Housing: Strategy

While Vermont’s population has stagnated over the last decade, Lamoille County’s population has been growing. But as the number of people in each household decreases, housing costs and home prices continue to rise at a rate unequal to income growth. This means that more housing units may be necessary to house the same number of people and the ability of people to spend money outside of their basic needs may be restricted. The expectation, therefore, is an overwhelming need for additional housing as the County continues to grow. To meet this need, the Regional Plan offers the following Housing objectives:

Provide for the full housing continuum: There is more to the County’s housing picture than simple supply. The housing needs of various segments of the population vary greatly. Affordability for young families, renters, and first time homebuyers is a major workforce housing concern. At the same time, an aging population creates future needs for more housing options for senior and disabled residents.

Ensure a diverse and affordable housing stock: With the diversity of communities in Lamoille County, from rural communities without traditional village centers or commercial cores to towns that are the workforce center of the region to communities with heavy seasonal housing stock, the housing needs of each community vary. Further, each community has different water and wastewater availability, development pressures, and priority needs that must be addressed.

Consider the costs of housing plus transportation: As the cost of transportation rises, the costs of housing plus transportation may start to factor into where housing is built or re-developed. Encouraging growth in Center Areas by locating centers of employment, services, and housing more compactly, helps alleviate added transportation costs.

This chapter was based on available U.S. Census and American Community Survey data, municipal plans, the regional plans of other Regional Planning Commissions, the report *Fair Housing and Land Use Regulation in Lamoille County, Vermont* (2007), the 2005 *Lamoille County Housing Needs Assessment*, the 2010 *Vermont Housing Needs Assessment*, and the *Vermont Housing Needs Assessment Guide* (2003). While this section aims to be comprehensive in addressing the needs of Lamoille County’s population and its communities, it is nearly impossible to capture every housing need or scenario. The section aims to address trends found throughout the region and provides suggestions, policies, and recommended action items to guide LCPC’s work with ensuring all residents have safe, quality housing they can afford over the next eight years.

POLICIES & ACTION ITEMS

*Policy:* Housing affordability is a regional challenge and whenever possible, regional solutions should be promoted.

**Action Items:**

- Assist every municipality to plan for the full spectrum of the “Housing Continuum” to meet present and future population needs, including, but not limited to: entry level housing, manufactured housing parks, transitional housing, accessory apartments, senior housing and assisted living facilities, multi-family housing, single-family housing, and duplexes.
- Along with its member municipalities, conduct a county-wide housing study and needs assessment. This study will address the full “housing continuum” and will include an analysis of housing availability and affordability, including “specialized housing”. The study will recommend strategies for increasing availability...
and/or affordability where they are lacking within housing types of the continuum.

- Support housing that allows elderly residents to age in their communities, including but not limited to accessory units and elderly housing.
- Identify appropriate locations for specialized housing options. “Specialized housing options” are identified in the Housing Section. Locations are discussed in the Land Use section.
- Maintain historic housing data for comparison to current trends in order to help project future housing needs.
- Work closely with existing housing organizations on the planning, financing, development, and management of affordable housing projects in Lamoille County to ensure all residents have affordable shelter options year round.
- Advocate for state policies and funding for initiatives that increase housing opportunities and affordability.
- Upon request, assist municipalities with non-regulatory language or ordinances that provide creative ways of addressing housing needs. Housing options that could be explored include: community loan funds, co-operative housing, co-housing, reverse mortgages, HomeShare Now, and other techniques aimed at increasing housing opportunities and affordability.

**Policy:** LCPC, together with municipalities and regional housing organizations, should promote and support efforts that allow and encourage clustering for the purpose of providing affordable housing, building multi-family units, providing lots for single family homes, and mixed-use development projects.

**Action Items:**

- Upon request, assist municipalities with individualized housing plans that accommodate the diverse and changing housing needs of each municipality through non-regulatory mechanisms, zoning and subdivision regulations, and other mechanisms. Assistance will include further education and outreach to the public about housing responsibilities, statutes, and needs for sheltering.
- Encourage affordable housing by offering potential incentives to meet a municipality’s stated affordable housing goals, such as reducing permit or hookup fees or allowing single meters to serve multi-unit structures for municipal sewer, water or electrical services.

