Survey Report, 1982).

In addition to topography, soil character has also played a role in development patterns within town. Wetlands are a common landscape feature throughout Ludlow. Drainage capabilities, as well as modern ordinances, have affected development possibilities in these areas. Areas that are relatively flat, with loose soil have been marked with dense development. In addition to the naturally flat topography, in the southwest corner of town, these soils are less rocky and therefore have been more favorable to development (See Figure 3.3.1 and Figure 3.3.2).

Because areas with poor drainage often make development difficult and costly, they can serve as a means of encouraging the protection of important wildlife habits. The two largest wetland areas in Ludlow are Westover Wildlife Area and an area along Second Pond and Minnechaog Brook (Ludlow OSRP 2006).

In addition, a comparison of the Soil/Drainage and Land Use maps shows a correlation between soil drainage and development patterns within Ludlow (Figures 3.3.2 and Figure 9.1, Ludlow Land Use 2005). The areas on the Land Use map, defined as “Residential” closely resemble the “excessively drained” and “somewhat excessively drained” portions of town. Of Ludlow’s approximately 18,000 acres, about 30 percent have been developed. Though Ludlow’s land use is dominated by Natural Land, 17 percent of the town is made up of Residential land use (See Land Use Table 9.1).
This growing number is cutting into significant portions of Natural Land. It is necessary for a strategy to be put in place in order to direct future growth so that it does not damage the health and integrity of the Ludlow’s natural resources.
Figure 3.3.2

Ludlow Soils (Classified by Drainage)

Legend
- Excessively drained
- Somewhat excessively drained
- Moderately well drained
- Well drained
- Poorly drained
- Very poorly drained
- No data

Source: MassGIS, 2009
3.4 Trees and Forests of Ludlow

One of Ludlow’s most impressive natural resources is its forests—a vast mix of birches, oaks, maples, hemlocks and pines (Town of Ludlow: Natural Hazards and Mitigation Plan, 2008). The western portions of town are marked by mature forests dotted by streams, ponds and wetlands. These large tracts of forested land provide many benefits to the local community. Unbuilt lands, both forests and wetlands, provide optimal habitats for a variety of plant and wildlife species. The forests of Ludlow are also a significant part of the “rural character” that residents value.

Figure 3.3.3 and Figure 3.3.4 depict “prime forest” land in Ludlow. Using data from the Natural Resource Conservation Service (NRCS) and MassGIS Soils, potentially forested land was classified into “nine different categories based on potential average timber productivity of white pine and red oak” (MassGIS). Potentially forested land “included all land currently forested as well as abandoned farmland and unimproved pastures” (MassGIS). Of the 18,000+ acres in Ludlow, more that half are considered prime forestland (9,687 acres). This land provides more than potential timber productivity. These large forested areas are inherent to this town’s identity. It is part of what comprises people’s views of Ludlow and its “rural character”.

Aerial View of Ludlow. K. Martin, 2007
Figure 3.3.3

Ludlow Prime Forest

Legend
- Forest Stewardship Program Properties
- Prime_forest

UMass Department of Landscape Architecture and Regional Planning
Source: MassGIS, 2009
**Benefits of Trees and Forests**

As developed areas continue to increase, trees in Ludlow may exist because of preservation, good design, bad design or simply by accident. ‘Urban Forestry’ is the planning and management of vegetation in developed areas. The US Forest Service broadly defines ‘urban forests’ to include “parks, street trees, landscaped boulevards, public gardens, river and coastal promenades, greenways, river corridors, wetlands, nature preserves, natural areas, shelter belts of trees and working trees at industrial brownfield sites” (www.fs.fed.us/ucf). Though much of the forest in Ludlow is found in “natural areas”, street trees and other public trees help make up this system.

A community’s trees contribute to the overall quality of life. The benefits of trees fall into four main categories: social, communal, environmental, and economic categories (See Table 3.2).
Table 3.2 Benefits of Trees

<table>
<thead>
<tr>
<th>Social</th>
<th>Communal</th>
<th>Environmental</th>
<th>Economic</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Aesthetically pleasing; serve as decorative features</td>
<td>• Define spaces</td>
<td>• Enhance air quality</td>
<td>• People spend more in downtown districts that are nicely landscaped</td>
</tr>
<tr>
<td>• Promote mental well-being</td>
<td>• Emphasize views</td>
<td>• Serve as water quality resources; Enhance infiltration</td>
<td>• Reduce local temperature, creating microclimates and saving energy</td>
</tr>
<tr>
<td>• Provide shade and privacy</td>
<td>• Screen out objectionable views</td>
<td>• Provide species habitat and promotes biodiversity; development continues to expand, fragmenting critical habitat areas</td>
<td>“Trees properly placed around buildings as windbreaks can save up to 25% on winter heating costs” (US Forest Service, Northeastern Area).</td>
</tr>
<tr>
<td></td>
<td>• Reduce glare and reflection</td>
<td></td>
<td>• Tree planting programs/initiatives &gt;“green collar” economies</td>
</tr>
<tr>
<td></td>
<td>• Reduce noise and wind</td>
<td></td>
<td>• Higher property values</td>
</tr>
<tr>
<td></td>
<td>• Direct pedestrian traffic</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Provide background to complement, or enhance architecture</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Act as a buffer for incompatible uses</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Threats to Forests / Local Landscape:

In recent years, the number of subdivisions within Ludlow has increased. Unfortunately, many of these new developments have negatively effected the native vegetation and larger ecosystems by clear cutting lots. Though this keeps initial construction costs low, the community and the environment will face other subsequent long-term costs as a result.

Unabashedly clear-cutting forests is an act from which a number of negative ripple effects can begin. Forests are intricate ecosystems that provide numerous self-sustaining ecological functions. Removing all vegetation and re-grading the land disrupts the inherent cycles and increases the potential of soil erosion, water degradation and sedimentation in waterways. Opponents of clear cutting also call aesthetics into question. Clear cutting lots for residential developments limits quantity and quality of these forest viewsheds.

Adapted from International Society of Arboriculture Website,
Clear-cutting of lots for sub-division development.
Source: Sweet Homes of Colorado, 2009 and H. Farrell, 2009

A Previous Commitment to Urban Forestry

In 2003, the town of Ludlow worked with the PVPC to obtain an Urban Forestry Grant that aided in the development of a new shade tree bylaw in all subdivisions (2006 OSRP). The grant was also supposed to support the Ludlow DPW in conducting a sample tree inventory of the town. A community tree inventory is the “collection of information relating to the health and diversity of trees in the community” (MA DCR, 2006). During this time, a local Urban Forestry Committee was created, with one goal being to establish a new bylaw that would provide stronger protection for existing trees in town. The grant money also went to support the DPW and the newly formed Urban Forestry Committee in establishing “hundreds of new trees” in town (2006 OSRP).
In May 2007, the Massachusetts Department of Conservation and Recreation presented Ludlow with the Tree City USA® Award (See Figure 3.3.8). The Tree City USA® program is sponsored by the Arbor Day Foundation in cooperation with the USDA Forest Service and the National Association of State Foresters (Arbor Day Foundation, 2009). In order to achieve Tree City USA® status communities must meet four requirements:

- Have a tree department
- Spend at least $2 per capita on urban forestry
- Enforce laws that protect public trees
- Hold an Arbor Day celebration

Tree City USA

The Tree City USA® program provides affiliated towns and cities with “direction, technical assistance, public attention and national recognition” (Arbor Day Foundation, 2009). The award is given to communities of various sizes throughout the Commonwealth that display a strong sense of commitment to the community and urban forestry cause.
Unfortunately, over the years, it seems that the commitment has dwindled. After speaking with Paul Dzubek, the Director of Public Works in Ludlow, a new tree inventory is in order. The current inventory is “limited” and outdated. It was only a sample inventory and it was conducted over five years ago. Furthermore, the Urban Forestry Committee “has not met in some time”.

**Recommendations**

The Town of Ludlow needs to reestablish it Urban Forestry Committee to refresh the community’s commitment to such a valuable resource. A long-range community tree planting and management plan must be established. In addition, it is necessary for a new tree inventory to be conducted. The inventory should take into account species diversity, physical dimensions, and health condition. Once collected, this inventory data, will then serve to inform efficient management decisions in order to maintain a healthy community landscape (MA DCR, 2006).

**Section Conclusion**

The urban forest in any community is part of a larger “green infrastructure”. Green infrastructure is defined as “an interconnected network of natural areas and other open spaces that conserves natural ecosystem values and functions, sustains clean air and water, and provides a wide array of benefits to people and wildlife” (Benedict and McMahon, 2006). Green infrastructure is successful when considered at various scales – from the neighborhood, to the town/city to the regional.
3.5 Habitat

Ludlow’s Habitat in Context

Wildlife habitat and natural communities within Ludlow play an important role in the well being of ecosystems at the regional scale. Centrally located between major natural areas in all four directions, Ludlow is a critical link that supports habitat and ecosystem connectivity across long distances. For example, it serves as an important stepping stone for wildlife movement between the Connecticut River Valley to the west and the Quabbin Reservoir to the northeast, Holyoke Range to the north and the Chicopee River to the south (Figure 3.4.1). While the rest of this section will analyze and assess habitat resources within town boundaries, looking at the regional scale shows that the local resources are performing important functions that support wildlife biodiversity and ecosystem functions in the Western Massachusetts region and beyond.

Analysis

Within the boundary of Ludlow, there are a great variety of habitats for plant communities and wildlife (Figure 3.4.2). It has a wealth of prime forests comprised of mature, northern deciduous species, pine and hemlock. Native plants such as Common Witchhazel, Maple-leaf Viburnum, and Mountain Laurel characterize the understory layer of these climax forests. The moderate terrain is drained by many small brooks and spotted with wetlands. Ludlow’s wealth of wetlands, freshwater bodies and vernal pools diversify the landscape with distinctive vegetation and provide habitat for rare and specialized wildlife such as heron, salamander and treefrog. The Chicopee River along the southern town boundary is a tremendous riparian habitat that supports a wealth of riparian and avian species, including top-order, birds of prey such as the American Bald Eagle. Having a variety of natural landscape features of significant size renders the town of Ludlow particularly wealthy and distinctive in terms of wildlife habitat as a natural resource (Ludlow OSRP, 2006, Mass GIS).
Figure 3.4.1

Assessment of Ecological Integrity at Regional Scale

Holyoke Range
Quabbin Reservoir
Connecticut River
Chicopee River
Valley

Ecological Integrity
Low
Med
High

Town Boundary

Source: MassGIS, 2009

Ch. 3 Natural Resources and Watershed Protection
Figure 3.4.2

Terrestrial and Riparian Habitat

- Town Boundary
- Highway
- Major Road, Collector
- Minor Road, Arterial
- NHESP Certified Vernal Pools
- Successional
- Water
- Wetland
- Agricultural
- Prime forest

Chicopee River

Source: MassGIS, 2009
The recent decades of development in Ludlow have negatively affected habitat quantity and quality by destroying the ecological integrity of lands on site and fragmenting habitat areas off-site. Many of the remaining natural areas and wildlife habitats are still under threat. Four vascular plants are currently described as Threatened or of Special Concern by the state’s Natural Heritage and Endangered Species Program: Climbing Fern, Philadelphia Panicgrass, Long-beaked Baldsedge, and Swamp Dock. Similarly, NHESP has identified three turtle species: the Eastern Box, Spotted and Wood Turtles, and two salamander species: the Blue-spotted and Four-toed Salamanders as being of Special Concern in Ludlow (Ludlow OSRP, 2006). Habitat of endangered species must be protected and where possible, enhanced. This can work as a barrier to development, and/or establish design regulations and restrictions for proposed development.

**Assessment**

Data furnished by the University of Massachusetts’ Department of Natural Resources Conservation assesses habitats according to their level of Ecological Integrity. Named “CAPS” for Conservation Assessment and Prioritization System, this data subsequently identifies and prioritizes land for biodiversity conservation and assumes that conservation of intact, ecologically defined communities of high integrity can conserve most species and ecological processes (UMass, CAPS data, 2009). NHESP designates land according to its role as Supporting Natural Landscape, Priority or Core Habitat. Both CAPS and NHESP data are used to analyze and assess Ludlow’s habitat resources.

The northeastern, forested areas less fragmented by development are able to support top-order terrestrial and avian species such as eagles, wild cats and bears. This significant natural area is home to Facing Rock Wildlife Management Area and Springfield Reservoir. The Natural Heritage and Endangered Species Program has identified both Supporting Natural Landscape and Core Habitat.
Figure 3.4.3

NHESP Habitat and Levels of Protection

Ch.3 Natural Resources and Watershed Protection 82
Assessment of Ecological Integrity and Levels of Protection

Figure 3.4.4

Ch.3 Natural Resources and Watershed Protection

UMass Department of Landscape Architecture and Regional Planning
Source: MassGIS, 2009
which means that wildlife are foraging for food and migrating through as well as breeding and raising their young (Figure 3.4.3). CAPS data indicates that the area is mostly of high and medium ecological integrity (Figure 3.4.4). Much of this land is already permanently protected in care of Springfield Reservoir and the recreational resources facilitated by the Department of Fish and Wildlife.

The northwestern corner of town is home to Westover Conservation & Wildlife Area, which is owned by the federal government and is also permanently protected from development. It is a contiguous, 300 acres of prime forest containing a 100-acre wetland and vernal pools. It is a destination for hunting, fishing, hiking and viewing wildlife, recognized locally for its unique character and habitat value (Ludlow OSRP, 2006). It is of high ecological integrity (Figure 3.4.4) and serves as Core Habitat and Supporting Natural Landscape (Figure 3.4.3).

Protective and defensive planning strategies can target the unprotected lands of high ecological integrity located within and around these protected cores: Facing Rock/Springfield Reservoir and Westover Conservation & Wildlife Area (Figure 3.4.6). These strategies would employ planning knowledge, regulation and land acquisition to tailor land protection more accurately and deliberately to include unprotected parcels of high ecological value in and around the existing, protected cores (Ahern, 1995). It is particularly important to identify green corridors between existing cores for permanent protection. This would support and expand long term well being of habitats which already support sustainable patterns and processes.

A natural focus of protective and defensive planning strategies would be the lands along Fuller, Lyon and West streets in the north of town. They are of high value to wildlife but are without legal protection. They are designated as Supporting Natural Landscape and Priority Habitat for Rare Species (Figure 3.4.5), and are indicated as being of high and medium ecological integrity (Figure 3.4.6). Rich in freshwater, forested shrub wetlands
and home to one of the largest Blue Heron rookeries in Western Massachusetts (Conversation with local landowner), this area has significant, intrinsic habitat and scenic value. Despite fragmentation by the existing roads and development, the area provides critical connectivity between Westover Conservation & Wildlife and Springfield Reservoir/Facing Rock making it a logical focus for extending permanent land protection in the form of one or more connective corridors.

Possibly the most threatened area of high habitat value in Ludlow is Minnechoag Mountain in the eastern/central part of town between the Masspike and Center St. NHESP designates most of it as Supporting Natural Landscape with portions of Core Habitat and Priority Habitat of Rare Species (Figure 3.4.5). CAPS data shows the whole mountain as being of high ecological integrity (Figure 3.4.6). Minnechoag Mountain stands alone as a distinguished patch of habitat core that is seriously fragmented and disconnected from the nearby habitat cores: Springfield Reservoir/Facing Rock to the north or the Chicopee River to the east and south. Nevertheless, it is a high value core and serves as a stepping stone for connectivity between other town-scale habitat cores. Public landowners own much of the property on Minnechoag Mountain. They suggest they would expand inward from the ring of existing subdivisions around the base of the mountain and ultimately, bisect the mountaintop to connect both sides with roads. (Conversation with Conservation Commission, 10-2-09). This would result in significant loss and fragmentation of this high-value habitat. Therefore, Minnechoag Mountain can be considered the most threatened, high value area in Ludlow with regard to the protection of wildlife habitat as a natural resource. Defensive and offensive planning strategies may be employed by which the devastating processes of loss and fragmentation would be stopped (Ahern, 1995). In the long run, it is cheaper, easier and more effective to preserve existing habitat and ecological function than to replace it where is has been lost.
Assessment of Ecological Integrity in Unprotected Land

Figure 3.4.6

Ch.3  Natural Resources and Watershed Protection  87
It is possible to enhance and restore habitat in areas of low ecological integrity through opportunistic planning strategies (Ahern, 1995). Figures 3.4.4 and 3.4.6 show that most of the developed land in Ludlow including residential subdivisions and the urban downtown area has some, albeit low, ecological integrity. In these circumstances, opportunistic strategies would aim to bring nature back into developed areas in order to restore ecological function and support the needs of wildlife. Downtown, this could take the form of an increase in native trees and shrubs along street corridors and property lines. Industrial areas such as Ludlow Mills can expand and fill gaps in the vegetated buffer along the Chicopee River, integrate native trees and shrubs into parking lots, gardens and grounds, and consider adding green roofs when redesigning and renovating the buildings. Suburban residential developments can begin to reintegrate nature by replacing lawn, non-native plants, and asphalt (where possible) with native trees and shrubs in wide planting strips along streets, parcel lines and building foundations. Opportunistic strategies can also include retrofitting existing infrastructure with migratory underpasses, restoring riparian pathways along waterbodies, and utilizing abandoned right-of-way as vegetated corridors in a green network.

**Section Summary**

In summary, Ludlow is faced with the challenge of continuing to grow and develop without compromising the incredible value of its natural areas and wildlife habitats. While the needs of wildlife and people are often viewed as being in conflict, creative design and planning tools can reframe the question of habitat in terms of mutual well being and common interest. As described in the previous paragraph, the areas of Ludlow that are most developed for human habitation currently have the lowest ecological integrity and habitat value. However, they also offer the greatest opportunity for enhancement efforts that would produce healthier, more sustainable habitats for humans and wildlife.
3.6 Farmland

Long before Ludlow became a center of industrial activity it was a small but thriving agricultural center. With the coming of the mills, urban residential growth spread out north and east into former agricultural landscapes, a trend that has continued to the present.

Farmland in Ludlow supports over thirty-one farming operations, many of which supply fresh produce to town residents through farm stands and markets such as Randall’s. Local agriculture also supplies feed for animals at the Lupazoo (USDA, 2008; Ludlow Agricultural Commission, 2009). Aside from its value as a natural and economic resource, Ludlow farmland also helps buffer some of the town’s most pristine ecological habitat from degradation and it has the potential to double as a fallow-season recreational resource. Finally, agriculture is a vital source of cultural identity centered on the vocation of farming and the rural lifestyle (Stokes, et. al, 1997; University of Massachusetts CAPS, 2008).

According to the Ludlow Open Space and Recreation Plan (2006), between 1985 and 2006 Ludlow lost 25% of its remaining farmland. The suburbanization of rural areas of the town has been a cause of concern among town residents, as expressed during the 2006 Open Space and Recreation Plan community visioning workshops.¹

Using the best data available, it is estimated that there are 1,367 acres of farmland in Ludlow (8% of the town’s total land area).² There are thirty-one USDA-registered farms in town as well as an undetermined number of small, non-registered agricultural

¹ West St. cornfield, Holyoke Range in distance. (Gagnon, 2009)
operations. In 2008, of the thirty-one registered farms, twenty-eight of them made less than $50,000, all but nine of them operated on less than fifty acres of land and only seven of thirty-one farm owners listed farming as their primary occupation (USDA, 2009). In short, many Ludlow farms are small and marginally profitable, making them susceptible to development pressure. In 2006 Ludlow re-established an Agricultural Commission and in 2008 it passed a Right to Farm bylaw which establishes farming as a right in town and protects farmers from nuisance claims.

Much of the existing farmland in Ludlow is concentrated in the north end of the town, above Church Street in the Lyon-Munsing-Fuller-Rood street areas northward to the Granby border. Other large farm landscapes are located near the Belchertown border on the east side of the town at Poole and Alden streets. Parcels become smaller and more fragmented as one moves south and west toward the farmless urban core. Upper Lyon Street and the Munsing-Church-Rood junction are considered as particularly scenic agricultural landscapes.² Expansive agricultural vistas are also present at the Granby line on West St. At least three farmsteads in Ludlow contain buildings over 200 years old; many more structures are over 100 years old (Ludlow Agricultural Commission, 2009).

Farming in Ludlow includes corn, alfalfa, and hay; pasture (goats, sheep, beef cattle, horses); and several nurseries including a 58-acre complex on the west end of town near the Chicopee Line (Ludlow Agricultural Commission, 2009; USDA 2008). The Lupazoo, (49 parcel acres), is regarded as farmland as is Randall’s (32 parcel acres directly owned; 127 parcel acres of abutting supporting farmland) which grows vegetables and fruits and

Old barn, Lyon Street. (Gagnon, 2009)
operates a large commercial farm market; these two enterprises constitute Ludlow’s farm-related tourism.

Over 70% of farmland in Ludlow is located on quality soil. MDAR considers soil as just one of several qualifying factors for their Agricultural Preservation Restriction and Farm Viability Enhancement programs (MDAR, 2009). There are three general categories of quality soil and topographic conditions—Prime Farmland (USDA determined), Unique Farmland (USDA; suited for specialized crops) and Farmland of Statewide Importance (MDAR determined). Most agricultural parcels in Ludlow contain a mosaic of these high quality types and soils of lesser value. Because these soil types are not particularly stratified on any one farm parcel, it is not fruitful to distinguish between farms with quality soils and those without quality soils. Furthermore, farmland that is not very useful for growing grain or truck crops can be a successful pasture or hay field, both which have value to the farmer and to the greater community; the latter in terms of rural community preservation. Soils, therefore, should not play a crucial role in the assessment of Ludlow farmland for town-scale planning purposes or as a qualifier for state agricultural preservation programs.

**Agricultural Preservation Programs**

Of the 1,367 acres of farmland, 61% of it (835 acres) is enrolled in Chapter 61A—a state funded voluntary program which provides farmers with tax breaks in exchange for an agreement not to develop or subdivide their land for a five year period and an legal option that allows the town the first right to purchase the farmland if it is put up for sale while enrolled. If the farm is sold and subdivided while enrolled, the property owner must pay back the tax incentives. Similarly, the Massachusetts Farm Viability Enhancement Program provides farmers technical and financial assistance in exchange for a temporary do-not-develop covenant. It is unknown how many farms in Ludlow participate in the latter process. Neither of these programs provide permanent protection for farmland.
The Massachusetts Department of Agricultural Resources (MDAR) also offers an Agricultural Preservation Restriction program (APR) which sets aside development rights on agricultural land in perpetuity (forever) in exchange for further tax relief incentives (MDAR, 2009). Through this program towns can apply for APR grants that cover up to 80% of the cost of purchasing the development rights of qualified farmland providing that the town demonstrates support for agricultural preservation. "Support" is evaluated by a 12-criterion system which considers the influence of the town's bylaws and codes, existence of an agricultural commission, commitment to farmland mapping and tracking, and the existence of agricultural programs such as farmer's markets and community supported agriculture (CSA). Neighboring Belchertown and Granby contain APR land but Ludlow has not protected any of its land through this program.

**Farmland clustering**

Agriculture is more likely to thrive amidst other agriculture: farmers share equipment and labor, farm businesses thrive where there are enough farms to support them, there is less nuisance pressure from neighbors, state and federal programs favor larger tracts of connected agricultural land, and large farm-sized lots are less susceptible to fragmentation due to ANR (Approval Not Required) related development. Denser farmland clusters can also form a visual and cultural resource in the form of recognizable rural agricultural neighborhoods (Stokes, et. al, 1997).

Such clustering exists in the Ludlow region. The most obvious cluster is centered around the Munsing-Church-Rood intersection extending north to upper Lyon street and south to Randall's Farm, roughly circular; the second descends from the dense farmland in Granby into the north end of town at West Street and Lyon Street; and the third is an extension of farmland concentration in west Belchertown; it encompasses the upper half of the western border of town from Route 21 south to Poole Street (See Map A).
**Scenic farmland**

Despite extensive suburban development in town, Ludlow is still blessed with pleasant agricultural landscapes and vistas. These landscapes are more than just a visual amenity; they also announce a shift in cultural identity tied to the vocation of farming and a lifestyle of rural living.

Using modified criterion developed by the United States Bureau of Land Management (BLM) for rating land according to its scenic value (Stokes, et. al, 1997), as well as feedback from Ludlow residents, Ludlow’s scenic agricultural landscapes include the upper Lyon Street corridor; the West/ Tilley Street junction; the Munsing/ Fuller/ Rood crossroads; and the east Poole Street area near the Belchertown border. Besides offering scenic vistas, these areas also contain many classic New England-style farm structures, some of them several hundred years old (Ludlow Agricultural Commission, 2009). A total of 719 acres (52%) of farmland is located in part or full within an identified scenic landscape.

**Community garden potential**

Community gardens can provide agricultural, educational, and community building opportunities, especially in densely developed parts of town where backyard gardening is not an option. Required are small parcels of undeveloped land within a walkable distance of dense urban areas (usually less than a half mile). Community gardens range
from neighborhood vegetable plots only a fraction of an acre in size to Community
Supported Agriculture (CSA) projects that may span tens of acres or more (Stokes, et. al, 1997). The existence of community garden projects is just one of several bonus "action
criterion" which increase the town's ability to qualify for APR grants (MDAR, 2009).

Only one open agricultural parcel (4.5 acres) is located near downtown Ludlow—but, at
0.65 street miles northwest of the center of town (using the Library as the center point)
it is bit out of the 0.5 mile comfort radius and even further from most of the major
schools in town. If Ludlow is interested in downtown community gardens, it may have to
consider clearing wooded land (for instance, undeveloped land within Chicopee River
flood zone) or rehabilitating industrial land (for instance, using excess undeveloped land
at the Ludlow Mills project). Successfully growing produce on these "downtown" farms
is possible; over 80% of undeveloped land in southern Ludlow rests on quality soil.

If the community is interested, larger CSA projects could be situated further out from
the center of town, preferably on existing agricultural land that has high conservation
value. Farmland near the municipal recreation area at Camp White might be a good
target for this type of project because of the potential for residents to combine travel
trips and the familiarity of location.

**Other uses for farmland**

In addition to its value as a natural and cultural resource, scenic amenity, and as a
source of economic livelihood, during the fallow season farmland can provide land on
which to practice recreational activities such as hunting, cross-country skiing, sledding,
and snowmobiling. Farmland borders can also serve as links in a community's
recreational greenway system (Stokes, et. al, 1997; Benedict and McMahon, 2006). The
protection of agricultural parcels in the upper Lyon Street area and the Fuller/ Rood
intersection would be essential for the construction of any greenway circuit connecting
Facing Rock Wildlife Management Area, the Ludlow Conservation Area, and Camp White.

Where farmland abuts important ecological resources it can serve as a habitat buffer that shelters animal and plant species from various disruptive conditions that accompany more intensive land use: noise, pollution, frequent human intrusion, and the introduction of invasive species. Some animals will use farmland as migration corridors while others find additional food sources in the rich transitional habitat at the farm-woodland edge (Stokes, et. al., 1997). Native bird species, such as the Bobolink and Eastern Meadowlark, require open grassland (hay fields) in which to nest (Kaufman, 1996; Massachusetts Audubon Society, 2001). Farmland on West Street, Fuller Street, and upper Lyon Street lie directly between the large natural habitats of Facing Rock Wildlife Management Area, Springfield Reservoir, and the Ludlow Conservation Area; subdivision of farmland in these areas may contribute to further fragmentation of Ludlow's natural systems.

**Loss of agricultural land**

Current residential regulatory zones in the town all appear equally erosive in regard to their impact on the retention of farmland in Ludlow. Higher density residential zones to the south have continued to expand north into easily developed agricultural land; inequitable "spot zoning" has also cut heavily into existing farmland despite the lack of water and sewer services in such "satellite" suburban developments. In the north, rapid expansion of "Approval Not Required" development along the sides of public roads has erased roadside vistas and has shunted farmland out of sight. As
shrubbery and trees on new house lots mature, farmland will become even less visible. Such has been the case with lower Lyon Street and Rood Street. Near Randall's Farm, 127 acres of working farmland lie almost totally obscured behind street-side homes. If Ludlow's rural agricultural heritage is to be retained, those lands must be visually accessible to the community, not hidden behind rows of two-story houses and associated landscaping (at which point the amenity becomes the privilege of the minority whose backyards abut farmland). Furthermore, agricultural and suburban land uses often clash; although Ludlow has recently passed a Right to Farm Act which protects the rights of farmers to practice their vocation, such bylaws may not endure in the face of increased conflict between expanding suburban growth and diminishing agricultural interests (Stokes, et. al., 1997).

Industrial and commercial development does not appear to be a direct threat to existing farmland under the current zoning scheme. The Westover Industrial Park has undeveloped industrial land and there are no commercial zones in or abutting the larger farm clusters in town. However, housing demand generated by new industry may fuel the continued consumption of Ludlow's farmland.

In the absence of predictable zoning, the proximity of water lines, sewer lines, and medium to high density development appear to be the strongest indicators of future farmland loss (Figure 3.5.1). Oppositely, land locked farm parcels (which have no road frontage), parcels enrolled in Chapter 61A (which shows commitment to farming), and farm parcels segmented by or largely made up of land that is within a flood zone, wetland, or water supply protection zones are less at risk of loss, although none of these factors are absolute deterrents to development.

**Recommendations and Prioritization**

If the Ludlow community is interested in protecting farmland, its efforts will likely include revisions to the town's regulatory bylaws, the development of financial and
regulatory incentive programs, partnerships with government agencies, farmers, and non-profit land conservation groups, and outreach efforts aimed at educating farmers about tax-relief and farm subsidy programs. Additionally, efforts to bring the practice of farming to the general community—such as CSA projects—can help strengthen public commitment to preserving farmland within the town and reduce farm vs. residential conflicts (Stokes, et. al., 1997).

More specifically, the town should pass the Community Preservation Act, which could supply the 20% matching funds necessary for participation in the state's APR grant program. It should identify important farmland via Agricultural Preservation Overlay zones; standards for low-impact development in these zones could be implemented through the adoption of careful Design Review and/or Form-Based Code. Current and predicted markets for elderly and rental housing as well as the town's need to meet the state's 10% affordable housing quota could be leveraged to support both Transfer of Development Rights and Conservation Development (also called Cluster Development) by right—zoning tools that can be used to concentrate development in ways which minimally impact agriculture. The town should work in conjunction with non-profits and state and federal agencies to educate farmers about state and federal programs such as Chapter 61A, APR, Farm Enhancement Viability, and the USDA Farm Bill; likewise it should engage partnerships with non-profits who are interested in agricultural conservation and community supported agriculture.

However, not all of the existing farmland in Ludlow can be preserved. Therefore it is important for the town to prioritize existing farmland by a) the value of each agricultural parcel according to its ability to sustain agriculture and serve as a link in a mosaic of farmland parcels that, when taken as a whole, preserve identifiable portions of the town's farming landscape; and b) the eminent risk of development inherent to each farmland parcel. Considering both risk and value allows the town to concentrate its conservation efforts productively, with a clear set of goals and vision. Furthermore,
mapping, tracking, and prioritizing farmland for conservation are "action criterion" which increase the town's ability to qualify for grants under the state APR program. Figure 3.5.2 demonstrates farmland prioritization visually; here the values are extended to the assessor's parcel for the sake of clarifying ownership. Criterion for value include scenic quality, clustering (the farm is part of a recognizable agricultural landscape minimally broken by suburban development), size, and lack of clustering. ("Scenic quality" is determined by community identification and/or modified BLM criterion). Criterion for risk include proximity to water and sewer lines (<=200 feet), location within 500 feet to 1500 feet of water and sewer lines (town bylaws mandate that developers tie at their own expense in their development is within 1500 feet of water and sewer lines. It is therefore less expensive to either build close to the lines or to build outside of the mandatory tie-in zone), proximity to medium to dense development, Chapter 61A involvement, applicable regulatory restrictions, and detachment from public roads (land locked parcels). See Figure 3.5.2.
Figure 3.5.1

Farmland Conservation Priority (by Parcel)

- Town Hall
- Regional farmland
- Scenic farmland

Priority
- Higher value, higher risk
- Higher value, lower risk
- Lower value, higher risk
- Lower value, lower risk

Value=
- +2 scenic
- +1 farmland cluster
- -1 <5 acres and isolated

Risk=
- +2 proximal to water or sewer lines
- +1 proximal to medium or high density residential
- -1 land-locked parcel
- -1 Chapter 61A
- -1 500ft to 1500ft from water or sewer lines
- -1 >50% of parcel subject to restriction or >50% bisected by restriction

UMass Department of Landscape Architecture and Regional Planning
Source: MassGIS, PVPC, Town of Ludlow 2009
3.7 Composite Assessment / Natural Resources Greenway Plan

As has been presented, the town of Ludlow has a richness and a diversity of natural resources that is uniquely its own. From its wide variety of wildlife habitat, and the prominence of wetlands and ponds throughout town, to the sheer acreage of prime forest and farmland, the landscape in Ludlow is a patchwork of possibilities. With a clear vision, Ludlow has the potential to create a natural resources based, conservation greenway which could link together its disconnected resources and create a system of ecological services, beneficial to the people, plants and animals that call Ludlow home. This greenway will allow movement of wildlife between patches of habitat, promote the protection of water and forest resources (thereby enhancing their quality), and aid in maintaining the rural character that the town values so highly.

Based upon the knowledge accumulated during the process of completing discrete systems assessments (hydrology, habitat, topography, etc.), we were able to complete a group composite assessment, which informed our spatial analysis and led to the creation of the greenway plan that follows. To complete this assessment, the Town of Ludlow was divided into individual cells, each measuring approximately 100’ by 100’ in area. Each of these cells was then evaluated based on a scoring rubric that assigned values based on the absence or presence of a number of criteria, such as wetlands, vernal pools, high value habitat, prime forest and farmland. The criteria used are enumerated to the right in Table 3.3.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat</td>
<td></td>
</tr>
<tr>
<td>Low Value</td>
<td>+1</td>
</tr>
<tr>
<td>Medium Value</td>
<td>+2</td>
</tr>
<tr>
<td>High Value</td>
<td>+4</td>
</tr>
<tr>
<td>Hydrology</td>
<td></td>
</tr>
<tr>
<td>Vernal Pools</td>
<td>+4</td>
</tr>
<tr>
<td>Wetlands</td>
<td>+3</td>
</tr>
<tr>
<td>Riparian Buffers</td>
<td>+4</td>
</tr>
<tr>
<td>Water Bodies</td>
<td>+4</td>
</tr>
<tr>
<td>Aquifer Recharge Areas</td>
<td>+1</td>
</tr>
<tr>
<td>Topography</td>
<td></td>
</tr>
<tr>
<td>0 - 15% Slopes</td>
<td>0</td>
</tr>
<tr>
<td>15 - 25% Slopes</td>
<td>+1</td>
</tr>
<tr>
<td>25% + Slopes</td>
<td>+3</td>
</tr>
<tr>
<td>Land Use</td>
<td></td>
</tr>
<tr>
<td>Prime Forest</td>
<td>+2</td>
</tr>
<tr>
<td>Scenic Farmland</td>
<td>+3</td>
</tr>
<tr>
<td>Clustered Farmland</td>
<td>+2</td>
</tr>
<tr>
<td>Other Farmland</td>
<td>+1</td>
</tr>
<tr>
<td>Developed</td>
<td>-1</td>
</tr>
<tr>
<td>Developed, Unbuilt</td>
<td>+1</td>
</tr>
<tr>
<td>Undeveloped</td>
<td>+2</td>
</tr>
</tbody>
</table>
Figure 3.6.1

Natural Resources Combined Assessment

Legend

- Ludlow
- Other Open Space
- Combined Assessment Value
  - None
  - Low
  - Medium
  - High

Ch.3 Natural Resources and Watershed Protection 102
Based on the cumulative score received by each 100’ by 100’ piece of land, we were able to create a visual representation of the natural resources within Ludlow, in terms of high, medium, and low value resource areas. Based upon this gradient, which can be seen in Figure 3.6.1, we were able to outline the optimal spatial arrangement for linking together the high value, high resource areas within the town.

**Greenway Plan (Figure 3.6.2)**

Significant natural resource areas exist within the town of Ludlow. The largest is found at Facing Rock Wildlife Management Area, followed by Minechoag Mountain, the Westover Conservation Area, and the area around Second/Lost Pond. Our proposed greenway outlines a potential spatial strategy for linking these major resource areas, both within the town context, and at the larger regional scale. We propose linking the major areas through a series of corridors, the largest being the Chicopee River corridor. These proposals do not necessarily represent “on the ground” spatial linkages, but rather suggest a broad pattern that the town can use as a tool for the acquisition and protection of lands that fall within or around our proposed corridors.

At the regional scale, our proposed linkages would serve to connect valuable resource areas, such as the Chicopee River, Connecticut River, Quabbin Reservoir and the Holyoke Range through the town of Ludlow, in a “hub and spoke” spatial arrangement. Creating this linked system of protected land, the pattern of which is suggested by the existing high value resource land and protected open space, would enhance the region’s capacity for wildlife movement and hydrological integrity, while also promoting the protection of forest and farm resources, and potentially linking in with existing and proposed recreational trails.

At the town scale, our proposed linkages advocate for the acquisition and protection of land along a series of hierarchical corridors. Looking at the town scale greenway plan (Figure 3.6.3), the thick orange lines represent the major proposed corridors.

Ch.3  Natural Resources and Watershed Protection  103
Natural Resources Greenway Plan

Legend
- Ludlow

Greenway Type
- Existing Protected OS
- Proposed OS
- Open Space
- Outside Ludlow
- Open Water
- Wetlands
- Parcel Boundaries

Figure 3.6.2
Ch.3 Natural Resources and Watershed Protection
104

Source: MassGIS, 2009
Natural Resources Greenway Plan

Legend

- Ludlow

Greenway Type
- Existing Protected OS
- Proposed OS
- Open Space
- Outside Ludlow
- Open Water
- Wetlands
- Parcel Boundaries

Figure 3.6.3
Ch.3 Natural Resources and Watershed Protection

UMass Department of Landscape Architecture and Regional Planning
Source: MassGIS, 2009
The first of these corridors, the Facing Rock to Westover Conservation & Recreation Corridor, runs from the west through the Westover Wildlife Management area and through the more rural portion of town, almost along the Granby border to the area around Second/Lost Pond and then to the Facing Rock area. From there, it proceeds to the east into Belchertown and eventually up to the Quabbin Reservoir. The Facing Rock to Minechoag Mountain to Chicopee River Corridor, and the Alden Street Corridor both connect major habitat and recreation areas from the upland parts of town to the Chicopee River. Another major corridor is the Chicopee River; it crosses underneath Interstate 90 and connects to the Chicopee River Walk in Chicopee and eventually to the Connecticut River. The same corridor also continues up the Chicopee River and along the Palmer town line to connect with the Quabbin Reservoir.

Additionally, we propose a series of smaller scale connections that reach out to neighboring town’s protected open space and green fingers that occur within the Ludlow town boundary. These green fingers tie together smaller patches of high resource value land, provide green space in the more heavily urbanized areas, and to create a linked web of connections that strengthen and enhance the resilience of the larger network.

The town of Ludlow has a stated goal of protecting its valuable water and wildlife habitat resources, as well as its rural character, agricultural land, and historical heritage; the sum of which makes Ludlow unique. This proposed Natural Resources Greenway will serve as a model for the town to use in its efforts to protect and preserve its abundance of natural resources for future generations. It provides a flexible framework under which the town can prioritize future land acquisition, and leverage other strategies such as transfer of development rights and conservation/preservation restrictions to guide future development. With concerted effort, Ludlow can begin to leverage its unique blend of resources and history with the enthusiasm of its residents to become a destination within the Pioneer Valley.
Farmland Footnotes

1. Preliminary results of the Master Plan Survey (last checked October 16, 2009) also show similar strong sentiments.

2. There exists a dearth of good data on both the current and historic locations of farmland in Ludlow. The most recent land use data from MassGIS is dated (2005) and imprecise. Earlier data sets do not use the same analysis criterion, thereby confusing any comparison over time. Orthographic coverage for the region is also dated (2005). Open Space data (2009) is accurate in showing Chapter 61A land and APR land. MDAR, PVPC, and MassGIS contacts all confirmed the lack of precision with regard to available spatial agricultural data. It is also true that estimates of farmland extent are tied to how one defines "farm." For instance, is it only the land being grazed or plowed or is it that plus the land on which the farmhouse and barn rest? Is a woodlot on part of a parcel largely containing farmland part of the farm?

To produce a best estimate of the extent of current farmland, an overlay of existing farmland in Ludlow was created by combining 2005 Land Use data from MassGIS showing pasture, cropland, nurseries, and orchards with 2009 Open Space data (from MassGIS and modified by PVPC) showing Chapter 61A land. These data were then checked against 2005 orthographic photos and Google Earth orthographic mosaics (date unknown; possibly no later than 2005) and corrections were made. Land listed Chapter 61A (2009 data) was accepted at face value regardless of 2005 orthographic incongruence. Wood lots and farm structures included in 61A assessments were considered to be part of the total farmland.

3. Via conversations with residents and through a rapid scenic value assessment based on Bureau of Land Management criterion. BLM criterion include variety of vegetation, presence of water features, color, character of adjacent scenery, scarcity (rare or memorable landscapes), and the nature of cultural modifications. The BLM criteria "landform," which deals with
topographic relief, was not included because most farmland in Ludlow has mild relief. Farmland was considered "scenic" only if it was visually accessible from a public road.