**Policy:** LCPC encourages municipal efforts to maintain adequate sewer, water, and other facilities and services that accommodate residential growth in Center Areas.

**Action Items:**

- LCPC supports efforts to upgrade sewer, water, and other infrastructure to accommodate residential growth in Center Areas.
- Work with municipalities to improve the quality of the existing housing stock. Efforts may include: providing technical assistance in applications for grants, loans, and tax credits for code improvement; in adoption and enforcement of health and building codes; assisting with lead and asbestos assessment and abatement; and brownfield assessment, remediation, and reuse.

**Policy:** LCPC shall assist municipalities in preparing capital programs and capital budgets to fund improvements to community infrastructure and services needed to support housing development, particularly within Center Areas.
Action Items:

- Work with municipalities to designate Growth Centers and Neighborhood Planning Areas.
- LCPC should assist municipalities in pursuing State and Federal funding to assist in the installation and/or upgrade of improved municipal services to service housing developments, particularly within Center Areas.
- The existing housing stock should be preserved and renovated. Adaptive re-use of older and historic buildings is encouraged, especially in Center Areas.

**Policy:** LCPC supports residential development that is compatible with existing community character as defined in municipal plans, historic development patterns, and smart growth land use patterns. An increase in the total number of dwelling units and/or housing density in comparison to neighboring properties shall not in and of itself be considered detrimental to the character of the neighborhood.

**Policy:** Development standards should permit a variety of housing (including single-family, multi-family, accessory, and mobile homes). Municipalities should use alternatives to minimum lot size to regulate use and intensity of development, especially in Center Areas.

Action Items:

- Encourage policies, regulations, and projects that support policies outlined in this Land Use Plan, aimed to cluster housing, preserve open space and working landscapes, and involve a variety of regulatory and non-regulatory tools to achieve desired densities and settlement patterns.
- LCPC encourages innovative planning, design, and construction of primary housing that minimizes cost, energy consumption, and environmental impacts of housing.
- To support clustering of housing, developers shall consider use of community water/wastewater systems, wastewater pretreatment, and innovative wastewater treatment.
- To ensure a predictable permitting process, municipalities are encouraged to provide clear standards to assess applications for new housing and subdivisions.
- Conduct trainings throughout the region on land use tools and creative solutions to address housing needs, including, but not limited to form based codes, PUDs, density bonuses, alternatives to large lot zoning, voluntary and compulsory inclusionary zoning and types of subdivisions, and other creative solutions to address housing needs. Trainings will be tailored for Planning Commissions, Development Review Boards, and other municipal decision-makers.
Housing: Background and Inventory

Municipalities may find unique approaches to addressing housing needs applicable to the community but ultimately, a regional entity may be able to facilitate work between municipalities, service providers, non-profit agencies, and residents of varying needs to address housing needs.

Housing is affected by transportation, location, workforce development and opportunity, and land use trends. Regional organizations that do not work directly with those seeking housing, such as LCPC, can be liaisons between regional groups, agencies, entities, and organizations that do create housing and housing policy. Housing struggles are not limited to any one community in the county. Policies and programs implemented in one community may have consequences in the next. LCPC can facilitate county-wide dialogues in order to help finance and locate housing.

To address housing needs and trends, it is useful to collect and analyze data on demographic changes or to undertake housing needs assessments. A Lamoille County regional housing needs assessment was last conducted in 2007. Since the recession of 2008 – 2010, trends are likely very different given changes in the regional, state, and national economies.

Lamoille County’s demographic trends show a substantial increase in housing starts, likely due to the County’s increasing population. Housing challenges include affordability, adequate stock of housing for diverse populations, quality of housing, transportation costs, land constraints, and availability of employment opportunities. Everyone needs shelter and a regional approach to addressing housing makes everyone responsible for ensuring all people are adequately, appropriately sheltered.