4. Prioritization system:
Value was determined by adding 1 to a base value of 0 for farmland located in an identified farm cluster and by adding 2 for farmland located within an identified scenic landscape. Value was reduced by 1 for farmland that is both located on less than 5 acres and does not abut other farmland parcels that, when taken together, amount to more than 5 acres.
Risk was determined by adding or subtracting the following to/from a base of 0:
+2  for farmland within 200 feet of water and sewer lines
+1  for farmland within 500 feet of medium to high density build-out (using 2005 MassGIS land use data)
-1  for farmland enrolled in Chapter 61A (2009 parcel data)
-1  for land-locked parcels
-1  for parcels located within 500 to 1500 from water and sewer lines. (Town bylaws mandate that developers tie at their own expense if their development is within 1500 feet of water and sewer lines. It is therefore less expensive to either build close to the lines or to build outside of the mandatory tie-in zone)
-1  for parcels that were composed of greater than 50% regulated land (flood zones, seasonal wetlands, water protection zones) or were completely divided by a swath of regulated land leaving 50% or more of the parcel divorced from a public road (i.e. 50% or > land-locked by regulatory restrictions)

Value and Risk were summed to create Priority. Numeric values of >1 for Value and Risk were considered "high"; all other numeric values were considered "low." Priority is broken down by: higher value, higher risk; higher value, lower risk; lower value, higher risk; and lower value, lower risk. "Lower" and "higher" were used in lieu of "low" and "high" to avoid the kinds of connotations absolutes are likely to induce.
4.0 Cultural and Historic Resources

4.1 Introduction

The town of Ludlow has many historic and cultural assets dating from the time before incorporation in 1774 to the present day that can be used as guides, support and enhancements to future development. Especially important to note is the variety of cultural and historic landscapes - urban, agricultural, railroad, natural - within Ludlow that make it a unique destination for tourism and a special place to live. If protected and preserved, these vernacular landscapes represent an opportunity for Ludlow to define itself locally, regionally and nationally even as the town grows and develops. Following is a preliminary inventory and assessment of the cultural and historic assets of Ludlow *. Also included here are recommendations that highlight these town assets and incorporate them into an overall green infrastructure plan.

4.2 Inventory and Assessment

Overview

The history of the town of can be understood in four eras pertaining to its built environment and settlement patterns: 1) the period preceding European settlement through incorporation in 1774, before the Chicopee River was bridged; 2) the development of the Jenksville industrial area in the early industrial 1800's; 3) the development of Ludlow Village in the late industrial period of the nineteenth and twentieth centuries; and 4) development since the mid-twentieth century (Chapin, I., 1794; Walling, H., 1857; White, O., 1912) (see maps 4.1-4.3). Many cultural and historic resources associated with these times exist (see maps 4.5 - 4.7, fig. 4.1-4.8), but none identified below are protected at the local level by regulation, by-law, ordinance or design review; neither are they protected at the state or national level. Many buildings, sites and landscapes have been extensively modified, moved or lost. In addition, new development stylistically different from and insensitive to the historic fabric has resulted in a loss of vernacular character throughout the town.
* a more thorough inventory and assessment will be done by the Pioneer Valley Planning Commission, with the community, beginning in November 2009 (Parson, B., 2009)
Map. 4.2 Ludlow 1857
Map. 4.3 Ludlow 1912
fig. 4.1 Indian Leap RR bridge site Zervas, D. 2009

fig. 4.2 Greene-Towne bridge Zervas, D. 2009

fig. 4.3 Railway Zervas, D. 2009

fig. 4.4 Clocktower & Mill #8 Zervas, D. 2009
fig. 4.5 Eli Fuller Tavern  Zervas, D. 2009

fig. 4.6 Hubbard Memorial Library
www.hubbardlibrary.org

fig. 4.7 First Church  google earth

fig. 4.8 Ludlow Farm  Gagnon, P. 2009
Early Ludlow

From the times before European settlement until the late 18th century, the region, known successively as Minechoag (berry land), Eastern Outward Commons (forest and swampland held in common by Springfield residents) and Ludlow (agricultural community) (McChesney, H., 1978; Noon, A., 1875; Pilon, K., 1999) was defined most significantly by the lack of bridges across the Chicopee and the consequent isolation of the region from Springfield and areas south and east of the river. There are no known historical primary trails, artifacts or sites of the pre-European settlement period (Massachusetts Historic Commission, 1984). Around the time of incorporation in 1774, the important transportation routes were inland, and crisscrossed the area connecting farms and mills to each other and to the area then known as Ludlow Center (Chapin, I., 1794) (see map 4.1). These historic routes survive today as Center, Church, Booth, Lyon, Fuller, Miller, West, and Holyoke streets. The Ludlow Center of Colonial and early Federal periods has been designated a historic district by the National Register of Historic Places (1988); important sites there are the Old Meetinghouse; Post Office; First Church, including the church commons and cemetery; houses with barns; and monuments (see map 4.7, fig. 4.9 - 4.12, appendix A: NRHP Ludlow Center map and data sheet). There are other scattered sites of this period with historical significance throughout Ludlow, most importantly cemeteries (McChesney, H., 1978; Noon, A., 1875; Pilon, K., 1999). Few buildings are in original condition; most have been extensively modified, moved or demolished. The agricultural vernacular landscape - foodstuffs, sheep - (McChesney, H., 1978; Noon, A., 1875) of this time now exists in remnants, farmland still being cultivated on a historic scale along Munsing Street, Rood Street and Lyon Streets in central Ludlow, and along Poole Street in the east (map 4.5). These roads that afford views of the agricultural landscape fabric are scenic resources for the town. The farms along upper Lyon also have importance in later periods, as homesteads purchased by Polish immigrants who left the mills to pursue agriculture (Minnie, E., 2009).
fig. 4.9 Soldiers Monument  McChesney, H. 1978

fig. 4.10 Ludlow Center Post Office  
McChesney, H. 1978

fig. 4.11 Old Meeting House  McChesney, H. 1978

fig. 4.12 Fuller Cemetery  McChesney, H. 1978
Early industrial period through the Civil War

In the early nineteenth century bridges were built across the Chicopee at East Street - Red Bridge Road (Red Bridge, before 1832), and importantly, at Indian Orchard (Put's Bridge, 1794) (see map 4.2). The area near Put's Bridge was developed as a textile manufacturing facility at Wallamanumps Falls by Jenks in 1814; this business became Springfield Manufacturing Company in 1821. Through two expansions (1822-1829, 1840-1846) stone mills, a grist mill, gun shop and gun barrel factory were added. Between 1846-1948 textile manufacture was again the main industry. During this period some worker housing was built in the area to house the mostly English immigrants who worked in the factories (see fig. 4.13). As industry and population grew, the area known as Jenksville became a village center equal in significance to Ludlow Center, and surpassed it by 1881, despite the fact that Springfield Manufacturing went bankrupt in 1848 and the later Ludlow Mill Company suffered serious declines during the Civil War. Town government moved to Joy's Hall on North (now Center Street) in 1893. Historic resources important to this period are the mill area, the Put's Bridge area, Union Church of Christ, and the 1811 Jenksville cemetery site on Winsor at the present day Masonic Lodge. (see map 4.6, fig. 4.14 - 4.15). The Collins Bridge was built across the Chicopee at Miller in 1852, and stood until washed away by the 1938 flood; it was replaced by the Greene-Towne Bridge in 1939 (McChesney, H., 1978; Pilon, K., 1999) (See maps 4.2, 4.5).
**Ludlow Village in the late Industrial Age**

In 1868 following the sale of the Ludlow Mills Company, Ludlow Manufacturing Company (later Ludlow Manufacturing Associates) moved its textile manufacturing operations to the Jenksville area (map 4.3). In its heyday (1870's - 1920's) Ludlow Manufacturing Associates contributed many important institutional brick buildings - Ludlow Hospital, Gowen and Twombley building, Stevens Memorial recreational building, Union public school, and an apartment and business building on East Street - to the area now known as Ludlow Village. Mill and factory buildings, worker housing, parks and athletic field (later Whitney Street Park) were built by the company.
as well. (see map 4.4, fig. 4.16 - 4.18; appendix B: NRHP Ludlow Village data sheet and map) (McChesney, H., 1978; Noon, A., 1875; Pilon, K., 1999). Ludlow Manufacturing Associates also provided land and/or financing for many others including Hubbard Library, Ludlow High School, Ludlow Savings Bank, St. Andrew's Episcopal Church, and St. Paul's Methodist Church. (McChesney, H., 1978) (fig. 4.19 - 4.22) The institutional buildings have not been preserved by the town, but rather adapted for re-use; the churches all have present day congregations. Most structures are in excellent condition, and still demonstrate vernacular building style, detail and materials. Many of the worker housing and associated streets (fig. 4.23) built by Ludlow Manufacturing Associates also remain; the homes are occupied and although few remain in original condition many exhibit unique stylistic and construction details, such as concrete block walls (fig. 4.24). State Street was constructed at this time to service the mills and is in use today. Mill buildings still on site are in good condition. Very significant to this historic landscape is the Red Bridge Generating Station (fig 4.25), built in 1901 to power the Ludlow Manufacturing industries in Ludlow Village (see map 4.3). Ludlow Manufacturing Associates was responsible for the replacement of the covered wooden Put's Bridge by an iron construction in 1898 (McChesney, H., 1978; Noon, A., 1874; Pilon, K., 1999) (See map 4.6).
Map. 4.4 Downtown Ludlow 1912
fig. 4.16 Ludlow Village c. 1910  Pilon, K. 1999

fig. 4.17 Ludlow Village c. 1911  Pilon, K. 1999
fig. 4.18  East Street Park c. 1910  Pilon, K. 1999

fig. 4.19  St. Paul's Church  Pilon, K. 1999

fig. 4.20  Ludlow High School  Pilon, K. 1999
This mill industry vernacular landscape is a unique asset to Ludlow, being of local, regional and national importance, and is so recognized as a Historic District by the National Register of Cultural and Historic Resources.
Historic Places (1992) (see map 4.6). The greater Ludlow Village area is also important as the place where immigrants, from many different countries of origin, first settled in Ludlow (Barosso, J., 2009). Workers came successively from Canada, Ireland, Scotland, Poland, Italy, Portugal and the Ukraine (McChesney, H., 1978).

This period also saw the railroad come to Ludlow - the Springfield Athol and Northeastern (SAN) line in 1873 and the Hampden Railroad in 1913 (see map 4.3, fig. 4.26). Paid passenger service never began on the Hampden line due to legal problems, and in 1929 United Electric purchased the abandoned railway to use for transmission lines. Service on the SAN was discontinued in 1934 and the station on Sewall Street torn down in 1960 (McChesney, H., 1978). Railway easements are undeveloped however, in some places throughout Ludlow and as such are historic and cultural resources.

![fig. 4.26 Hampden R.R. abutment](image)

**Mid-twentieth century to present day**

The latest period in Ludlow's history is most significantly characterized for cultural landscape purposes by construction of the Westover Air Force base in 1939 and the Massachusetts Turnpike in 1957. Appropriating the Hampden line railbed in the western and central portions of Ludlow, the highway bisected the town north from south (McChesney, H., 1978). Town
growth in this period is concentrated in new commercial, recreation and housing developments both north and south of the turnpike (fig. 4.26 - 4.27), industrial development on the former Air Force base site, and new town buildings and schools primarily along and off Chapin Road.

![Big Y Supermarket](image1.png) ![Rod & Gun Club rifle range](image2.png)

**fig. 4.26 Big Y Supermarket** Pilon, K. 1999  **fig. 4.27 Rod & Gun Club rifle range** Pilon, K. 1999

Present day cultural resources include the many churches, ethnic centers, clubs and restaurants that serve Ludlow's residents, representing and preserving heritage. Several of these sites lie within or adjacent to Ludlow Village Historic District. Other culturally important places for the town are the Ludlow Fish and Game Club where the town's annual celebration takes place, Frank’s Diner, Randall's Farm (Barosso, J., 2009; Kibbe, B., 2009; Stefancik, D., 2009), Senior Center, Exit 7 Theater (Kibbe, B., 2009; Stefancik, D., 2009), the Indian Leap Christmas tree bonfire site, Indian Leap rowboat launch site and Minechoag fire tower (Minnie, E., 2009) (see map 4.5)

**Present conditions**

Ludlow has many historic and cultural assets that can be used as guides, support and enhancements to future development. Especially important to note is the variety of cultural and historic landscapes - urban, agricultural, railway, natural - within Ludlow that make it a unique destination for tourism and a special place to live. However, many buildings, sites and landscapes have been extensively modified, moved or lost. In addition, new development stylistically different from and insensitive to the historic fabric has resulted in a loss of vernacular character throughout the town. The tree-lined streetscape of historic East Street
has been lost to road expansion and commercial development, (fig. 4.28 - 4.29), as one example. The expansion and re-purposing of the Ludlow hospital building into the Healthsouth rehabilitation facility, while providing new services and jobs, eliminated the historic facade and entrance of the 1907 building (fig. 4.30 - 4.31). Rural character has similarly been lost by road, power and commercial development (fig. 4.32 - 4.35), and by subdivision. Lastly, important historic places like the former Jenksville cemetery site (fig. 4.36 - fig. 4.37) and the Sewall Street train station are invisible to visitors and residents.

fig. 4.28 East Street c. 1903  Pilon, K. 1999
fig. 4.29 East Street  2009  d. zervas 2009

fig. 4.30 Ludlow Hospital c. 1949  Pilon, K. 1999
fig. 4.31 Ludlow Hospital  2009  d. zervas 2009
fig. 4.32  Fairbanks House c. 1900  Pilon, K. 1999

fig. 4.33 456 Holyoke 2009  d. zervas 2009

fig. 4.34  Holyoke St. at Harris Pond, 1900  Pilon, K. 1999

fig. 4.35  Holyoke St. at Harris Pond, 2009  d. zervas 2009
4.3 Recommendations

The rich and varied history of Ludlow, as expressed in the existing remaining built environment and settlement patterns, provides a strong basis for a unique community identity. As such Ludlow's past is an important consideration and guide to future development. If protected, Ludlow's unique vernacular landscapes - mill river town, rural settlement, railroad community - are resources that can help the town retain its intrinsic character, for the benefit of both residents and tourists. The following measures are recommended:

Regulatory

- Adoption of the Community Preservation Act, to ensure survival of the cultural and historic assets of the town
- Local regulation to preserve and enhance the historic character of the National Register Historic Districts - zoning and building permit by-laws, planning design review, local historic area and building designation, demolition delay by-law

Non-regulatory

- City-wide historic and cultural sites brochure and signage
• History museum, located in the mills area, but including agricultural history
• Tourist information center in the downtown/mills area
• Tourist lodging in the mills area, and campsites along trails
• Town history celebrations such as festival, parades
• Revived traditions such as the row boat crossing to Indian Leap (fig. 4.38 - 4.39)

Additionally, we recommend a cultural and historic greenway system (see maps 4.8, 4.9) as part of a green infrastructure approach to growth and development, to consist of:

• Designated scenic roads with marked bike lanes throughout the vernacular agricultural landscape, connecting to Ludlow Center
• Designated on-road bike lane and sidewalk "urban" greenway, connecting the downtown Ludlow Village area to scenic roads, bike-hike trails and historic walking tour
• Off-road bike-hike trails, along railbeds and other rights-of-way connecting to other historic sites
• Historic walking tour in the downtown area, supported with bi-lingual brochures, in-person and/or audio guides, signage and website
Lastly, we recommend public art sculptures and installations to commemorate forgotten or disappeared historic sites along the greenway and elsewhere. Historically themed public art variously remembers people, events, industry, natural features, architectural style, and traditions. Shown here (fig. 4.40 - 4.41) are a Filipino WWII Veterans memorial in California by artist Cheri Gaulke; and public art works in the former mill town of Turners Falls, Massachusetts, by artists James Rourke and Cynthia Fisher that expresses the industrial and river histories of that town (fig. 4.42 - 4.43). Similar aspects of Ludlow's history could be highlighted by sculpture, installation and/or mural, enriching the experiences of residents and visitors alike (fig. 4.44).

![Fig. 4.40 Filipino WWII memorial](www.flickr.com)

![Fig. 4.41 Filipino WWII memorial](www.flickr.com)
fig. 4.42 Powertown
www.turnersfallsriverculture.org

fig. 4.43 Atlantic Salmon
www.turnersfallsriverculture.org

fig. 4.44 Paddle art
www.abbemuseum.org
4.4 Summary

The town of Ludlow has many historic and cultural assets dating from the time before incorporation in 1774 to the present day that can be used as guides, support and enhancements to future development. Especially important to note is the variety of cultural and historic landscapes - urban, agricultural, railroad, natural - within Ludlow that make it a unique destination for tourism and a special place to live. If protected and preserved, featured and made accessible, these vernacular landscapes represent an opportunity for Ludlow to strengthen itself as a community, and to define itself locally, regionally and nationally.
Cultural Resources

- Cultural significance
- Historic significance
- Historic (former location)
- Dams
- Scenic route
- Cemeteries
- National Register--Historic District

Ch. 4 Cultural and Historic Resources

UMass Department of Landscape Architecture and Regional Planning
Source: MassGIS, 2009
5.0 Parks, Recreation and Protected Open Space

5.1 Open Space

A key factor in improving and maintaining one’s physical, emotional and social health is healthy living. Parks and recreation play a vital role in encouraging people to develop and maintain healthy lifestyles by providing the programs, the facilities and the protected environment that allow people to be physically and socially active. (www.massrpa.org, 2009) Through identifying the town’s unique agricultural, recreational and cultural resources, an open space framework for the town’s future decision making will be provided.

As seen in the Regional Open Space Map, Ludlow has a significant amount of protected open space (4,538 acres) within the boundaries of the town. However, because the majority of this space is concentrated in the northern portion of town and surrounds the Ludlow Reservoir, it is
not within easy access (0.5 mile is generally accepted as a comfortable walking distance) for the majority of Ludlow’s citizens.
The percentage of total open space by primary purpose or use is indicated by the map and table above. The largest portion of open space in Ludlow is conservation area which covers 81% of the total open space while recreation and conservation/recreation are only 9% and 6% respectively.

**Ludlow MA, Open Space - Level of Protection**

<table>
<thead>
<tr>
<th>Level of Protection</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Perpetuity</td>
<td>89</td>
</tr>
<tr>
<td>Limited</td>
<td>6</td>
</tr>
<tr>
<td>None</td>
<td>5</td>
</tr>
</tbody>
</table>

(Source: MassGIS, 2009)

Protected open space and recreational land are properties committed to conservation, recreation, historical and cultural purposes. These spaces can be protected permanently (in-
perpetuity), for a limited time or not at all. The map and table above summarize the open space in Ludlow by level of protection.

Land is considered to be protected in perpetuity if it is owned by the town’s conservation commission, a state conservation agency, or a non-profit land trust or if the town received federal or state assistance for the purchase or improvement of the property. (MassGIS, 2009) The majority of open space land in Ludlow (4,058 acres or 89%) is protected in perpetuity however this is not land that is readily accessible to the public. Lands that have limited protection are protected by legal mechanisms or through functional or traditional use (examples include cemeteries and municipal golf courses). Non-protected land is unprotected by any legal or functional means. Typically this land is privately owned and can be sold without restriction at any time (examples include scout camps, private golf courses, and private woodland).

44% of the protected open space in Ludlow is owned by the City of Springfield Water Department. This includes land in and around the Ludlow Reservoir (a backup water supply for the City of Springfield). Currently public access to this land is limited. The Town of Ludlow owns 20% of the total open space. Town owned land includes the Westover Conservation Area, the town forest, Camp White and the public schools. State owned open space (31% of the total) includes Nash Hill Reservoir, Facing Rock, Ludlow State Forest and Red Bridge State Park. The private parcels consist of the Ludlow County Club and Scout Troop 180 Camp which equal 5% of the total open space.
**Ludlow Master Plan – Inventory & Assessment**

**Ludlow MA, Open Space - Land Ownership**

![Map of Ludlow MA, Open Space - Land Ownership](image)

<table>
<thead>
<tr>
<th>Ownership</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Springfield Water Dept.</td>
<td>44</td>
</tr>
<tr>
<td>State of Massachusetts</td>
<td>31</td>
</tr>
<tr>
<td>Town of Ludlow</td>
<td>20</td>
</tr>
<tr>
<td>Private</td>
<td>5</td>
</tr>
</tbody>
</table>

(Source: MassGIS 2009)

**Chapter 61**

Chapter 61 was created to provide preferential tax treatment to landowners who maintain their property as open space for the purposes of timber production, agriculture or recreation. Chapter 61 was created specifically for forestland. Landowners with 10 or more contiguous
acres of forest land and having a long-term commitment to improving the quality and quantity of timber on that land will be taxed based on the current use of the property (the productive potential of land for growing trees) rather than at the fair market or development value of the land. (DCR, 2009) Per the 2006 Town of Ludlow Open Space and Recreation Plan, Chapter 61 land will be taxed at no more than 5% of the lands’ fair market value. While both Chapters 61A and 61B may include forestland, Chapter 61A was designed to classify agricultural land and Chapter 61B was designed to classify recreational land. (DCR, 2009)

Currently, Ludlow has 2,155 acres of chapter 61 land. Chapter 61 land is considered to be temporarily protected open space but this designation is primarily for tax purposes and not for land conservation/protection.