Housing and Demographic Changes
In the last two decades, new housing starts in many Lamoille County towns have increased substantially, at a rate faster than overall population growth. For comparison, between 1990 and 2010, the number of housing units in the county increased approximately 31.4%, while the population increased by only 24% (Table 3-1). This trend is attributable to several factors, including a declining average household size, which will be discussed in detail later in this chapter.

Housing Needs and the Housing Continuum
People have different housing needs at different ages. When there is a burst of demand within a specific age group, it leads to inflation within their particular type of housing. Lamoille County must track population and age statistics to ensure each group has an adequate supply of housing to meet their needs. The State of Vermont describes each group and its housing demand in this way (Table 3-2):

<table>
<thead>
<tr>
<th>Town</th>
<th>Population % Change</th>
<th>Housing % Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belvidere</td>
<td>52.63%</td>
<td>25.75%</td>
</tr>
<tr>
<td>Cambridge</td>
<td>37.20%</td>
<td>53.80%</td>
</tr>
<tr>
<td>Eden</td>
<td>57.50%</td>
<td>52.46%</td>
</tr>
<tr>
<td>Elmore</td>
<td>49.21%</td>
<td>34.07%</td>
</tr>
<tr>
<td>Hyde Park</td>
<td>26.02%</td>
<td>41.88%</td>
</tr>
<tr>
<td>Johnson</td>
<td>9.19%</td>
<td>22.61%</td>
</tr>
<tr>
<td>Morristown</td>
<td>10.44%</td>
<td>17.69%</td>
</tr>
<tr>
<td>Stowe</td>
<td>25.66%</td>
<td>24.59%</td>
</tr>
<tr>
<td>Waterville</td>
<td>26.50%</td>
<td>51.90%</td>
</tr>
<tr>
<td>Wolcott</td>
<td>36.37%</td>
<td>38.72%</td>
</tr>
<tr>
<td>Lamoille County</td>
<td>24.02%</td>
<td>31.37%</td>
</tr>
</tbody>
</table>

Table 3-1 Population change and housing change, 1990-2010

Table 3-2 Housing Continuum by Age Group

<table>
<thead>
<tr>
<th>Age Group</th>
<th>General Characteristics</th>
<th>Housing Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>20s</td>
<td>-Lower incomes</td>
<td>Apartments</td>
</tr>
<tr>
<td></td>
<td>-High mobility</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-Small households</td>
<td></td>
</tr>
<tr>
<td>30s</td>
<td>-Beginning families</td>
<td>1st Time Homebuyer</td>
</tr>
<tr>
<td></td>
<td>-Small children</td>
<td>Mobile homes</td>
</tr>
<tr>
<td></td>
<td>-Growing income</td>
<td>Condos</td>
</tr>
<tr>
<td>40s</td>
<td>-Growing families</td>
<td>Step up to larger house</td>
</tr>
<tr>
<td></td>
<td>-Growing income</td>
<td>Additions, home improvements</td>
</tr>
<tr>
<td>50s</td>
<td>-Stable housing</td>
<td>Live in existing homes</td>
</tr>
<tr>
<td></td>
<td>-Empty nest</td>
<td>Renovate and improve housing</td>
</tr>
<tr>
<td></td>
<td>-Income peak</td>
<td></td>
</tr>
<tr>
<td>60s</td>
<td>-Nearing retirement</td>
<td>Begin process of “downsizing”</td>
</tr>
<tr>
<td>70s</td>
<td>-Retirement</td>
<td>Smaller homes</td>
</tr>
<tr>
<td></td>
<td>-Reduced income</td>
<td>Condos</td>
</tr>
<tr>
<td></td>
<td>-Reduced physical mobility</td>
<td>Retirement developments</td>
</tr>
<tr>
<td>80s/90s</td>
<td>-Risk of frailty</td>
<td>Assisted living</td>
</tr>
<tr>
<td></td>
<td>-More single households than couples</td>
<td>At risk of institutional care</td>
</tr>
</tbody>
</table>