<table>
<thead>
<tr>
<th>Chapter 61 Land</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 61 (forestry)</td>
<td>24</td>
</tr>
<tr>
<td>Chapter 61A (agriculture)</td>
<td>42</td>
</tr>
<tr>
<td>Chapter 61B (recreation)</td>
<td>34</td>
</tr>
</tbody>
</table>

(Source: MassGIS 2009)

Chapter 61A lands are used for agricultural and horticultural uses. To qualify for this program, the land needs to be actively devoted to agriculture or horticulture and must consist of at least five contiguous acres under the same ownership. Actively devoted to agriculture or horticulture means the land must have been farmed for the two fiscal years prior to the year of classification and have produced a minimum of $500 gross sales for the first 5 acres of productive land. (Ludlow OSRP, 2006)

Chapter 61B lands are recreational in use and are similar to Chapter 61A land except that no commodity needs to be produced. The property must be at least five contiguous acres under the same ownership and must meet at least one of the following criteria: be maintained in a substantially natural, wild or open condition; be maintained in a landscaped condition.
permitting the preservation of wildlife and natural resources or be used for certain recreation purposes. Recreational purposes include land used for the following outdoor activities as long as the activities do not materially interfere with the environmental benefits of the land: hiking, camping, nature study and observation, boating, golfing, horseback riding, hunting, fishing, skiing, swimming, picnicking, private non-commercial flying, or hang gliding. Depending on the classification, Chapter 61B land may be subject for open public use. (Ludlow OSRP, 2006)

The Chapter 61 programs are designed to help landowners afford to maintain farms, natural areas and working forests. Leaving the program and changing the land to residential, industrial or commercial use can result in a tax penalty. Should the landowner decide to sell their land, the town of Ludlow has the first right of refusal to buy Chapter 61 land. Chapter 61 lands can be developed for other uses at the end of their protection term or when their functional use is no longer necessary. These lands will revert to unprotected status at a given date unless protection status is extended.

The following table is a summary of public open space, schools and recreational areas in the town of Ludlow, with recreation field and playground information updated as of September 2009.

Table 6.1 - Summary of public parks and recreational areas in the town of Ludlow, MA.

<table>
<thead>
<tr>
<th>Parks and Recreation Areas in the Town of Ludlow, MA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Springfield Reservoir</td>
</tr>
<tr>
<td>Facing Rock Wildlife Management Area</td>
</tr>
<tr>
<td>Name</td>
</tr>
<tr>
<td>-------------------------------------------</td>
</tr>
<tr>
<td>John J. Thompson Memorial Pool</td>
</tr>
<tr>
<td>Ludlow State Forest</td>
</tr>
<tr>
<td>Nash Hill Reservoir</td>
</tr>
<tr>
<td>Red Bridge State Park</td>
</tr>
<tr>
<td>Electric Park Playground</td>
</tr>
<tr>
<td>Haviland Pond Beach</td>
</tr>
<tr>
<td>Ludlow Town Forest</td>
</tr>
<tr>
<td>Library Park</td>
</tr>
<tr>
<td>Memorial Park</td>
</tr>
<tr>
<td>Ludlow Community Center/Randall Boys &amp; Girls Club</td>
</tr>
<tr>
<td>West Street Playground</td>
</tr>
<tr>
<td>Westover Municipal Golf Course</td>
</tr>
<tr>
<td>Whitney Street Park</td>
</tr>
</tbody>
</table>
## Parks and Recreation Areas in the Town of Ludlow, MA

<table>
<thead>
<tr>
<th></th>
<th>Acres</th>
<th>Ownership</th>
<th>Level of Protection</th>
<th>Recreation Fields</th>
<th>Playgrounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camp White</td>
<td>27.00</td>
<td>Ludlow Conservation Commission</td>
<td>Permanent</td>
<td>2 soccer fields</td>
<td>some equipment</td>
</tr>
<tr>
<td>Westover</td>
<td>296.00</td>
<td>Ludlow Conservation Commission</td>
<td>Permanent</td>
<td>1 soccer field, 2 baseball diamonds</td>
<td>playground</td>
</tr>
<tr>
<td>Conservation and</td>
<td></td>
<td></td>
<td></td>
<td>1 soccer/football field, 1 baseball</td>
<td></td>
</tr>
<tr>
<td>Wildlife Area</td>
<td></td>
<td></td>
<td></td>
<td>diamond, tennis courts</td>
<td></td>
</tr>
<tr>
<td>Veteran's Park</td>
<td></td>
<td></td>
<td></td>
<td>1 soccer field, 2 baseball diamonds</td>
<td>playground</td>
</tr>
<tr>
<td>Elementary School</td>
<td></td>
<td></td>
<td></td>
<td>1 soccer/football field, 1 baseball</td>
<td></td>
</tr>
<tr>
<td>High School</td>
<td></td>
<td></td>
<td></td>
<td>diamond, tennis courts</td>
<td></td>
</tr>
<tr>
<td>Ludlow Senior</td>
<td></td>
<td></td>
<td></td>
<td>1 soccer field, 1 softball diamond</td>
<td>playground</td>
</tr>
<tr>
<td>High School</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>East Street</td>
<td></td>
<td></td>
<td></td>
<td>1 soccer field, 1 t-ball field</td>
<td>playground</td>
</tr>
<tr>
<td>School</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chapin Street</td>
<td></td>
<td></td>
<td></td>
<td>1 soccer field, 2 baseball diamonds</td>
<td>playground</td>
</tr>
<tr>
<td>Elementary School</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annadias Fields</td>
<td></td>
<td>Private</td>
<td></td>
<td>1 soccer field - private, but community</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>is allowed to use</td>
<td></td>
</tr>
<tr>
<td>West Street</td>
<td></td>
<td></td>
<td></td>
<td>1 baseball diamond</td>
<td>playground</td>
</tr>
<tr>
<td>Silva Field</td>
<td></td>
<td></td>
<td></td>
<td>1 football field</td>
<td>playground</td>
</tr>
</tbody>
</table>

Recreation fields and playground information is based on visits to Ludlow and a conversation with the administrative assistant to the Ludlow recreation committee in September 2009 (Gates, 2009).
Open Space Service Area

The map ‘Open Space Service Areas’ indicates areas in downtown Ludlow that are within a 0.5 mile radius (comfortable walking distance) of public open spaces. Areas that are not within the circular outlines do not have public open space/parks within an easy walking distance and indicate a shortage of open space. Additionally, public open space/parkland in the downtown area does not have enough parking/access to accommodate users of the space.

Local parks and recreation areas provide communities the opportunity to vary their routine and experience nature. The National Recreation and Parks Association has found that in respect to overall health, local park and recreation users report fewer visits to a physician for purposes other than routine check-ups than did non-park users even when controlling for the effects of age, income, education level, health status and other possible influencing factors. (Ho, 2003)
According to the National Recreation and Park Association (NRPA), the national standard acreage of open space/parkland is 10 acres for every 1,000 people in metropolitan areas. (www.prm.nau.edu, 2009) Per the 2000 National Census, the population of Ludlow was 21,209 which would indicate a need for 212 acres of open space/parkland in order to be in line with the national average. Ludlow currently has approximately 67 acres of town owned public parks and playground areas. This is a striking difference as compared to the national average. The majority of the population of Ludlow is concentrated in the South East section of town. Of the 67 acres of public parkland, only 37 acres is concentrated in this area.

The overall lack of public open space in proximity to the majority of the population is further echoed through community members voicing a desire (as per meetings with town members and information in the 2006 Ludlow OSRP) for more recreation fields and greater accessibility to current and future fields/parks.

Property at the Westover Golf Course has been noted as a potential location for additional soccer fields for the community (Gates, 2009). While this would be an overall benefit to the community, it would not create more public parkland/open space within walking distance for the majority of the population of Ludlow.

Three years ago the town gave land on Sportsman Road, near the Boys and Girls club, to build a skate park. The land was surveyed and money was raised, however due to the economic downturn, interest in the skate park diminished and it has not been built (Gates, 2009).
5.2 Existing and Potential Trail Systems

Within Ludlow there is a large amount of conservation land that lacks connection between one another. With three large hiking areas within town, there needs to be strong linkages connecting the areas to one another as well as the trails at the regional scale. Use of an abandoned rail line will connect the downtown to the waterfront as well as connecting the western portion of the town to Red Bride State Park on the eastern border. Hiking trails along the power lines and easements within town help connect the large hiking areas as well as historical and agricultural destinations within town.

Regional Trails

There are three major trail systems that surround the town of Ludlow: the Mass Central Rail Trail, the Metacomet-Monadnock Trail and the Connecticut Riverwalk. None of these three trails listed go through the town of Ludlow, but could be connected to through a variety of hiking and biking trails that are currently in place.
Looking at regional trails, the Mass Central Rail Trail, when completed, will connect Northampton to Boston, spanning 104 miles and connecting 24 communities within Massachusetts. The trail is along an abandoned railway that was destroyed in the late 1930’s by a hurricane (Mass Central Rail Trail Coalition, 2009). The trail will eventually create a connection to the Appalachian Trail and intersect with the Metacomet-Monadnock Trail that connects Connecticut to New Hampshire. This intersection, which occurs just to the north of Ludlow and Belchertown, will create a vast amount of opportunities for long distance travel, as well as day hikes to a plethora of destinations. Much of the Mass Central Rail Trail is still under development and listed as a potential trail, but residents of the neighboring communities can use the trail, as the Norwottuck Rail Trail, from Northampton to Amherst. The connection from Amherst, through Belchertown and up to Ware is currently under development. The trail just misses passing through Ludlow on its way through Belchertown, but is close enough in proximity that there are current bike routes that already connect to the rail trail.
The longest hiking trail in the region, which was recently designated a National Scenic Trail, is the Metacomet-Monadnock Trail, which passes just to the west and warps north of Ludlow. The M+M trail begins on the Metacomet Trail on the Connecticut state line, traversing 114 miles before ending at Mt. Monadnock in New Hampshire. This ridgeline trail touches on the summits of Mt. Tom, Mt. Holyoke and Mt. Monadnock while passing through other scenic vistas, offering views of farmlands, waterfalls and cliff faces to bikers, backpackers and the occasional group of mountain bikers. The M+M trail passes just to the west of the Connecticut Riverwalk which eventually connects to Ludlow through a variety of bikeways and hiking trails. The trail crosses over the Connecticut River and connects Mt. Tom and Skinner State Park, which lie just to the Northwest of Ludlow. This is where a potential connection is possible that will lead down through South Hadley and Granby and connect to the hiking trails in the Westover Conservation Area. Currently there is a bike route that leads from the center of Ludlow all the way up through Granby and Belchertown, eventually hooking on to the M+M trail. These two connections to the M+M trail help connect Ludlow, which has very few trails in town, to the surrounding communities and eventually to the larger scope with connections from Connecticut to New Hampshire and east to Boston.
The Connecticut Riverwalk currently connects two nearby towns by running 1.7 miles parallel to the Connecticut River in Agawam and 3.7 miles in Springfield. The 3.7 miles adjacent to the eastern banks of the river in Springfield passes by Riverfront Park and the Basketball Hall of Fame in the South End. There are trails proposed by the city that will run along the banks of the river in Chicopee as well as several other proposed loops and trails that will connect to existing trails in the three towns. When the Riverwalk is finally completed, it will total 20 miles in length, connecting the towns of Chicopee, Springfield and Agawam as well as many other towns via the connections to the already existing trails in the area.

The Connecticut River is a valuable resource in the Valley, but due to its fragmentation by I-91, dikes and railroads, the riverfront has lost its appeal (City of Springfield, 2009). The Riverwalk will not only restore this natural asset, but will offer opportunities for connections throughout the surrounding towns and trail systems. There are currently a handful of bike
routes and hiking trails that connect to the Riverwalk, which stretch back to the center of Ludlow.

**Ludlow Trails**

Looking at a local level, Ludlow has few hiking trails and really no existing bike trails that are not on roadways. The majority of these trails are on state land and not under town management. The hiking trails in town are located in three separate areas with no real connection to one another. Small loops of trails are located in the Northwest corner of Ludlow at the Westover Conservation Area, but the trails are isolated from the rest of the town with no trails linking to Facing Rock Wildlife Management Area or the downtown district. The next set of hiking trails is at Facing Rock Wildlife Management Area where there is a large loop and several small trails interconnected throughout the area. Meetings with local residents have shown that there are several trails that traverse the land in that area, with one large loop that connects back up by the Springfield Reservoir trail and also a cut through trail along the power lines.

There are several existing hiking trails along the power lines, owned by Western Mass Electric Company, which connects the eastern border of town to the Westover Conservation Area. The power line hiking trails connect the East Cemetery through the new housing development just to the south of the Springfield Reservoir and up through Facing Rock Wildlife Management Area and west to the Wildlife Conservation Area. Trails along power lines connect Facing Rock Wildlife Management Area to the Chicopee River as well as connecting across the center of town by Camp White and down to West Street Playground. There are numerous hiking trails that circulate along the new development by the Ludlow State Forest as well, with the most used hiking trail alongside the road the leads up to the fire tower which overlooks the forest. The last hiking trails in town are those in the Chicopee State Park, which could easily connect to the Westover Conservation Area on an abandoned rail line.
One of the most direct connections to the Connecticut River is through a bikeway that would connect up to Chicopee State Park, which has an abundance of hiking trails and lies right on the border of Ludlow. Several potential trails link to Chicopee State Park that connect to the Westover Conservation Area, the Lupa Zoo and Nash Hill Reservoir, as well as the downtown district of Ludlow. The disconnection between the three main hiking areas can be easily remedied with a trail along the power lines and back roads, connecting the Westover Conservation Area to Red Bridge State Park via Facing Rock Wildlife Conservation Area and the Springfield Reservoir.

The only off road bike trail that exists in town is a paved trail that wraps around the Springfield Reservoir. This paved portion of the trail ends at the eastern edge of the reservoir; a foot beaten path connects that trail along Route 21 and back to the trail head. This bike trail is a gem to the community, offering views of the town’s water from a flat, paved path for people of all
ages. Since there are not any actual bike trails within Ludlow that do not run along roadways, this bike trail should be a completed loop around the reservoir, giving residents options to the larger trail systems, as well as an escaped from the face paced bike routes in town. Route 21 is a major bike route that should have a designated bike lane. Route 21 leads up to the Mass Central Rail Trail and down to the Chicopee River and into Springfield. Several bike trails and hiking trails have been proposed, but where bike routes are the only option, bike lanes need to be implemented so bicyclists and motor vehicles can share the roads safely.

Although there are several bike routes that go throughout the town, the bike routes leave the city fragmented and several of the town’s destinations unconnected. There is no biking or hiking access to the Nash Hill Reservoir, Lupa Zoo or Camp White as well as no connections between the Ludlow State Forest and the Springfield Reservoir. Connections are missing between Troop 180 Camp, the East Cemetery and Red Bridge State Park as well. There are many opportunities to connect between playgrounds, parks, schools and historical landmarks in the downtown by a type of educational trail system. Small educational trails should be explored in the downtown to connect the historic sites of the town to the schools and parks.

Seeing the disconnection that lies within the town and region, Ludlow needs to take advantage of the resources that they have. Several abandoned rail lines run through the town. A rail line wraps around the Westover Airforce Base and enters Ludlow from the Northwest corner, easily connecting to the Westover Conservation area. Other rails lines stemming from Springfield run along the Chicopee River and the downtown, making it possible to connect the Connecticut Riverwalk through Ludlow and up to the Mass Central Rail Trail in Belchertown. These abandoned rail lines could house off road bike trails that could connect important destinations within the town to one another and onto the broader trail systems that lie within the region.
Ludlow is a growing community with strong cultural and natural resources. A proposed system of trails will tie the town of Ludlow in with the surrounding communities and the larger trail systems that serve New England and beyond. With multiple schools, parks, playgrounds and a community center in the downtown, connections are vitally necessary. Designated bike lines need to be created on roadways since there is limited opportunity for bike trails off the main roads. Hiking and biking trails are the best linkages between Red Bridge State Park, Springfield Reservoir, Facing Rock Wildlife Management Area, Westover Conservation Area and Chicopee State Park. There is plenty of opportunity along the power lines and riparian corridors in town. Ludlow sits in a very nice location within the Pioneer Valley; with ample opportunity to not only connect community assets, but also to the larger trails within the region.
5.3 Proposed Parks, Recreation and Protected Open Space Greenway

The proposed parks, recreation and protected open space greenway connects downtown Ludlow to the conservation areas in the northern part of town through a network of bike and hiking trails. In addition to providing nature connections that will benefit wildlife and ecosystems, the greenway will make the open space resources of the town more visible and accessible to its citizens. The trail system itself will serve not only recreational purposes, but it will also provide the citizens of Ludlow an alternate means to travel around town. Instead of being dependent on their cars, the community would have the option to bike or walk to school and work without being on Ludlow’s busy roads. This could also alleviate the lack of sufficient
parking at many of the recreational facilities around town. There are areas within the greenway that are designated for future recreational fields (such as soccer fields).

Within the greenway we chose three areas to focus on. We zoomed in on these areas and were able to make more specific recommendations on how to implement the greenway and the potential benefits to these areas.

As mentioned previously in this report, the southwest part of town is underserved in parks, recreational areas and protected open space. The map below indicates areas that could be designated as part of the greenway. The proposed connections provide links, in this primarily residential area, that would allow children to walk to Chapin Street Elementary School safely.
The grade change, streams and wetlands in this area also provide great opportunities for exercise and exploration which can help foster a sense of environmental stewardship and awareness in both children and adults.
Greenway Connections

- Proposed Greenway
- Potential Recreation Fields
- Existing Open Space
- Proposed Bike Routes
- Proposed Hiking Trails
One of the most important connections within the town of Ludlow is the proposal of a multi-purpose trail along the eastern edge of the town which will connect the Springfield Reservoir to Red Bridge State Park. This trail will go along the riparian corridor that passes by Alden Pond and down to the Chicopee River Reservoir. Currently there are existing trails that wrap around Alden Pond and a small mowed path that comes off the Springfield Reservoir trail and connects to Route 21. If these trails are connected, this will provide a connection from those at the Springfield Reservoir, around Alden Pond, down through Troop 180 Camp and onto Red Bridge State Park where it can link on any number of trails, mainly the proposed bike trail that goes along the abandoned rail line in this portion of the town.
The Chicopee River is a significant natural and scenic resource for Ludlow. Former Ludlow mills buildings line part of the river in the downtown. Unfortunately, there is little public access allowing people to get close the Chicopee River. The focus area located along the Chicopee River was chosen to provide greater public access to the river and this historic area.

One potential strategy for this area is phasing. The first stage would be to create green streets along Sewall Street and south extension of Hampshire Street. The proposed green streets will be pedestrian-friendly streets with green streetscape. The second phase would be to create public open spaces where these streets meet the river. The final phase would be to create additional access to the river between these initially created open spaces connecting the two parks and thereby creating part of the greenway.
The view of picture is from the Sewall Street to the Chicopee River

Perspective shows the proposed public access to the Chicopee River
5.4 Conclusion

In conclusion, Ludlow has tremendous resources at its disposal. As evidenced by the 2006 Open Space and Recreation Plan for Ludlow, the community has interest in preserving and utilizing these local resources. The combination of these two factors, resources and community interest, makes Ludlow an ideal location to implement a greenway that would shape future planning and development of the area.
6.0 Services and Facilities

Services and facilities serve as a town’s lifeblood. A town cannot properly function without reliable, safe, and secure supplies of water, energy, waste water treatment, and other public services that are often taken for granted. These services tend to be strained during times of development pressure and shifts in the demographics of a municipality’s residents. Ludlow relies heavily on outside service providers to deliver a large proportion of services to the community. While this level of regional dependence has its advantages, it may also pose significant challenges that might not exist if the town owned and provided these services itself. Analysis of this chapter was compiled using a variety of data as well as interviews with several departments, the outside service providers, and individuals affiliated with the town of Ludlow. To make sense of this, we first present some historical background, and then describe the current condition of major infrastructure elements in town. We conclude with an initial identification of ways to address the challenges noted in this chapter.