Source: Vermont Department of Housing and Community Development, 2005 VT Housing Needs Assessment

Demographic trends (see Section 2) indicate that the proportion of the population who are retirement age and elderly will increase over the next decade. While the middle-aged tends to be the wealthiest sector of the population, many of those in the elderly age range may be single people with limited incomes and the need to locate near services. The increasing trend shifting towards older renters over younger will impact the housing demands. From a supply standpoint, older renters expect higher quality rental units than younger renters or may need to shift from a detached single family home to a more modest living unit. Based on supply information discussed earlier, it appears there has been an increase in the supply of rental housing. These trends will likely continue for the next ten years.

Household and Family Characteristics
Housing needs differ based on household types. The Census breaks families into three groups\(^1\):

- married couples,
- female householder with no spouse present, and
- male householder with no spouse present.

In addition to families, the Census breaks households into non-families\(^2\). The town with the highest percentage of householders living alone is Stowe (33%) followed by Belvidere and Morristown (29%). Different people desire

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1 According to the 2010 US Census and American Community Survey, a household that has at least one member of the household related to the householder by birth, marriage, or adoption is a “Family household.” Same-sex couple households are included in the family household’s category if there is at least one additional person related to the householder by birth or adoption. Same-sex couple households with no relatives of the householder present are tabulated in nonfamily households. Federal rulings in 2015 have likely changed these definitions. At the time the data was collected, these are the definitions and categories counted.

2 "Nonfamily households" consist of people living alone and households which do not have any members related to the householder.
home-ownership but generally have more difficulty doing so than married couples. This can be due to cost, bank

Lamoille County, 2010:
63% of the 10,014 households were families
48.3% of households were married families – often living in home-ownership situations
10% of households were female householders
27% of households live alone

policies, credit, or other factors.

What is telling about the household data is similarities between Stowe and Johnson Town. Both Stowe and Johnson have high rates of households composed of non-family members (43%). This could be housemates, same sex couples, or non-married partners, for example. Both Johnson and Stowe have high rates of rental occupancy. However, for Johnson, this is likely due to the high population of students and for Stowe, it is the high population of seasonal residents, many of whom are retirees.

Table 3-3 depicts the trends in the average size of families and all households between 1990 and 2010 for the county and the entire state. The average family and household size across Lamoille County and Vermont appears to be steadily decreasing since 1990. Families and households that are smaller may desire smaller dwellings. However, the numbers presented are averages and many households do experience overcrowding. Overcrowding has become much more of an issue with the high rate of foreclosures and declining economy as families move in together to share costs. Similarly, taking in elderly or lower-income relatives may be unsuitable for smaller houses not equipped to handle more people.

<table>
<thead>
<tr>
<th></th>
<th>Lamoille County</th>
<th>Vermont</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year</td>
<td>Household</td>
<td>Family</td>
</tr>
<tr>
<td>1990</td>
<td>2.56</td>
<td>3.07</td>
</tr>
<tr>
<td>2000</td>
<td>2.45</td>
<td>2.94</td>
</tr>
<tr>
<td>2010</td>
<td>2.37</td>
<td>2.87</td>
</tr>
</tbody>
</table>

Sources: 1990 - 2010 Censuses of Population and Housing

Housing Stock Characteristics
According to the U.S. Census, the majority (68%) of the housing units in Lamoille County in 2011 were single-family homes. The second most common housing unit type in Lamoille County in 2011 was a unit in a building with 3 or more units (13%). This is followed by mobile homes (10.5%) and buildings with 2-units (8.6%).

The housing stock in Lamoille County is primarily owner occupied. The County has stayed at 70 – 71% owner occupancy rate from 1990 to 2010 for all occupied properties. Johnson has the highest percentage of rental
occupancy of all Lamoille County towns, however, the rate of owner occupancy to rental occupancy has the highest rate of change in Cambridge. This is due in large part to the high rental population in Jeffersonville.