6.1 Laying the groundwork

In the early 1900’s, Ludlow Manufacturing Company, a global manufacturer of jute yarn and twine, built much of the town’s current infrastructure including water, sewer, and educational facilities, to meet the needs of the mill and its growing employment base. Through the 1930’s and 1940’s, the Mill’s productivity declined as a result of supply disruptions coming from India and subsequently the company moved its main operations to Calcutta. With production centered overseas, in the 1950’s the Mill began to sell off pieces of Ludlow’s infrastructure, including the water supply to Springfield Aqueduct and the electric infrastructure to Western Massachusetts Electric Company (WMECO). The town is still dependent upon these service providers to deliver the town’s electricity and water (WMECO and Springfield Water and Sewer Commission).
The Springfield Reservoir (also referred to as the Ludlow Reservoir) was originally the source of public water supply. However, in 1994 the reservoir was taken offline and is now utilized for backup and emergency purposes only. The reservoir was constructed in 1875 and holds a total of 1.71 billions gallons of water (Springfield Water and Sewer Commission). In 2001, the Springfield Water and Sewer Commission along with state agencies helped protect the reservoir and its surrounding lands which are currently protected under a state conservation restriction and land management plan.

In the years following World War II, with the mass production of the automobile and the location of Westover Air Force Base, Ludlow began its formation as a bedroom suburban community. As such, sprawl placed new demands on infrastructure and extending household services. In recent years, Ludlow has not adequately directed development through land use policies. Consequently, sub-division developments have been constructed across all parts of town where support infrastructure does not currently exist. There are currently just over 4,000 homes using public sewer, leaving about 2,100 residents reliant on septic systems. This poses environmental risks to water quality as much of the town is close to or abutting wetland areas connected to the Chicopee River Watershed area. In addition, many of the homes in rural areas rely on well water for their drinking source.

Ludlow does not generate its own municipal power supply. However, Mass Municipal Wholesale Electric Company, a non-profit public electricity producer, operates two of its five generating units and corporate headquarters in Ludlow and is in the process of building a natural gas fired generating unit at its Stony Brook site. In addition, WMECO operates two hydropower plants on the Chicopee River, while an additional one is operated by CEEI.
6.2 Trends and Data

Water

Ludlow’s water supply stems from the Little River and storage at the Borden Brook (2.5 billion gallon) and Cobble Mountain (22.3 billion gallon) reservoirs located 30 miles to the west within the towns of Blandford, Russell, Granville, and Westfield. Water is treated at the West Parish Filtration Plant in Westfield, flows on to Provin Mountain in Agawam through 37 miles of water mains, and continues on through 580 miles of piping to customers in Springfield and Ludlow. This water supply system is administered by the Springfield Water and Sewer Commission who are also responsible for installing water infrastructure. The town is also linked to the Quabbin Reservoir to the east via an aqueduct, but presently do not use this as a supply.

The Springfield Water and Sewer Commission has made several capital improvements, with other projects under way to help update and maintain the reliability of the region’s water supply. The Ludlow Transmission Main Project was completed in 2007, which included the installation of over 6,600 feet of 16 inch pipe running through East and Chapin Streets. Also completed in 2008 was the removal of 3,161 feet of asbestos cement pipe and 800 feet of new water main running through the Karen Drive area of town. However, approximately 25 to 30 percent (exact figures not provided) of the town’s residents are not connected to public services and remain dependent upon water from wells. This is largely a result of unmitigated development occurring in the rural areas of town where it has not been cost effective to extend service; see below (Springfield Water and Sewer).
Waste Water & Stormwater Management

The Ludlow Department of Public Works is responsible for maintaining the town’s waste water and storm water treatment facilities. In compliance with recent state legislation, separation of the last combined sewer and overflow drainage located on Hubbard Street, will be completed in December of 2009 with final clean up and paving coming in 2010. This will bring the town compliant with state and federal environmental standards pertaining to storm water management (National Pollution Discharge Environmental Standards - NPDES) and avoid costly fees that can result from noncompliance, which Ludlow has been subject to in the past. Ludlow has maintained all other compliance with new NPDES standards requiring substantial review and filing on an annual basis. The most recent filing was completed by the DPW in April of 2009.

The town recently purchased a vacuum truck to clean the sewer system in town and help maintain efficiency, which previously was done by an outside contractor. Continued efficiency, however, will be largely dependent upon the level of future demands posed by residential development on waste water and storm water runoff. Current sewer infrastructure is old and aging, as referenced in the town’s 1963 Sewer Master Plan. While some improvements have been made over the years, replacement and maintenance needs will increase in the years to come.

Capital Improvements Plan

Ludlow has facilities that are currently quite adequate, although continuing maintenance and updating of some facilities will be required. Several of the town’s buildings were built around 1970 and are in relatively good shape. However, the library and service center date back into the late 1880’s, while the community center was constructed in 1905. All three buildings will be needing improvements or replacement in the future. Given the current state, federal and local budget challenges, careful planning for such large capital expenditures is critical. Though the town makes appropriations annually for capital expenditures, Ludlow does not have a capital improvements plan to anticipate long term improvements to infrastructure requiring substantial capital investment.
Fire and emergency services

Residential development over the past decade and budgetary limitations have placed significant strain on emergency services. From 1999 to 2008, emergency calls increased by 40 percent, with 69 percent specifically for medical emergencies. Fire Department and emergency personnel have met this challenge, as response times have slightly improved over the period to an average of less than 3.5 minutes per call.

The safety complex, which houses fire, police and emergency services, is at capacity for garaging equipment and apparatus used by the departments. Continued development in the rural areas of town (particularly in precinct three) and increases in the elderly population from demographic shifts will put further strain on the department’s ability to continue providing outstanding service. Coordinating land use and development permitting with facility availability, planning for new or additional facilities, and increasing personnel as necessary may be required going forward to continue these good results.

Emergency and Hazard Mitigation Response Plans

Planning and responding to natural disasters or sudden unexpected events that threaten the safety and well-being of a town’s residents can often overwhelm municipal services and facilities, if reaction is not properly anticipated. Two types of plans are critical in helping to ensure the safety of residents in the wake of these circumstances: Emergency Response Plans and Hazard Mitigation Plans.

Emergency Response Plans (ERP) have become a priority for many communities since September 11, 2001. An ERP should include response plans for all town services including fire, police, and DPW, incorporating them into a coherent detailed response to unforeseen threats and emergency situations. These plans are used to respond to events that range from an unlikely terrorist attack to massive disruptions in power or water supplies. Ludlow does not have an integrated plan per se, however most departments do have response plans in place to respond to such emergency events.
Hurricanes, floods, ice, storms, fires, and other disasters, while not common occurrences, are capable of doing tremendous damage to a municipality. As witnessed by the damage of Hurricane Katrina, having a plan to mitigate the impacts of such events can help minimize the damage and impacts to daily life in town. The Federal Emergency Management Agency (FEMA), requires that municipalities have a Hazard Mitigation Plan in place in order to receive mitigation funding from the agency in the event of a disaster. As such, putting a plan in place that considers a location’s economic, demographic, geographic, and other unique factors, can help save lives and save the community money needed for rebuilding infrastructure and costs from rescue operations. Ludlow does have a pre-disaster mitigation plan that identifies the areas prone to potential impact as a result of these circumstances. The plan should be updated as necessary and integrated amongst the town departments.

*Sidewalks and bicycle transport*

As a commuter town, infrastructure for connectivity and mobility for non-motorized transport particularly aimed at the elderly and youth, has been strained by funding availability. Only approximately $20,000 per year is directly allocated to sidewalk improvements, resulting in neglected areas. In addition, the town does not have safe alternatives to motorized commutes, such as a bike path or bike lanes, but interest in this has been expressed by residents in stakeholder meetings. While the redevelopment of Ludlow Mills will reopen access to the river that has not been available in over one hundred years, it will be important for the town to enable safe access to these areas for bicycles, walking, and other non-motorized means, without relying on driving.

*Updating the electric grid*

Aging electrical infrastructure has led to inefficiencies and unreliable service in parts of the Northeast region of the country. Federal and state governments have pressed power delivery companies to make improvements to the grid to combat these problems. As part of a larger grid overhaul, the Greater Springfield Reliability Project, implemented in part by WMECO (a
division of Northeast Utilities Corporation), will be installing a 345 kilovolt power line which will run through Ludlow on existing right of ways. The project will help ensure efficient and reliable electricity to regional customers including those in Ludlow. It will also provide a large boost in tax revenues for the town and help provide the region with access to a larger number of energy suppliers from greater distances.

6.3 Opportunities and Challenges

Like many old industrial towns in the northeastern U.S., Ludlow is seeing its infrastructure show signs of aging. Based on our infrastructure and capacity assessments, it appears that the areas best suited for future economic development initiatives and job creation, such as Westover Industrial Park, Ludlow Mill and the town center, will not be inhibited by future water demands. However, challenges lie in maintaining aging infrastructure, providing emergency services to a changing population, and reliance upon regional dependencies for vital town services such as water and electric.

In particular, increased residential development has increased demands on facilities and services. Residents of newer developments are forced to rely on septic and well water service, while being vulnerable to longer emergency response times. There are two clear responses to this. The first is establishing a capital improvement plan, which will allow for long term planning for costly infrastructure improvements and the upgrading of necessary equipment and facilities. Just as important is that Ludlow can control where future residential development happens by implementing land use policies based on infrastructure capabilities and making smart investments in the infrastructure of target growth areas. Smart land use will help lessen the extension of underutilized services and spread the cost of improvements over time.

Ludlow’s future is bright. Its many natural assets and community spirit make it an attractive place to live. With appropriate visioning and planning, the town will help ensure a safe, reliable, and healthy future for its children and future residents.
7.0 Transportation

7.1 Introduction

The completion of Interstate I-90 in 1957 drastically changed the development pattern in Ludlow from a small town with a dominant downtown center to mostly a residential community. This residential growth has allowed residents to live farther away from the city center and their occupations. This lifestyle is automobile dependent, requiring residents to access much of their daily activities via a motor vehicle. Almost 89 percent of resident’s drive alone to work (American Community Census (2007). With Ludlow’s location in the eastern region of Hampden County, residents have an opportunity to commute to Springfield, Worcester and Boston. This access has helped foster an increase in population and traffic volume in and around Ludlow. The geography of Ludlow as a connector to the Turnpike for many regional towns also creates significant pass-through traffic. Taken together, the lack of alternatives to automobile use and the town’s connector status have lead to a significant traffic problem.

Ludlow’s road network consists of one state numbered route, and many local main roadways. Presently Route 21 is the only state numbered route within the community. The town’s ability to impose its powers over this particular route’s development is limited. The limitations include physical design and control of roadway use of these state numbered routes. However, the Massachusetts Highway Department has increased its flexibility in recent years in working with local communities concerns about these design issues. Other major roads within the community include but are not limited to, Center Street, Holyoke Street/Chapin Street, and Church Street. Center Street carries the largest amount of traffic volume and has four lanes (two lanes dedicated for each direction). Most other roadways within the town are two lane roads which limit the traffic volume capacity of these roadways.
Ludlow roads suffer from peak hour (rush hour) traffic; this time is typically recognized as 7:00-9:00 A.M. and 4:00-6:00 P.M. Part of this peak hour capacity problem is due to an increased volume of residents from neighboring communities. “West Avenue is an alternative route to the Massachusetts Turnpike for commuting traffic from Belchertown, Palmer and Wilbraham........ vehicles can turn right onto Fuller Street to utilize either Cady Street or Holyoke Avenue to access Interstate 291 in Chicopee via Burnett Road” (PVPC Traffic Study of Fuller Street, Cady Street, West Street and West Avenue Report discovered, p. 3 July 2005). Residents now consider traffic congestion to be a major problem and some think that increased traffic will eventually impact the quality of life in Ludlow, and could negatively impact economic development (Ludlow Stake Holders Interviews). PVPC and Mass Highway have begun to address these concerns, but increased development pressure and commuting patterns make this a difficult issue. Ludlow DPW has done a good job maintaining town roads especially in light of the amount of use the system endures.

Alternative mobility has been less successful in Ludlow. Sidewalks are most heavily used in the downtown area, but excessive curb cuts, inconsistent condition and lack of connectivity appear to reduce the amount of pedestrian use. Bike lanes have not been integrated into the transportation network. Bike lanes have been met with skepticism from town departments and the public is concerned for due to safety concerns. The high volume of vehicles on the main roads has created apprehension in pursuing these initiatives.. There is interest in biking for recreation, however. Comments from key stakeholders and the Master Plan Commission have indicated that residents would be interested in pedestrian/bicycle lanes in areas such as the Springfield Reservoir. In recent years the balance between protection and security of the reservoir has led to the gates being closed during certain hours. Residents want an opportunity to access the natural corridors of the town. Public transportation has also not been integrated into the community transportation system, as is further explored in the section below. The town is primarily served by the B-6 Ludlow via Bay, while Stoney Brook Prison is served by the express B-12.
7.2 Current Conditions

Safety
PVPC has conducted several safety studies within the town of Ludlow. In 2005, PVPC conducted an intensive traffic study of Fuller Street, Cady Street, West Street and West Avenue to evaluate the efficiency and safety of these intersections (PVPC Traffic Study of Fuller Street, Cady Street, West Street and West Avenue Report discovered, p. 8 July 2005). Key findings of the PVPC study are shown in Figure 7.1 below. A large percentage of the accidents were angle crashes, which commonly occur in intersections. Some injuries have occurred in these accidents but there have been no fatalities recorded in recent years.

Figure 7.1 - Top Crash Locations in Ludlow, 2003-2005

<table>
<thead>
<tr>
<th>Location</th>
<th>Total Crashes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center Street (Route 21)/Cherry Street</td>
<td>33</td>
</tr>
<tr>
<td>Fuller Street with Cady Street</td>
<td>16</td>
</tr>
<tr>
<td>Fuller Street with Cherry Street</td>
<td>16</td>
</tr>
<tr>
<td>Center Street with West Avenue</td>
<td>14</td>
</tr>
<tr>
<td>West Street with Cady Street</td>
<td>14</td>
</tr>
<tr>
<td>West Avenue with Fuller Street</td>
<td>8</td>
</tr>
</tbody>
</table>

One note about these findings is that the intersection of Center Street and Cherry Street was not part of this study; it was, however, ranked number 100 (being least dangerous of the 100) in (PVPC’s Top 100 Most Dangerous Intersections from 2003-2005). No other Ludlow intersection was in the top 100.

Parking
In 2000, PVPC conducted a parking analysis for the downtown area of Ludlow (Ludlow Parking Study Chestnut Street and Windsor Road Area). This report found that many of the parking spaces were are under-utilize during non-peak hours and near capacity during peak hour. This study also found that parking lots in the downtown were utilized at a much higher rate than on street parking. Angled spaces were recommended for Chestnut Street to increase capacity by 15 spots. Many local activity centers, including the senior center, are in this area. Efficient and safe parking is required for greater ease of access to these activities. With additional pressures
from the mill redevelopment, Ludlow needs to consider performing another parking utilization study. There has been public interest generated in turning the former Boys and Girls Club into a parking garage. This parcel is located adjacent to the Chestnut Street area and could help alleviate parking constraints within this location. Parking lots in the downtown do posses ADA parking spaces (handicapped) and are paved.

Public Transportation

Ludlow’s public transportation is very limited and lacks integration into the community. The town is served by two bus routes, the B-6 and the B-12. The B-6 begins at Springfield Bus Terminal and ends at the Ludlow Big-Y®. It accesses the downtown area along Center, Hubbard and Sewall Street with occasional service to Williams Street. The B-12 is an express route which accesses the Ludlow State Prison from the Springfield Bus Terminal, with no other bus stops in town. The B-6 averages 35,762 riders monthly, while the B-12 has roughly 2,000 riders a month. Both cause and effect of this limited service is that less than 0.8 percent of residents use public transportation as a commuting option (ACS, 2007). Riders from Ludlow experience about a 40 minute ride to the Springfield bus terminal where most transfers occur. Saturday trips are scheduled to take 45 minutes, while there is no Sunday PVTA service.

![B-6 Route within the town of Ludlow](image-url)
7.3 Opportunities and Challenges

Stakeholders and town officials attribute intersection capacity problems to an increase in population from development within Ludlow and significant pass-through traffic from new development in neighboring communities. This development has created an auto dependent lifestyle which requires intensive maintenance of the road system for properly functioning. Intersection capacity and retiming of the lights may alleviate these issues somewhat. Ludlow has used PVPC very well in optimizing its traffic circulation through a variety of studies in the past decade. Ludlow faces unknown additional large developments such as, Belchertown State Hospital, downtown mill redevelopment and possible casino construction. This large scale development would have an impact on the traffic volume, vehicle types and additional roadway maintenance. While these changes bring challenges, the redevelopment of the Ludlow mill in particular also brings significant opportunity to address the lack of alternative mobility in Ludlow. By taking the steps described below to support bus, bike, and walking to this dense destination location, Ludlow can limit the negative outcomes of growth in the town.

*B-6 Expansion*: Expansion of public transit could provide alternative modes of transportation. The mill redevelopment is estimated to create 1800-2500 jobs in a concentrated location, which provides an opportunity for expanded PVTA service. Providing alternative direct transportation to this location would decrease the amount of traffic the mill would generate. Pedestrian facilities, such as sidewalks and bus shelters, may have to be constructed to attract more users to this alternative. Working with PVTA and PVPC, service could possibly be extended to the State Street corridor to further support alternative transportation options to the mill redevelopment.

*National Center for Safe Routes to School*: Sixteen percent of all children walk or bicycle to school now, while in 1970 forty-two percent of children walked or biked to school (National Center for Safe Routes to School). State programs such as Safe Routes to School can help establish healthy transportation choices for school aged children. Working with this program safe routes can be selected for children who choose to bicycle and walk to school. It is
important to encourage healthy choices in children’s lives, this program can help implement this option. Furthermore, the program can also be influential in improving traffic safety and calming around schools.

*Mill building parking garages:* Some of the older mill buildings could be reused as parking garages. Often these structures are costly to build and maintain, but these existing structures could reduce many of the costs. These structures could help support parking for new employees of the mill redevelopment and access to the downtown area.

This chapter provides a brief glimpse into the traffic issues that the Town of Ludlow faces, and the opportunities that are opening up to the town. The later chapters on greenway corridors also describe ways to improve local quality of life through enhanced mobility. Traffic is a problem in Ludlow, but with proper planning it may actually be able to improve with time.
8.0 Energy and Sustainability

Energy dependence and climate change present huge challenges for municipalities. Ludlow is susceptible to the risks posed by changing climate patterns and their dependency upon finite energy resources. The risks to towns like Ludlow range from economic instability to disruption of the local food supply. Adapting to a changed climate may require changes to infrastructure to address increased floods, higher temperatures, etc. Communities are also responsible for working to reduce their municipal contributions to greenhouse gases and when possible making changes to the town’s built form and practices that will assist residents in reducing their own emissions. Towns therefore need to attend to reducing their use of fossil fuels, increasing local energy reliance where feasible, and gradually implementing regulations that will help the adapt to a changed climate. These changes require community visioning and time for policies to be implemented; fortunately, there are substantial non-profit, state and federal policies particularly in the area of energy alternatives that can assist the Town of Ludlow in its goals.

Plans need to respond to and when possible anticipate future conditions. The increasing costs of energy are becoming a significant issue. Increased demand resulting from a growing world economy and the slow down in the discovery and production of new oil is indicating that our petroleum dependent transportation network may be drastically affected in the years to come. The risks are not of running out of oil, but rather an economic issue of demand outstripping the world’s production capabilities. Residents of Ludlow again experienced the potential impacts of such disruptions in 2007 and 2008 with gasoline reaching over $4 a gallon and other energy prices jumping by as much as 20%.

As a result, federal and state initiatives to reduce energy dependence and greenhouse gas emissions have been adopted by and large. The Pioneer Valley Green Energy Plan, which Ludlow has adopted, is the first regional plan addressing energy reduction in the state. Goals
include reducing the region’s energy consumption to 2000 levels by the end of 2009 and reducing those levels by 15 percent between 2010 and 2020. The long term goal of the plan is to reduce the region’s greenhouse gases by 80 percent of 2000 by the year 2050. In addition, the state of Massachusetts signed into law the Green Communities Act of 2008 which is designed to help municipalities meet similar reduction goals. As will be further discussed below, Ludlow has begun meeting the requirements of the GCA.

Addressing energy and climate in the comprehensive plan is an excellent first step in this process. A comprehensive plan should address climate change and sustainability in ways that are flexible and versatile. This comprehensive plan can be used as a guide to help develop appropriate sustainability parameters for the town of Ludlow, such as benchmarking and goal setting. As Ludlow begins to undertake more sustainable processes and knowledge in these fields grow, it is important the town fosters efficient methods of implementation for full potential to be reached.