**HOUSING UNITS (1 house = 1,000 units)**

<table>
<thead>
<tr>
<th>Year</th>
<th>Cambridge</th>
<th>Hyde Park</th>
<th>Waterville</th>
<th>Morristown</th>
<th>Johnson</th>
<th>Stowe</th>
<th>Elmore</th>
<th>Eden</th>
<th>Lamoille County</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>2000</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
</tr>
<tr>
<td>2010</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
<td>1,500</td>
</tr>
</tbody>
</table>

During the time period 1990 – 2010, Cambridge, Hyde Park, and Waterville increased their housing units by 50%. Morristown has had the slowest rate of housing unit growth throughout this same time period, increasing its housing stock by 17.7%.

Lamoille County depends on its seasonal population for much of the economic growth. However, a majority (82.7%) of the County’s housing stock is year-round housing. Cambridge, Johnson, and Morristown each have only a small portion (5%) of their housing stock as seasonal. On the other hand, Stowe, Elmore, and Eden each have significant seasonal populations, 39%, 29%, and 26% respectively.

**Figure 3-4 Percent of owner occupied and renter occupied housing, 1990 and 2010**
One way of measuring housing quality is by the age of housing stock. Much of Vermont’s housing stock is older than the national average. This corresponds to housing quality issues and the potential need for housing rehabilitation as opposed to new housing, which can come with its own set of additional costs. Examples of issues that can arise with an older housing stock include: prevalence of lead paint and asbestos, no fire code, and inefficient energy use. Lamoille has a newer stock than the state average, with 20% built prior to 1939. In fact, Lamoille has one of the lowest percentages in the state for housing built prior to 1939. Almost 19% of the housing stock was built since 2000, which is a high rate relative to other counties and exemplifies the county’s increasing growth rate. It should be noted, however, that 95% of the 84 houses in Cambridge Village were built prior to 1939.

In 2011, the median year of all structures built for housing units in Lamoille County was 1978. The median year of renter occupied housing is 1974 (40 years old) and for owner occupied housing units it is slightly later, 1980. Lead paint was banned from use in 1978. It is likely that many renters and homeowners are exposed to lead in their housing.

All houses have their challenges but one of the challenges with older homes is their functionality. When houses were built in the 19th century, they were larger to accommodate extended families and families that were much larger than they are today. The average size of a family in Lamoille County today is 2.87 people, which is down from 1990 and down dramatically from 7.00 people in 1800. Large Victorian homes have proved useful for a number of adaptive re-uses. Beyond their intended use as a single-family home, these homes have found use as rental apartments for individuals and families, shared housing situations for elderly, assisted living facilities, commercial uses, museums, transitional housing, or mixed-use developments (commercial and residential uses).

A recent example of an adaptive re-use housing project utilizing a Victorian home and carriage house in Lamoille County includes Lamoille View, a Lamoille Housing Partnership project which opened in 2013 as a senior housing project with 25 units.

The Need for Fair and Affordable Housing

It would be ideal for all residents of Lamoille County to have fair and equal opportunity to secure affordable housing that meets their needs for shelter and accessibility. Unfortunately that is not always the case. Common barriers to housing include low incomes, high housing costs, accessibility and self-care needs due to age and disability, and possible discrimination based on these factors, race and ethnicity, familial status, and more.

Communities with zoning and subdivision bylaws must be careful not to drive up housing costs by requiring large lots or having other requirements that add costs to the final unit. By state law, municipalities must treat mobile homes the same as other types of housing and must allow mobile home parks, multi-family housing, and accessory apartments in their communities. In 2007, LCPC published a report entitled *Fair Housing and Land Use Planning & Regulation in Lamoille County, Vermont*. This report analyzed Lamoille County’s municipal plans and zoning bylaws to assess the degree of compliance with the U.S. Fair Housing Act and propose steps to further the
goal of fair housing. The report noted that all towns and villages with a plan have some language that may be impractical given the community’s lack of regulatory authority and that many communities do have some provisions to increase access to affordable housing.