### 8.1 Ludlow’s Climate in 2020 and Beyond

The Northeast Climate Impact Assessment (NECIA) is the most comprehensive study to date on expected environmental changes to the New England region. This association consists of the Union of Concerned Scientists and independent researchers. With their concentrated efforts they have been able to model likely climate change and what it will mean in the Northeast. The New England region is expected to have longer summers and shorter winters. Seasonal shifts include an increase in temperatures, increased rainfall in winter months and agricultural insecurity.

Ludlow’s local hazards mitigation plan established in 2006 identified flooding as a medium to low risk. This assessment was compiled using FEMA data with the purpose of identifying where damage would be concentrated and estimating financial losses. Analyzing FEMA’s Q3 flood areas identified the Chicopee River and the Westover Wildlife Management Area as highly flood
prone areas. Increased flooding may also jeopardize the integrity of the 11 dams in town, which if released uncontrolled, can cause significant amounts of damage. The mitigation plan also identified winter and ice storms as a medium to high risk. New England has a long history of winter storms and occasional ice storms have proven to be equally dangerous, as witnessed by the winter storms in early 2009 that seriously disrupted towns in north central Massachusetts. Increased winter precipitation as predicted by NECIA, could prove influential in making these storms more frequent.

8.2 Trends and Data

Ludlow has a history of sustainable practices as a town. During the industrial build up of the early 1900’s, the town harnessed hydro power from 11 dams, including three dams on the Chicopee River that are still actively generating power today. Recycling programs have been implemented in schools saving thousands of dollars a year in trash collection fees. The DPW has done a good job educating town residents who have most recently posted a 27 percent recycle rate for 2007. There is still room for improvement, as Ludlow trails the neighboring towns of Wilbraham and Chicopee who achieved a 33 percent recycle rate (Mass DEP 2008).

**Green Communities Program**

In 2008, the state of Massachusetts implemented the Green Communities Act (GCA) to encourage municipalities to increase energy efficiency and reduce energy consumption. The GCA provides an annual fund totaling over $10 million available only to municipalities that meet certain requirements; this money can be used by the towns to invest in sustainable projects and improvements. Ludlow has received free planning assistance under the act in order to meet the 5 minimum benchmark criteria required under the GCA to be eligible for the larger pool of funds. The five minimum benchmarks set by the act are:

1. Allow by right permitting for alternative energy generation, or allow permitting for alternative energy manufacturing facilities and research and development.
2. Expedited permitting process for goal number 1, which approval is not to exceed one year from application submission.
3. Establish an energy baseline for municipal energy usage and create a plan to reduce this baseline by 20 percent within 5 years.
4. Purchase only fuel efficient vehicles for municipal use when available.
5. Establish a building code which considers the life cycle of buildings, also known as the “stretch code”.

Ludlow has met the first two requirements under the GCA, allowing by right permitting for alternative energy and allowing expedited permitting for energy facilities. The town is currently working with the Pioneer Valley Planning Commission to meet the remaining three criteria. In addition to these baseline criteria under the GCA, municipalities should establish an energy committee to make recommendations on issues of sustainability. Ludlow formed its town energy committee in September of 2009 and the first meeting will take place in October of the same year. The committee hopes to hit the ground running and work towards forming a sustainability plan which will incorporate practices outlined by ICLEI, an international organization of local governments for sustainability.

*Municipal baseline reduction and fuel efficient vehicles*

The town owns and maintains 13 municipal buildings, including the school system, as well as several other facilities which consume energy including streetlights and the sewer system. While school buildings, in particular the high school, are one of the highest consumers of electricity, the community center has spent almost $100,000 over each of the last two fiscal years on electricity. An expectedly high user, the emergency services complex has spent an average of $49,000 over the past two fiscal years (see Figure 8.1 below).

Replacing streetlights with energy efficient bulbs can make a significant difference in the town’s electric costs. This will be a first step in the plan to reduce Ludlow’s baseline energy consumption from current levels by 20 percent. Under the GCA, the town will be required to
purchase fuel efficient transport for all municipal vehicles where permissible (excluding emergency vehicles and commercial vehicles used by the DPW for instance). The town has not yet begun to purchase fuel efficient vehicles for municipal purposes.

Figure 8.1 Municipal Building Electric Costs Fiscal Year 2009

<table>
<thead>
<tr>
<th>Facility</th>
<th>Costs in Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>School Department</em></td>
<td></td>
</tr>
<tr>
<td>High School</td>
<td>$ 229,461</td>
</tr>
<tr>
<td>Baird Middle School</td>
<td>$ 131,805</td>
</tr>
<tr>
<td>Chapin School</td>
<td>$ 41,051</td>
</tr>
<tr>
<td>East School</td>
<td>$ 36,340</td>
</tr>
<tr>
<td>Weterans Park School</td>
<td>$ 43,231</td>
</tr>
<tr>
<td><em>Town Offices</em></td>
<td></td>
</tr>
<tr>
<td>Administrvive Offices</td>
<td>$ 21,667</td>
</tr>
<tr>
<td>Town Hall</td>
<td>$ 24,990</td>
</tr>
<tr>
<td>Library</td>
<td>$ 16,000</td>
</tr>
<tr>
<td>Service Center</td>
<td>$ 21,388</td>
</tr>
<tr>
<td>Safety Complex</td>
<td>$ 46,680</td>
</tr>
<tr>
<td>Dept. of Public Works</td>
<td>$ 10,162</td>
</tr>
<tr>
<td>1st Meeting House</td>
<td>$ 603</td>
</tr>
<tr>
<td>Community Center</td>
<td>$ 97,904</td>
</tr>
<tr>
<td><strong>Total Town Electric Costs FY 2009</strong></td>
<td><strong>$ 721,282</strong></td>
</tr>
</tbody>
</table>

Alternative energy potential

Ludlow has a long history of producing clean and renewable energy. As an old mill town, Ludlow leveraged its greatest natural asset at the time, the Chicopee River, to generate electric power. Three hydro plants are operational today: the Indian Orchard Plant, operated by CEEI, along with the Putts Bridge Dam Station and the Red Bridge Dam operated by WMECO. Solar installations on municipal buildings, most notably the schools, could serve as both clean energy sources and educational opportunities for the town’s children and has been discussed by members of the energy committee. Wind power is not economical in the Pioneer Valley, however potential for methane capture and geothermal may be alternative sources worth
exploring, particularly on the town’s capped landfill, which can also serve as a staging area for solar power installation.

### 8.3 Opportunities and Challenges

Planning for future environmental conditions is difficult due to the lack of predictability. The creation of policies, goals and implementations within communities must prioritize flexible plans which are sensitive to the evolving nature of monitoring and measuring. Embracing flexibility eases the incorporation of relevant methods of measurement into the community’s future planning efforts.

“Long-term thinking is not about fixing in place a set of long-term policies; rather it is about adopting a process over the long-term that allows for frequent readjustment of current policy and plans in the face of new knowledge, new experience, and new challenges.” (Post-Carbon Cities: Planning for Energy and Climate Uncertainty, 2007 Post-Carbon Institute.)

**Other grants and programs**

Federal programs such as the Energy Efficiency and Conservation Block Grants (EECBG) are being channeled through the American Recovery and Reinvestment Act of 2009. If leveraged, these funds can help meet critical needs in building a sustainable future for the town, but they may not be available for many years. Up to $150,000 can be awarded to invest in projects that meet certain guidelines pertaining to energy efficiency and conservation measures within a municipality, such as solar panels on schools, street light replacements, or education programs to help reduce residential and commercial electricity usage.

The group ICLEI, local governments for sustainability, has been assisting its member towns to improve their energy efficiency and reduce emission for some years now, and has recently begun working with communities to plan for local adaptation to climate change. The town may
want to consider membership in ICLEI, which will allow access to several planning tools and advanced assistance in developing a sustainable and resilient future.

*Ludlow working together*

Ludlow has taken the first steps in working towards a green future. While budgetary constraints and the changing economy may thwart some of this progress, there are ample opportunities to obtain funding and grant opportunities through state and federal programs, if Ludlow decides to take the initiative. Leadership by the newly formed energy committee in partnership with town government will be a big part of the driving force in being competitive for these grants. However, the deciding factor in the future sustainability of Ludlow will rest upon the residents and community participants to work together in responding to risks posed by changing climate patterns and dependence upon cheap fossil fuels. United, Ludlow can build resilience and create opportunities, while addressing the challenges that may lie ahead.
9.0 Land Use

By examining historic development patterns and applying modern and innovative land use tools, Ludlow can preserve its strong agricultural history while remaining competitive as a thriving New England town.

The town of Ludlow benefits from bountiful natural amenities, significant protected forest and open space, vibrant commercial corridors, concentrated mixed neighborhood development and easy access to transportation networks and job markets. Natural features like the Springfield Reservoir and Minechoag Mountain encouraged early development to concentrate in the southwest corner of the town. Development in the north and east sections of Ludlow was slow to follow. Recent residential growth has begun to change the agricultural character north of the Massachusetts Turnpike and along Route 21 heading northeast into Belchertown, which has experienced a major development boom. Stakeholder interviews have expressed support for more control of Ludlow’s future development. Tools like this Master Plan, the Open Space and Recreation Plan (2006), and the Zoning Bylaws (2008) will help identify and direct future development.

9.1 Historic Inventory

The relatively steep topography of Ludlow’s northeast corner encouraged early settlement of the lowest point in town, the town center. Following construction of bridges over the Chicopee River by 1881, the southwest Jenksville Village surpassed the Town Center District in population and development. Development concentrated around the Ludlow Manufacturing Associates mill and other smaller mill sites that utilized the hydropower resources of the Chicopee River and smaller streams throughout the town. Such density along the waterways allowed large open tracts to be used for farm and pasture lands.
Commercial Activity

As the 19th Century ended, Ludlow manufacturing activity slowed. Industrial activity shifted to the northwest corner of town by the mid-20th Century, following the 1939 construction of Westover Air Force Base in the neighboring town of Chicopee. Commercial activity concentrated along key transportation corridors and the local workforce increasingly shifted to jobs in other towns. The Massachusetts Turnpike was built in 1957 and bisected the town, further separating Jenksville Village from the Town Center, agricultural lands and the open space of the north. The opening of the Center Street interchange (Exit 7) for the Turnpike spurred additional commercial development in the immediate area and extending in all directions along the major roads. The historically dense village core supports a vibrant mix of uses but is threatened by the increasing traffic volume, strip development, and a lack of design standards to preserve the existing scale.

Historic Districts

The Jenksville Village District and the Town Center are both designated on the National Register of Historic Places by the United States National Parks Service (US Department of the Interior, 2009). The designation recognizes the areas as worthy of preservation for their physical representation of town history. Listing on the register comes with publicity on the National Parks Service website and in literature promoting historic places across the country. However, it is up to individual states and municipalities to regulate and protect their historically significant places. Currently, neither Massachusetts nor Ludlow provide any regulations to preserve or enhance the districts through zoning by-laws or design guidelines.

Open Space

Permanently protected open space, like that of Facing Rock Wildlife Management Area, Springfield Reservoir and Minechoag Mountain, totals approximately 3,636 acres or 20 percent of the Town’s 18,000 acres (MassGIS, 2009). Increasing suburbanization in Ludlow and neighboring towns threatens the agricultural and scenic northern areas of Ludlow by disrupting
the scenic viewshed; especially along the major roads through town. Trends in the amount of
developed land in Ludlow over the last four decades are shown in Table 9.1. Data presented in
Appendix 9.1: Issued Building Permits for New Structures, uses Belchertown, Chicopee, Ludlow
and South Hadley as a sampling of the region’s residential building boom of the past decade.
The residential growth of these towns impacts Ludlow because traffic from each travels
through town to access regional transportation networks. The primary traffic corridors are
rapidly being suburbanized thus depleting and hiding the open space of Ludlow. Consensus
from the 2006 Open Space and Recreation plan showed the rural character as very important to
the Town and recommendations in this Plan seek to preserve the landscape through carefully
directed continued development.

### Table 9.1 Trends in Developed Land in Ludlow

<table>
<thead>
<tr>
<th></th>
<th>1971</th>
<th>1985</th>
<th>1999</th>
<th>2005*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undeveloped land</td>
<td>13,936</td>
<td>13,303</td>
<td>12,442</td>
<td>12,840</td>
</tr>
<tr>
<td>Developed land</td>
<td>4,198</td>
<td>4,831</td>
<td>5,691</td>
<td>5,295</td>
</tr>
<tr>
<td>Percent developed</td>
<td>23</td>
<td>27</td>
<td>31</td>
<td>29</td>
</tr>
</tbody>
</table>

* Change is due to significant change in land use classification methodology and does not
  reflect a decrease in developed land or increase in undeveloped land.


### 9.2 Current Land Use

A mosaic of current land uses (based on aerial photo interpretation) is presented in Figure 9.1.
The categorization scheme represented in this map is an aggregation of the more detailed land
use codes used in the 2005 MassGIS classification schema.
Figure 9.1:
Ludlow Land Use 2005

Land Use 2005 LUZ Aggregated Uses
Agriculture Commercial Industrial Forested Residential Institutional Recreation Water

Source: MassGIS, 2005
Today approximately 30 percent of Ludlow’s 18,000 acres have been developed (see Table 9.1 above). Conservation and recreation space covers a total 11,842 acres and agriculture uses 737 acres\(^2\). Table 9.2 below shows the total acreage of Ludlow and a sampling of nearby towns. The individual land uses are reported by percent of total individual town acres, and a regional average for each use is provided. Ludlow’s land use is dominated by Natural Land, with 60.5 percent or 10,972 acres, which is only slightly less than the regional average for Natural Land. Ludlow’s 3,409 acres of Residential land is nearly five percentage points less than the regional sampling average. The amount of land used for Transportation in Ludlow is higher than the regional average primarily because of the Massachusetts Turnpike right-of-way.

### Table 9.2 Land Use by Percent of Town Size

<table>
<thead>
<tr>
<th>Town</th>
<th>Acres</th>
<th>Agriculture</th>
<th>Natural Land</th>
<th>Residential</th>
<th>Commercial</th>
<th>Industrial</th>
<th>Transportation</th>
<th>Other*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belchertown</td>
<td>35,376</td>
<td>7.4</td>
<td>72.1</td>
<td>10.5</td>
<td>0.4</td>
<td>0.3</td>
<td>0.2</td>
<td>9.1</td>
</tr>
<tr>
<td>Granby</td>
<td>17,966</td>
<td>11.8</td>
<td>71.6</td>
<td>10.6</td>
<td>0.7</td>
<td>0.5</td>
<td>0.0</td>
<td>4.7</td>
</tr>
<tr>
<td>Monson</td>
<td>28,633</td>
<td>5.6</td>
<td>82.9</td>
<td>7.5</td>
<td>0.2</td>
<td>0.3</td>
<td>0.2</td>
<td>3.2</td>
</tr>
<tr>
<td>Palmer</td>
<td>20,480</td>
<td>4.4</td>
<td>73.6</td>
<td>11.5</td>
<td>0.8</td>
<td>1.3</td>
<td>0.7</td>
<td>7.7</td>
</tr>
<tr>
<td>South Hadley</td>
<td>11,797</td>
<td>8.2</td>
<td>54.2</td>
<td>23.1</td>
<td>1.0</td>
<td>1.6</td>
<td>0.5</td>
<td>9.1</td>
</tr>
<tr>
<td>Ware</td>
<td>25,580</td>
<td>5.1</td>
<td>67.8</td>
<td>8.3</td>
<td>0.5</td>
<td>0.5</td>
<td>0.2</td>
<td>17.6</td>
</tr>
<tr>
<td>Wilbraham</td>
<td>14,293</td>
<td>4.2</td>
<td>62.9</td>
<td>23.4</td>
<td>1.0</td>
<td>1.2</td>
<td>0.3</td>
<td>6.9</td>
</tr>
<tr>
<td><strong>Ludlow</strong></td>
<td><strong>18,135</strong></td>
<td><strong>4.1</strong></td>
<td><strong>60.5</strong></td>
<td><strong>18.8</strong></td>
<td><strong>0.9</strong></td>
<td><strong>1.4</strong></td>
<td><strong>1.9</strong></td>
<td><strong>12.4</strong></td>
</tr>
<tr>
<td>Average</td>
<td>21,533</td>
<td>6.4</td>
<td>68.2</td>
<td>14.2</td>
<td>0.7</td>
<td>0.9</td>
<td>0.5</td>
<td>8.8</td>
</tr>
</tbody>
</table>

* Other includes: water, open land, recreation land, and mining uses.


Since 2000, the Ludlow Building Commissioner issued building permits for 487 new single-family units and eight multi-family buildings. In the same period nineteen new subdivisions were approved (See Appendix 9.3: Ludlow Subdivision Activity). Residential land use as of 2005 is presented in Table 9.3, Residential Land Use Summary. As of 2005, residential land use

---

\(^2\) Agriculture use is quantified here using the MassGIS (2005) methodology. Using other means of analysis, the amount of agricultural land in Ludlow has been estimated to be approximately 1,400 acres. Despite this discrepancy, the MassGIS data is still a useful standardized dataset that provides a basis for comparison to other towns.
toted just over 3,400 acres with almost 50 percent of that as single family homes on \( \frac{1}{4} \) to \( \frac{1}{2} \) acre lots.

### Table 9.3 Residential Land Use Summary

<table>
<thead>
<tr>
<th></th>
<th>Total Acres</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-Family</td>
<td>59</td>
<td>2</td>
</tr>
<tr>
<td>Single Family</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 1/4 Acre</td>
<td>363</td>
<td>11</td>
</tr>
<tr>
<td>1/4 to 1/2 Acre</td>
<td>1,696</td>
<td>50</td>
</tr>
<tr>
<td>1/2 to 1 Acre</td>
<td>1,277</td>
<td>38</td>
</tr>
<tr>
<td>Greater than 1 Acre</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3,404</td>
<td>100</td>
</tr>
</tbody>
</table>

*Source: MassGIS, Land Use Data, 2005.*

Project-by-project zone changes (26), subdivisions (12), and approval-not-required (ANR) (95) projects dominated town development between 2004 and 2008. In contrast to this fairly brisk pace for residential development, only 41 building permits for new commercial properties have been issued since 2000. Sixty-one (61%) percent of new commercial building happened on only four streets: Center, Carmelinas Circle, East or Holyoke (Building Commissioner, Building Permits 2000 – 2009). Between 2000 and the second quarter of 2009 there were nineteen approved zone changes from Agricultural to either a Residential, Business or Industrial zone.

**Land Use Administration**

The Town of Ludlow has a Representative Town Meeting form of government, so zoning changes require a 2/3 majority vote in town meeting. The Planning Board and Board of Selectman make recommendations on all requests that are brought to vote at the annual or special town meeting. In addition to town meeting votes, a variety of autonomous Boards and enforcement officers are responsible for land use and zoning management (See Appendix 9.2: Regulatory Structure). Inadequate coordination between Boards and officials has proven problematic for zoning bylaw enforcement and land development in the past (Ludlow, 1991).
A review of the zoning map and planning department records indicates that zoning changes are frequently approved through the 2/3 majority vote of the town meeting. However, when zoning changes are proposed without the benefit of a town-wide guiding vision or strategy, the approved changes can dot the landscape and risk lasting problems. Spot Zoning occurs when a single lot or a small part of a neighborhood is granted a zone change different from neighboring property. This typically benefits the interest of the owners of property in the spot zone. This has the negative effect of leading to land uses that are potentially incompatible with existing land uses and the community zoning scheme. The instances of spot zoning in Ludlow are typically for residential upzoning, which allows increased density within a subdivision or development. Rather than granting a special permit or variance for these instances, myriad zone changes lead to an incoherent vision of development in the town and increased intensity of use in peripheral areas of the town. The updated zoning map illustrates a fragmented zoning pattern, creating pockets of inconsistent land use (see Figure 9.2).
Figure 9.2

Ludlow Zoning Districts

Ch. 9 Land Use 195
Zoning Summary

Ludlow is divided into eight zoning districts:

- Agricultural
- Residential A-1, Residential A, Residential B
- Business A, Business B
- Industrial A, Industrial B, Industrial C

The zoning bylaws identify nine zones but there is currently no Industrial B zone in use. An inventory of the land area for each the eight zones is presented in Table 9.4.

Table 9.4 Zoning Inventory

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Acres</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural</td>
<td>12,954</td>
<td>73.7</td>
</tr>
<tr>
<td>Residential</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>2,489</td>
<td>14.2</td>
</tr>
<tr>
<td>A-1</td>
<td>178</td>
<td>1.0</td>
</tr>
<tr>
<td>B</td>
<td>393</td>
<td>2.2</td>
</tr>
<tr>
<td>Business</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>137</td>
<td>0.8</td>
</tr>
<tr>
<td>B</td>
<td>45</td>
<td>0.3</td>
</tr>
<tr>
<td>Industrial</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>432</td>
<td>2.5</td>
</tr>
<tr>
<td>B</td>
<td>-</td>
<td>0.0</td>
</tr>
<tr>
<td>C</td>
<td>894</td>
<td>5.1</td>
</tr>
<tr>
<td>No Zone</td>
<td>55</td>
<td>0.3</td>
</tr>
<tr>
<td>Total</td>
<td>17,577</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Ludlow zoning map, updated by UMass Amherst 20 September 2009 (unofficial map, not approved by Town).

The Agricultural District totals 20.2 square miles, or 74 percent of Ludlow. The existing Agricultural zone serves as a traditional “catch-all” district and allows:

- Traditional agricultural uses,
- Single-family homes by right on a minimum lot size of 40,000 square feet (0.92 acres), and
- Certain businesses by special permit.
The combined Residential zones include 4.78 square miles, or 17 percent of Ludlow. Residential A and A-1 zones are primarily single-family residence zones that:

- Allow a lot size of 15,000 square feet (0.35 acres),
- Allow nursing/convalescent homes, room rental, and accessory livestock by special permit in RA,
- Exclude nursing/convalescent homes, room rental, and accessory livestock from RA-1, and
- Exclude most agricultural uses in both categories.

The 392 acres currently zoned as Residence B are primarily located in the dense southwest portion of town, as well as in multi-family developments in the periphery. The Residence B zone allows:

- Single and two-family structures by right, and
- Multi-family units by special permit.

The Business A and B zones include 0.28 square miles, only 1 percent of Ludlow. Approximately 73% of the business-zoned land is located along the East Street and Central Street Corridors.

Industrial zones account for 2 square miles, or 7.6 percent of the total land, and include the Ludlow Mills site and two other tracts along the Chicopee River. There is currently no Industrial B zone. The 894-acre Industrial C zone is exclusively the Westover Industrial Airpark in the northwest of town.

Ludlow has five overlay districts:

- Water Supply Protection District
- Floodplain District
- Moderate Density Agriculture District
- Aircraft Flight District
- East Street Revitalization Overlay District
These overlay districts are used to modify allowable uses in the underlying zone, but do not change the underlying lot size requirements.

9.3 Future Land Use

Due to Ludlow’s proximity to Springfield, Hartford, Worcester and its location off the Massachusetts Turnpike, the town serves as a traffic corridor to and from neighboring towns and as a residential community where, “the number of workers living [in town is] larger than the number of jobs – indicating that [Ludlow] exports workers to other communities” (PVPC 2009). The proposed redevelopment plan to turn the Ludlow Mills into a mixed-use community is expected to help spark a new economic development wave in town. However, without proactive measures to guide this change and others, the town risks debilitating traffic problems, an inadequate parking system, and potentially unsafe neighborhoods for pedestrians, children and bicyclists.

Development Potential

When considering the future of Ludlow, both residential and commercial/industrial development will be important considerations in order to ensure the town’s vitality. From a land use perspective, however, it is often residential development that has the potential to dramatically change land uses across a wide area and alter residents’ perceptions of town character. Although there is some potential for infill and higher density residential development in the compact central areas of Ludlow, it can be anticipated that most of the residential development pressure will occur in the lower density Agricultural zone. Certainly that has been the historical trend over the past decade, with 73% of the building permits issued for residential development in the outlying areas of town (see Figure 9.3: Ludlow Building Permits 2000 – 2009).
Figure 9.3

Ludlow Building Permits 2000 - 2009

Ludlow Building Permits
Type
- Commercial
- Condominium
- Multi-Family
- Single Family
- Compact Sewered Area
- Protected Open Space

Breakdown by Location and Type

<table>
<thead>
<tr>
<th>Area</th>
<th>Construct Type</th>
<th>No. of Permits</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compact</td>
<td>Res</td>
<td>187</td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td>Comm</td>
<td>24</td>
<td>5%</td>
</tr>
<tr>
<td>Outlying</td>
<td>Res</td>
<td>305</td>
<td>57%</td>
</tr>
<tr>
<td></td>
<td>Comm</td>
<td>17</td>
<td>3%</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>533</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source: Ludlow Building Commissioner, 2009
Unless strong zoning is enacted, the main recipient of residential development will be the lands in the Agricultural zone that have not been permanently protected. The spatial distribution of this potential developable land is depicted in Figure 9.4: Ludlow Residential Development Potential, and is shown in more detail in Table 9.5. After deducting land that would be undevelopable due to physical constraints or lost to infrastructure requirements and geometric inefficiencies during subdivision, the net developable area would be approximately 3,400 acres. At maximum build-out and the current minimum lot size of 40,000 square feet, this would represent more than 3,500 new housing units.

**Table 9.5 Residential Development Potential in Agricultural Zone**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Total Land (ac)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unprotected Agricultural Parcels &gt;3 acres</td>
<td>5,555</td>
</tr>
<tr>
<td>Development Constraints:</td>
<td></td>
</tr>
<tr>
<td>Wetlands + 25 Foot No-Disturb Zone</td>
<td>(1,398)</td>
</tr>
<tr>
<td>&gt;25% Steep Slopes</td>
<td>(196)</td>
</tr>
<tr>
<td>Gross Developable Area</td>
<td>3,961</td>
</tr>
<tr>
<td>15% Allowance for new roads, lot creation inefficiency</td>
<td>(594)</td>
</tr>
<tr>
<td>Net Developable Area</td>
<td>3,367</td>
</tr>
</tbody>
</table>

*Source: Town of Ludlow, Assessor.*

The map shown in Figure 9.4: Ludlow Residential Development Potential, also distinguishes between lots categorized in the Assessor’s records as developable or potentially developable (i.e., that have no current structures), and those that may currently contain a structure but are also large enough for potential subdivision in the future. One item of note is that although the bulk of the potential building lots would be accessed via formal subdivision processes and new roads, there is also a potential for significant additional lot creation through the Approval-Not-Required (ANR) process along existing town roads. While lesser in total number, the creation of ANR lots has the potential to rapidly change perceptions of town character when they occur along scenic roads and in areas of town that are currently lightly developed.
Ludlow Residential Development Potential

- **Protected Open Space**
- **Vacant Developable Parcels**
- **Subdividable Parcels > 2.5 ac**

UMass Department of Landscape Architecture and Regional Planning
Source: Ludlow Assessor’s Office; MassGIS, 2009
Land Use Summary

Many of the Town’s priorities and concerns regarding its future form are ultimately expressed as land use policy choices. While this is not all-encompassing of every possible community issue, land use choices are some of the most visible and readily understood by the citizenry. Since land use represents a natural center of attention for voters, any plans should attempt to incorporate and synthesize as many of the important town planning issues as possible. The following sections attempt to identify and summarize some of the themes and areas of interest that will need to be explored in more detail as the Master Plan process moves toward implementation.

Community Strengths

One of Ludlow’s main strengths is the diversity of its resources, both physical and human. From a natural resources standpoint, Ludlow contains a variety of different habitats and land types that provide functional ecosystem services to the town; for example, the flood control function provided by the dispersed system of wetlands and open spaces. However, there also exists 1,445 acres identified by FEMA as floodplain lands which require continued development restrictions (PVPC, Natural Hazard Mitigation Plan) This diversity of natural resources also provides many elements of visual interest and recreational opportunities.

Although not racially diverse, Ludlow’s population has a substantial range of socioeconomic backgrounds. Although sometimes described as a “bedroom community” due to the high proportion of people employed outside the town’s border, Ludlow also maintains a strong sense of community through its various cultural, social and sporting organizations. This dedication to creating a functional, safe, and attractive community will serve the town well as it attempts to identify and implement a path forward. One tool offered by the state to help support the type of community already present in Ludlow is the optional Smart Growth Zoning Overlay District, commonly known as 40R Workforce Housing (Commonwealth, 2009). The program incentivizes dense mixed-use development to help meet the required 10 percent affordability of housing stock. The Ludlow Mills site is currently under consideration for the
optional zone. Other sites currently served by municipal sewer and water may also prove viable options for additional density in housing options.

**Challenges**

The fundamental challenge facing the town, as with most communities, is how to allocate limited resources. For example, how should the town prioritize between increasing the tax base, providing recreational opportunities, and protecting natural resources if each of these interests is competing for the limited resource of undeveloped land? The goal of the Master Plan is to establish some prioritization and guideposts for the town to follow as it moves forward.

An additional challenge for implementation of any identified strategies will be the decentralized nature of the town government. With the current form of town government, an additional level of effort is required in order to maintain a consistent vision of the town’s direction among the many independent elected boards. This does not imply that it can’t be done with the current governmental form, just that it requires a concerted effort to coordinate among boards and stay “on message”.

**Recommendations**

When considering the identification and implementation of land use policy choices, it will probably be most useful to identify the goals and strategies appropriate in discrete areas of town, as opposed to an overall vision of the town’s future. Specifically, the results of this study, thus far, suggest four distinct areas as potential focus areas: 1) The upper reaches of the West, Munsing and Lyon Streets area; 2) the Minechoag Mountain area; 3) the remainder of the current Agricultural zoning district; and 4) the compact “downtown” area.
These four areas can be considered to be representative of a cross-section of the planning issues faced by the town. Specific issues that were identified in each of the four areas, along with recommendations for potential responses are listed below:

**West St./Munsing St./Lyon St.:**

**Issues:**
- Retention of agricultural lands
- Maintenance of visual elements/town character
- Public recreation access

**Recommendations:**
- Consider whether political will exists for downzoning to lower density, higher frontage requirements,
- Consider establishment of a capital reserve fund for acquisition of lands being removed from the Chapter 61 program or purchase of Agricultural Preservation Restrictions (APRs),
- Examine possibilities for establishing a wildlife corridor through this area to connect Westover Conservation Area with Facing Rock WMA,
- Evaluate alternative mechanisms for encouraging and retaining agricultural uses, and
- Consider creating new public access points to protected lands.

**Minechoag Mt.:**

**Issues:**
- Public recreation
- Preservation of unfragmented land/wildlife habitat

**Recommendations:**
- This area is currently ringed by residential development, which is likely to increase in the future. Consider ways to provide an open wildlife corridor, possibly to link with power line right of way northwest of the mountain, and
• Consider mechanisms to encourage open space/conservation subdivision designs that would maintain more open space on the mountain side, thus providing more undeveloped habitat and recreational area contiguous with Ludlow State Forest.

**Remainder of Agricultural District:**

**Issues:**

• Consistency of vision for desired development
• Maintenance of housing affordability for Ludlow workforce
• Adequacy of commercial- and industrially-zoned land

**Recommendations:**

• In the past, the town has repeatedly shown a willingness to upzone specific projects to higher residential density. Consider consistently applying what is decided to be the most appropriate density for this zone.

• Perhaps establish new zones or overlays that would provide more opportunity (higher density) for workforce and elderly housing.

• Consider mechanisms for encouraging open space/conservation subdivision designs that limit proliferation of impervious area.

• Consider whether there is a need for additional industrially zoned land.

**Downtown:**

**Issues:**

• Encouragement of commercial activity
• Maintenance of housing affordability for Ludlow workforce
• Adequacy of commercially- and industrially-zoned land
Recommendations:

- Consider whether there is a need for more commercially zoned areas,
- Reconsider the parking system as a whole for better utilization, marking and signage improvements.
- Consider historic district preservation regulations and design standards,
- Consider establishing a higher residential density/mixed-use, perhaps in a 40R overlay district, and
- Consider opportunities for recreational open space in close proximity to population centers.

9.4 Conclusion

For over twenty years Ludlow has seen increasing traffic moving through town to surrounding communities and accessing the Center Street Exit 7 interchange for the Massachusetts Turnpike. As redevelopment plans for the Ludlow Mill site add residential and business units, and additional growth happens in the northern portions of town, the Town will need to calm traffic, increase walkability and provide safe shared routes for bicyclists while capitalizing on its cross-roads location. The town serves as an important corridor; this presents an opportunity to encourage people to enjoy the neighborhoods with vibrant restaurants and retail, or visit the rich recreational lands and beautiful forests of Ludlow.

The information presented in this report is intended to provide a solid base upon which a Master Plan can be built. Through its engagement with the Master Plan update process, the Town will have the opportunity to clarify and elaborate upon its desires for the future. Once the Master Plan update is complete, the Town will have a valuable framework to guide the prioritization and implementation of the steps required to achieve these goals.
APPENDICES
APPENDIX 1

INTRODUCTION
Appendix 1.1 References


Stakeholder Interviews (conducted in June 2009).
[http://www.ludlowmp.org/docs/comments_master_doc.pdf](http://www.ludlowmp.org/docs/comments_master_doc.pdf) and


APPENDIX 2

HOUSING
## Appendix 2.1

**Percentage Household Income Spent on Housing Costs by Income Group**  (US Census 2000)

<table>
<thead>
<tr>
<th>Household Income</th>
<th>Households with Cost Data</th>
<th>Housing Costs as a Percentage of Household Income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less than 20%</td>
<td>20-24.9%</td>
</tr>
<tr>
<td><strong>Homeowners</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than $10,000</td>
<td>202</td>
<td>0</td>
</tr>
<tr>
<td>$10,000-19,999</td>
<td>440</td>
<td>20%</td>
</tr>
<tr>
<td>$20,000-34,999</td>
<td>873</td>
<td>53%</td>
</tr>
<tr>
<td>$35,000-49,999</td>
<td>715</td>
<td>45%</td>
</tr>
<tr>
<td>$50,000-74,999</td>
<td>1,474</td>
<td>60%</td>
</tr>
<tr>
<td>$75,000-99,999</td>
<td>869</td>
<td>82%</td>
</tr>
<tr>
<td>$100,000-149,999</td>
<td>511</td>
<td>90%</td>
</tr>
<tr>
<td>$150,000 or more</td>
<td>155</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Total Homeowners</strong></td>
<td>5,239</td>
<td>3,090 (59%)</td>
</tr>
</tbody>
</table>

| **Renters**      |              |          |          |          |             |               |
| Less than $10,000| 227          | 0%       | 0%       | 5%       | 13%         | 56% 26%       |
| $10,000-19,999   | 376          | 3%       | 15%      | 0%       | 14%         | 64% 4%        |
| $20,000-34,999   | 332          | 16%      | 29%      | 18%      | 11%         | 13% 13%       |
| $35,000-49,999   | 376          | 52%      | 26%      | 13%      | 5%          | 0% 4%         |
| $50,000-74,999   | 274          | 95%      | 5%       | 0%       | 0%          | 0% 0%         |
| $75,000-99,999   | 75           | 100%     | 0%       | 0%       | 0%          | 0% 0%         |
| $100,000 or more | 19           | 100%     | 0%       | 0%       | 0%          | 0% 0%         |
| **Total Renters**| 1,679        | 614 (37%)| 268 (16%)| 119 (7%) | 134 (8%)    | 368 (22%)     | 176 (10%)     |
APPENDIX 3

Natural Resources and Watershed Protection
Appendix 3.1

Excerpted from the 2008 Massachusetts Integrated List of Waters (2008)

Integrated List categories 1-3 include those waters that are either unimpaired or unassessed with respect to their attainment of designated uses. Often insufficient data and information exist to assess all designated uses of any particular waterbody or segment. Furthermore, no Massachusetts waters are listed in Category 1 because a statewide Department of Public Health advisory pertaining to the consumption of fish precludes any waters from being in full support of the fish consumption use (see Fish Consumption Advisories later in this section). Waters listed in Category 2 were found to support the uses for which they were assessed, but other uses were unassessed. Finally, Category 3 contains those waters for which insufficient or no information was available to assess any uses. Waters for which assessments were determined to be insufficient for 303(d) listing were also included in Category 3. A small number of unimpaired or unassessed waters have TMDLs associated with them. Unlike the much larger number of “restorative” TMDLs developed for impaired waters, these “protective “ TMDLs were developed as planning tools to prevent water pollution problems in the future. Protective TMDLs are not cited in categories 2 and 3 of the Integrated List, but they do appear in Appendix 1 where all segments governed by TMDLs are listed.

Waters exhibiting impairment for one or more uses are placed in either Category 4 (impaired but not requiring TMDLs) or Category 5 (impaired and requiring one or more TMDLs) according to the EPA guidance. Category 4 is further divided into three sub-categories – 4a, 4b and 4c – depending upon the reason that TMDLs are not needed. Category 4a includes waters for which the required TMDL(s) have already been completed and approved by the EPA. However, since MassDEP chooses to list each segment in only one category, waters that have an approved TMDL for some pollutants but not others remain in Category 5 until TMDLs are approved for all of the pollutants. A list of all of the TMDLs approved by the EPA is provided in the table below. The complete report citations are presented in the Bibliography. Reference is made to the
Control Numbers (CN) of the applicable TMDL documents in the body of the Integrated List as well as in Appendix 1.

Category 4b was proposed by the EPA to list waters for which other pollution control requirements are expected to attain all designated uses through pollution control measures other than TMDLs. Massachusetts’ attempt to use this category in 2004 to list lakes and ponds impaired solely by mercury deriving from atmospheric deposition was disapproved by the EPA (see Fish Consumption Advisories later in this section). Massachusetts is not including any waters in Category 4b for the 2008 listing cycle.

The CWA distinguishes between “pollutants” such as nutrients, metals, pesticides, solids and pathogens that all require TMDLs and “pollution” such as low flow, habitat alterations or non-native species infestations that do not require TMDLs. Waterbodies impaired by “pollution” were included in Category 4c. The restoration of these waters will require measures other than TMDL development and implementation. Non-pollutant stressors are marked with an asterisk in the Integrated List to distinguish them from pollutants requiring TMDLs.

**List Category 5 – The 303(d) List of Impaired Waters**

While the EPA guidance provides the overall framework for a five-part list of waters, the development, submittal, and review of Category 5 remains subject to the prevailing regulation governing the implementation of Section 303(d) of the CWA. This regulation requires states to identify and list those waterbodies that are not expected to meet surface water quality standards after the implementation of technology-based controls and, as such, require the development of TMDLs. States must include on the lists the specific cause(s) of the impairment (if known). Finally, guidance pertaining to Section 303(d) is clear with respect to the removal of waterbodies from the list. Waterbodies or applicable segments thereof can be removed when a TMDL is approved by the EPA for that waterbody or segment (note that these waters are now listed in Category 4a until it is determined that they are no longer impaired). In addition, there are some instances when a previously listed waterbody can be removed from the 303(d) List without calculating a TMDL. These are: 1) when a new assessment reveals that the waterbody is...
now meeting all applicable water quality standards or is expected to meet those standards in a reasonable timeframe as the result of implementation of required pollution controls; and 2) when, upon re-examination, the original basis for listing is determined to be flawed.
Appendix 3.2

“Bedrock Lithology A” (map) indicates dominant rock groups in the region. Rock Group A consists of seven major lithological categories, three of which are present in Ludlow (MassGIS). Rock Group A can be subdivided into more specific lithologies, shown in “Bedrock Lithology B” (map). There are eighteen lithological categories for Rock Group B.
The table below shows the seven major (A) and minor (B) rock groups (MassGIS).

<table>
<thead>
<tr>
<th>Rock group A value</th>
<th>Rock group B values</th>
</tr>
</thead>
<tbody>
<tr>
<td>basin sedimentary</td>
<td>Mesozoic Basin sediments, Narragansett Basin sediments</td>
</tr>
<tr>
<td>calcpelite</td>
<td>calcpelite</td>
</tr>
<tr>
<td>carbonate rocks</td>
<td>carbonate rocks</td>
</tr>
<tr>
<td>granite</td>
<td>Avalon Granite, alkali granite, granite (other), Grenville granite, peraluminous granite, felsic volcanics</td>
</tr>
<tr>
<td>mafic rocks</td>
<td>basalt, mafic rocks, ultramafic rocks</td>
</tr>
<tr>
<td>metamorphic rocks</td>
<td>calcgranofels, pelitic rocks, sulfidic schists, metamorphic rocks (other)</td>
</tr>
<tr>
<td>unconsolidated sediments</td>
<td>unconsolidated sediments</td>
</tr>
<tr>
<td>water</td>
<td>water</td>
</tr>
</tbody>
</table>
Appendix 3.3 References


Arbor Day Foundation. (2009). Tree City USA


Department of Natural Resources Conservation, University of Massachusetts. (2009).


Community Guide: Urban and Community Forestry
Massachusetts Department of Conservation and Recreation.
Massachusetts Department of Agricultural Resources (2009).
http://www.mass.gov/agr/massgrown/

http://www.massaudubon.org/PDF/Grassland/grassfinalrep.pdf


Boston, MA: Massachusetts Historical Commission.


Retrieved from
www.ludlowmp.org/docs/Ludlow%20Open%20Space%20Plan_FINAL.pdf

Secretary of the Commonwealth: Citizen Information Service


www.sweethomesinc.com
APPENDIX 4

Cultural and Historic Resources
## Appendix 4.1 - National Register of Historic Places 1988 application, Ludlow Center, map and data sheet

<table>
<thead>
<tr>
<th>Historic Name</th>
<th>Map #</th>
<th>MHC #</th>
<th>Address</th>
<th>Type of Resource</th>
<th>Style</th>
<th>Status</th>
<th>Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuller Cemetery</td>
<td>13</td>
<td>805</td>
<td>Center Street</td>
<td>SI</td>
<td>1801</td>
<td>C</td>
<td>1982</td>
<td>N/C</td>
</tr>
<tr>
<td>First Church Common</td>
<td>14</td>
<td>1</td>
<td>859 Center Street</td>
<td>SI</td>
<td>1867</td>
<td>C</td>
<td>c.1842 C</td>
<td>N/C</td>
</tr>
<tr>
<td>Civil War Monument</td>
<td>14A</td>
<td>230</td>
<td>Center &amp; Church St.</td>
<td>SI</td>
<td>1912</td>
<td>C</td>
<td>c.1867</td>
<td>N/C</td>
</tr>
<tr>
<td>Road Monument</td>
<td>14A</td>
<td>901</td>
<td>First Church Common</td>
<td>SI</td>
<td>1783–84 C</td>
<td>C</td>
<td>1783–84 C</td>
<td>B</td>
</tr>
<tr>
<td>Center Monument</td>
<td>14A</td>
<td>902</td>
<td>First Church Common</td>
<td>SI</td>
<td>1844</td>
<td>C</td>
<td>1844 C</td>
<td>B</td>
</tr>
<tr>
<td>First Meeting House</td>
<td>14A</td>
<td>903</td>
<td>First Church Common</td>
<td>SI</td>
<td>1865</td>
<td>C</td>
<td>c.1844 C</td>
<td>B</td>
</tr>
<tr>
<td>Increase Sikes House</td>
<td>104</td>
<td>2</td>
<td>Church Street</td>
<td>SI</td>
<td>1875</td>
<td>C</td>
<td>c.1875</td>
<td>B</td>
</tr>
<tr>
<td>Fuller Trucking &amp; Asphalt</td>
<td>106</td>
<td>4</td>
<td>Center Street</td>
<td>SI</td>
<td>1866</td>
<td>C</td>
<td>c.1866</td>
<td>B</td>
</tr>
<tr>
<td>Old Parsonage</td>
<td>6</td>
<td>5</td>
<td>Center Street</td>
<td>SI</td>
<td>1974</td>
<td>C</td>
<td>c.1974 N/C</td>
<td>B</td>
</tr>
<tr>
<td>Lyon House</td>
<td>7</td>
<td>5</td>
<td>Center Street</td>
<td>SI</td>
<td>1935</td>
<td>C</td>
<td>c.1935 N/C</td>
<td>B</td>
</tr>
<tr>
<td>Barn</td>
<td>8</td>
<td>47</td>
<td>Center Street</td>
<td>SI</td>
<td>1865</td>
<td>C</td>
<td>c.1865</td>
<td>B</td>
</tr>
<tr>
<td>Barn</td>
<td>106A</td>
<td>6</td>
<td>Center Post Office</td>
<td>SI</td>
<td>The Chapel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Garage</td>
<td>107</td>
<td>3</td>
<td>Center Street</td>
<td>SI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### District Data Sheet

**Ludlow Village Historic District, Ludlow, Massachusetts**

<table>
<thead>
<tr>
<th>Street Address</th>
<th>Map #</th>
<th>MHC #</th>
<th>Historic Name</th>
<th>Const. Date</th>
<th>Style</th>
<th>Resource Type</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 Center St.</td>
<td>33-36</td>
<td>15</td>
<td>Hubbard Memorial Library</td>
<td>1888; 1990</td>
<td>Romanesque</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>33 Center St.</td>
<td>5</td>
<td></td>
<td>Ludlow Savings Bank</td>
<td>1948</td>
<td>Colonial Revival</td>
<td>B</td>
<td>NC</td>
</tr>
<tr>
<td>44 Center St.</td>
<td>32</td>
<td></td>
<td>Residence</td>
<td>1919-1931</td>
<td>Colonial Revival</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>53 Center St.</td>
<td>8</td>
<td>17</td>
<td>Union Church of Christ</td>
<td>1845, 1904, 1961</td>
<td>Greek Revival</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>14 Chestnut Place</td>
<td>53-55</td>
<td></td>
<td>Ludlow Hospital</td>
<td>1962-1974</td>
<td>Utilitarian</td>
<td>B</td>
<td>NC</td>
</tr>
<tr>
<td>12 Chestnut St.</td>
<td>49</td>
<td>9</td>
<td>Stevens Memorial Building (&quot;The Rect&quot;)</td>
<td>1906</td>
<td>Second Renaissance Revival</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>30-34 Chestnut St.</td>
<td>51</td>
<td>10</td>
<td>Gowen &amp; Trombly Building</td>
<td>1907-10</td>
<td>Victorian Commercial</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>37-39 Chestnut St.</td>
<td>27</td>
<td>11</td>
<td>Ludlow High School (Senior Center)</td>
<td>1910; 1926; 1930</td>
<td>Second Renaissance Revival</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>63 Chestnut St.</td>
<td>26/27B</td>
<td>13</td>
<td>Grammar School (S. Adelaide Cole Building)</td>
<td>1901-02</td>
<td>Romanesque</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>East St.</td>
<td>46</td>
<td></td>
<td>Memorial Park</td>
<td>est. c.1910</td>
<td></td>
<td>Site</td>
<td>C</td>
</tr>
<tr>
<td>61-85 East St.</td>
<td>47</td>
<td>8</td>
<td>Old Post Office Building (Parkside East)</td>
<td>1901</td>
<td>Second Renaissance Revival</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>13 Park Place</td>
<td>37</td>
<td></td>
<td>Residence</td>
<td>c.1906</td>
<td>Queen Anne</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>25 Park Place</td>
<td>38</td>
<td>74</td>
<td>Residence</td>
<td>c.1906</td>
<td>Dutch Colonial Revival</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>39 Park Place</td>
<td>42</td>
<td></td>
<td>Residence</td>
<td>1906</td>
<td>Queen Anne</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>45 Park Place</td>
<td>43</td>
<td></td>
<td>Residence</td>
<td>1906</td>
<td>Colonial Revival</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>51 Park Place</td>
<td>44</td>
<td></td>
<td>Residence</td>
<td>1906</td>
<td>Dutch Colonial Revival</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>13 Park Terrace</td>
<td>40</td>
<td>73</td>
<td>Residence, garage &amp; apartment</td>
<td>1906-1911 modern</td>
<td>Dutch Colonial Revival</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>20 Park Terrace</td>
<td>39</td>
<td>75</td>
<td>Residence</td>
<td>pre-1911</td>
<td>Queen Anne</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>21 Park Terrace</td>
<td>41</td>
<td></td>
<td>Residence</td>
<td>1919-1931</td>
<td>Colonial Revival</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>State St.</td>
<td>(130)</td>
<td>7</td>
<td>Ludlow Mfg. Associates: Mill #8</td>
<td>1901; 1906</td>
<td>Romanesque Industrial</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>State St.</td>
<td></td>
<td></td>
<td>Mill #9</td>
<td>1905</td>
<td>Load-bearing brick industrial</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>State St.</td>
<td></td>
<td></td>
<td>Mill #10</td>
<td>1907-08</td>
<td>&quot;</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>State St.</td>
<td></td>
<td></td>
<td>Mill #11</td>
<td>1912</td>
<td>&quot;</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>State St.</td>
<td></td>
<td></td>
<td>Mill #11 Warehouse</td>
<td>1914</td>
<td>&quot;</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>State St.</td>
<td></td>
<td></td>
<td>Locomotive House</td>
<td>early 20th c.</td>
<td>&quot;</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>State St.</td>
<td></td>
<td></td>
<td>Warehouse (#286-291)</td>
<td>early 20th c.</td>
<td>&quot;</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>State St.</td>
<td></td>
<td></td>
<td>Warehouse (#292-296)</td>
<td>early 20th c.</td>
<td>&quot;</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>State St.</td>
<td></td>
<td></td>
<td>Carpenter Shop</td>
<td>early 20th c.</td>
<td>&quot;</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Street Address</td>
<td>Map #</td>
<td>MHC #</td>
<td>Historic Name</td>
<td>Const. Date</td>
<td>Style</td>
<td>Resource Type</td>
<td>Status</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------</td>
<td>-------</td>
<td>--------------------------------</td>
<td>-------------</td>
<td>--------------------</td>
<td>---------------</td>
<td>--------</td>
</tr>
<tr>
<td>State St.</td>
<td>(130)</td>
<td></td>
<td>46 one-story storehouses</td>
<td>early 20th c.</td>
<td>&quot;</td>
<td>46 B's</td>
<td>C</td>
</tr>
<tr>
<td>State St.</td>
<td></td>
<td></td>
<td>Freezer</td>
<td>modern</td>
<td>No style</td>
<td>B</td>
<td>NC</td>
</tr>
<tr>
<td>7 Winsor St.</td>
<td>12</td>
<td></td>
<td>Residence garage</td>
<td>1917</td>
<td>Dutch Colonial Revival</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Winsor St.</td>
<td>13</td>
<td></td>
<td>Right of Way</td>
<td></td>
<td></td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>10 Winsor St.</td>
<td>31</td>
<td></td>
<td>Residence</td>
<td>1919-1931</td>
<td>Colonial Revival</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>18 Winsor St.</td>
<td>30</td>
<td></td>
<td>Residence</td>
<td>1906-1911</td>
<td>Colonial Revival</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>19 Winsor St.</td>
<td>14</td>
<td></td>
<td>Residence</td>
<td>1914</td>
<td>Four-square</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>26 Winsor St.</td>
<td>29</td>
<td>157</td>
<td>Residence</td>
<td>1911-1919</td>
<td>Dutch Colonial Revival</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>27 Winsor St.</td>
<td>15</td>
<td></td>
<td>Residence</td>
<td>1920</td>
<td>Dutch Colonial Revival</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>35 Winsor St.</td>
<td>16</td>
<td></td>
<td>Residence garage</td>
<td>1939</td>
<td>No style</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>38 Winsor St.</td>
<td>28</td>
<td>16</td>
<td>Residence</td>
<td>1906</td>
<td>Queen Anne</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>43 Winsor St.</td>
<td>17</td>
<td></td>
<td>Residence</td>
<td>1939</td>
<td>Colonial Revival</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>47 Winsor St.</td>
<td>18</td>
<td></td>
<td>Residence</td>
<td>1920</td>
<td>Colonial Revival</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>53 Winsor St.</td>
<td>19</td>
<td>158</td>
<td>Residence garage</td>
<td>c.1920</td>
<td>Colonial Revival</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>54 Winsor St.</td>
<td>27A</td>
<td>14</td>
<td>Primary School (Children's Language Inst.)</td>
<td>1906</td>
<td>Romanesque</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>59 Winsor St.</td>
<td>20</td>
<td></td>
<td>Masonic Lodge</td>
<td>1892</td>
<td>No style - altered</td>
<td>B</td>
<td>NC</td>
</tr>
<tr>
<td>Winsor St.</td>
<td>25</td>
<td></td>
<td>Memorial Field</td>
<td>est. c.1906</td>
<td>Site</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Town of Wilbraham) Red Bridge Road</td>
<td>30, 41A, 42 (Wilb.) 906</td>
<td></td>
<td>Red Bridge Power Station gatehouse dam power canal</td>
<td>1901</td>
<td>Romanesque industrial</td>
<td>Str.</td>
<td>C</td>
</tr>
</tbody>
</table>
Appendix 4.3 References and Sources

Barosso, Jason, Town of Ludlow Master Plan Committee, personal communication, September 2009
Chapin, Israel, 1794, historic Ludlow map, in the Hubbard Library collection, Ludlow MA
Kibbe, Betty, Ludlow Historic Commission, personal communication, September 2009
Minnie, Ed, local landowner, Planning Board member, personal communication, September 2009
Parson, Bonnie, Pioneer Valley Planning, personal communication, September 2009
Stefancik, Doug, 2009, Ludlow Town Planner, personal communication, September 2009
Walling, Henry F., 1857, historic Ludlow map, Pilon, K., 1999, *Ludlow*
White, Olin, 1912, historic Ludlow map in the Hubbard Library collection, Ludlow MA
APPENDIX 5

Parks, Recreation and Protected Open Space
Appendix 5.1 References


Gates, Debbie (administrative assistant to the Ludlow Recreation Committee), interview by Barbara Constable, Massachusetts, September 16, 2009

Ho, Chinghua, Laura Payne, Elizabeth Orsega-Smith and Geoffrey Godbey, “Parks, recreation and public health: parks and recreation improve the physical and mental health of our nation—research update.” *Parks & Recreation*, April 2003


Massachusetts Graphic Information System (MassGIS), Protected and Recreational Open Space, http://www.mass.gov/mgis/osp.htm, [accessed October 9, 2009]


Town of Ludlow: Open Space and Recreation Plan. (Spring 2006).


APPENDIX 6

Services and Facilities
Appendix 6.1: References

Alejandro, Edgar. WMECO, Ludlow Master Plan Committee, phone conversation. September 24, 2009

Babineau, Mark H. “Study to determine if growth and development that the Town of Ludlow has experienced is negatively impacting the Ludlow Fire Department’s ability to deliver timely emergency services”. Dec. 4, 2008

Gaudreau, Jim. Ludlow Department of Public Works, interview. October 9, 2009.

Harrington, Chip. “Master Plan Committee, Town School Committee, and Town Energy Committee” Interview, October 1, 2009


Pederson, Kathy. Springfield Water and Sewer Commission. # of Ludlow public water customers. Email, October 13, 2009


Appendix 6.2: Map of Average Response Time Approximate Coverage Area
APPENDIX 7

Transportation
APPENDIX 8

Energy and Sustainability
Appendix 8.1: References

Alejandro, Edgar. WMECO, Ludlow Master Plan Committee, phone conversation. September 24, 2009

Babineau, Mark H. “Study to determine if growth and development that the Town of Ludlow has experienced is negatively impacting the Ludlow Fire Department’s ability to deliver timely emergency services”. Dec. 4, 2008

Gaudreau, Jim. Ludlow Department of Public Works, interview. October 9, 2009.

Harrington, Chip. “Master Plan Committee, Town School Committee, and Town Energy Committee” Interview, October 1, 2009


Pederson, Kathy. Springfield Water and Sewer Commission. # of Ludlow public water customers. Email, October 13, 2009


APPENDIX 9

Land Use
## Appendix 9.1: Issued Building Permits for New Structures

<table>
<thead>
<tr>
<th></th>
<th>Belchertown</th>
<th>Chicopee</th>
<th>Ludlow</th>
<th>South Hadley</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2001</strong></td>
<td>Total Units</td>
<td>99</td>
<td>56</td>
<td>71</td>
</tr>
<tr>
<td></td>
<td>Single-Family Structures</td>
<td>97</td>
<td>42</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>All Multi-Family Structures</td>
<td>2</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2-Unit</td>
<td>2</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3- and 4-Unit</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>5+ Unit</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>2002</strong></td>
<td>Total Units</td>
<td>96</td>
<td>73</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>Single-Family Structures</td>
<td>94</td>
<td>47</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>All Multi-Family Structures</td>
<td>2</td>
<td>26</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>2-Unit</td>
<td>2</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3- and 4-Unit</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>5+ Unit</td>
<td>0</td>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td><strong>2003</strong></td>
<td>Total Units</td>
<td>123</td>
<td>43</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>Single-Family Structures</td>
<td>107</td>
<td>33</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td>All Multi-Family Structures</td>
<td>16</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2-Unit</td>
<td>16</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3- and 4-Unit</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>5+ Unit</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>2004</strong></td>
<td>Total Units</td>
<td>114</td>
<td>66</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>Single-Family Structures</td>
<td>114</td>
<td>38</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>All Multi-Family Structures</td>
<td>0</td>
<td>28</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2-Unit</td>
<td>0</td>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3- and 4-Unit</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>5+ Unit</td>
<td>0</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td><strong>2005</strong></td>
<td>Total Units</td>
<td>93</td>
<td>60</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>Single-Family Structures</td>
<td>93</td>
<td>39</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td>All Multi-Family Structures</td>
<td>0</td>
<td>21</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2-Unit</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3- and 4-Unit</td>
<td>0</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>5+ Unit</td>
<td>0</td>
<td>12</td>
<td>0</td>
</tr>
</tbody>
</table>
### Ludlow Master Plan – Inventory & Assessment

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Units</td>
<td>68</td>
<td>43</td>
<td>143</td>
<td>32</td>
</tr>
<tr>
<td>Single-Family Structures</td>
<td>68</td>
<td>31</td>
<td>53</td>
<td>32</td>
</tr>
<tr>
<td>All Multi-Family Structures</td>
<td>0</td>
<td>12</td>
<td>90</td>
<td>0</td>
</tr>
<tr>
<td>2-Unit</td>
<td>0</td>
<td>8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3- and 4-Unit</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5+ Unit</td>
<td>0</td>
<td>0</td>
<td>90</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Units</td>
<td>59</td>
<td>80</td>
<td>61</td>
<td>23</td>
</tr>
<tr>
<td>Single-Family Structures</td>
<td>59</td>
<td>64</td>
<td>50</td>
<td>23</td>
</tr>
<tr>
<td>All Multi-Family Structures</td>
<td>0</td>
<td>16</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>2-Unit</td>
<td>0</td>
<td>16</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3- and 4-Unit</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5+ Unit</td>
<td>0</td>
<td>0</td>
<td>11</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Units</td>
<td>18</td>
<td>11</td>
</tr>
<tr>
<td>Single-Family Structures</td>
<td>18</td>
<td>11</td>
</tr>
<tr>
<td>All Multi-Family Structures</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2-Unit</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3- and 4-Unit</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5+ Unit</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Appendix 9.2: Regulatory Structure

In 2007, the Town hired its first Town Planner. By creating this position, the Town took an important step toward proactive growth management rather then the reactive development process that dominated land use decisions in the past. One year later a two-thirds majority supported changing Town administration to a mayoral form of government. The non-binding referendum was defeated in a Charter commission proposal (Town Report 2008.)

Board of Selectman
The five-person elected Board of Selectman is responsible for overseeing the administration of town affairs. The Board of Appeals and Conversation Commission report to the Board of Selectman; and the Town Administrator, acting as the primary agent for the Board, is responsible for the implementation of policy directives and guidelines adopted by the Board of Selectman (Select Board 2008.)

Board of Appeals
The five regular members and two alternate members are volunteers appointed by the Board of Selectmen. The Board of Appeals is charged with hearing appeals or petitions for variances according to Massachusetts General Law, Chapter 40A, and the Town of Ludlow’s Zoning Bylaws (Town Report 2008.)

Conservation Commission
The Conservation Commission is a state mandated volunteer board, appointed by the Board of Selectmen. The Conservation Commission works on the Town’s behalf in administering the Massachusetts Wetlands Protection Act (M.G.L. Chapter 131, § 40), the Massachusetts Rivers Protection Act, and the Town’s Conservation Commission Bylaws (Chapter XV) (Town Report 2008.)
Planning Board

The five person elected Planning Board works for the general welfare of the Town, to protect the health of its inhabitants, to encourage the most appropriate use of land within the Town, to increase the amenities of the Town, and to provide an adequate supply of light and air and reduce the hazard from fire by regulating the location, use and height of buildings and the area of open spaces about them (Planning Board 2003.)
# Appendix 9.3: Ludlow Subdivision Activity 2000 – 2007

<table>
<thead>
<tr>
<th>Year Approved</th>
<th>Name of Project</th>
<th>Number of Lots</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>Boulder Creek off Moore Street</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Cislak Estates off Miller Street</td>
<td>20</td>
</tr>
<tr>
<td>2002*</td>
<td>Ayers Country Estates</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td>Applewood Drive</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Allison Lane</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Pinewood Road Ext.</td>
<td>Unknown</td>
</tr>
<tr>
<td></td>
<td>Deer Hill Circle</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Sugar Hill Estates</td>
<td>25</td>
</tr>
<tr>
<td>2003</td>
<td>Emma Way and Mariana Lane (off West &amp; Cady Streets)</td>
<td>16</td>
</tr>
<tr>
<td>2004</td>
<td>Cislak Estates</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Alden Heights</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Bowles Avenue Ext.</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Alden Hill Estates</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>King Street Ext.</td>
<td>3</td>
</tr>
<tr>
<td>2005</td>
<td>Old Farm Road</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Dowd Court Phase II</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Rosewood Estates</td>
<td>49</td>
</tr>
<tr>
<td>2006</td>
<td>Longford Development Corporation</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Dan Coelho - Irla Drive Ext.</td>
<td>4</td>
</tr>
<tr>
<td>2007</td>
<td>Timberidge Road - Phase II</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Avelino Way</td>
<td>10</td>
</tr>
</tbody>
</table>


Source: Town of Ludlow, Planning Board.
Appendix 9.4 References