**Housing Affordability**

The Vermont Department of Housing and Community Development (DHCD) housing policy states that housing is considered affordable when the costs (such as rent and utilities, or mortgage and taxes) are no more than 30% of income for a household earning 80% of the county median. As a general rule, the lower the income, the smaller the chance that available housing will be affordable. Factors that affect the affordability of housing are briefly discussed below. (For more detailed analysis, see the Economic Development, Energy, Transportation, and Demographics sections).

An affordable monthly housing payment for local families is approximately $1,334 per month, including taxes and utilities. Accounting for increases in heating fuel prices—which may exceed $200 per month during winter—there are a limited number of housing options in the region that are, by definition, affordable.

The median household income of a renter in Lamoille County is $32,147, compared to the median household income of a homeowner, $63,894. Homeowners spend about 24% of their incomes on housing costs. Most of Lamoille County’s towns and villages are unaffordable for renters, including: Belvidere, Cambridge Village, Eden, Hyde Park, Johnson, Johnson Village, Morrisville, and Stowe.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Belvidere</td>
<td>756</td>
<td>13.5%</td>
<td>1,536</td>
<td>25.80%</td>
</tr>
<tr>
<td>Cambridge</td>
<td>1,028</td>
<td>20.8%</td>
<td>1,733</td>
<td>22.30%</td>
</tr>
<tr>
<td>Cambridge Village</td>
<td>950</td>
<td>19.2%</td>
<td>1,779</td>
<td>28.10%</td>
</tr>
<tr>
<td>Jeffersonville</td>
<td>1,102</td>
<td>18.9%</td>
<td>1,399</td>
<td>31.40%</td>
</tr>
<tr>
<td>Eden</td>
<td>758</td>
<td>17.5%</td>
<td>1,340</td>
<td>21.70%</td>
</tr>
<tr>
<td>Elmore</td>
<td>953</td>
<td>21.3%</td>
<td>1,345</td>
<td>21.30%</td>
</tr>
<tr>
<td>Hyde Park</td>
<td>830</td>
<td>19.3%</td>
<td>1,286</td>
<td>21.80%</td>
</tr>
<tr>
<td>Hyde Park Village</td>
<td>867</td>
<td>21%</td>
<td>1,481</td>
<td>25.20%</td>
</tr>
<tr>
<td>Johnson</td>
<td>810</td>
<td>21.3%</td>
<td>1,389</td>
<td>26.80%</td>
</tr>
<tr>
<td>Johnson Village</td>
<td>817</td>
<td>19.5%</td>
<td>1,540</td>
<td>31.60%</td>
</tr>
<tr>
<td>Morristown</td>
<td>882</td>
<td>21.1%</td>
<td>1,545</td>
<td>23.10%</td>
</tr>
<tr>
<td>Morrisville</td>
<td>845</td>
<td>18.2%</td>
<td>1,406</td>
<td>23.00%</td>
</tr>
<tr>
<td>Stowe</td>
<td>1,443</td>
<td>23.2%</td>
<td>2,465</td>
<td>29.80%</td>
</tr>
<tr>
<td>Waterville</td>
<td>957</td>
<td>23.8%</td>
<td>1,322</td>
<td>24.60%</td>
</tr>
<tr>
<td>Wolcott</td>
<td>806</td>
<td>19.3%</td>
<td>1,246</td>
<td>26.60%</td>
</tr>
<tr>
<td>Lamoille County Average</td>
<td>977</td>
<td>20.8%</td>
<td>1,444</td>
<td>23.70%</td>
</tr>
<tr>
<td>Vermont Average</td>
<td>1,021</td>
<td>20.2%</td>
<td>1,516</td>
<td>23.20%</td>
</tr>
</tbody>
</table>

Low and middle-income residents do not fare as well. Lower-income earners are likely to have a harder time keeping up with housing costs than higher wage earners. A combination of rising land and home prices, concentration of employment in the low-wage service sector, and increased pressure on the rental market could rapidly push some Lamoille County communities out of the affordable range for low and middle-income residents. While owning a home may be more affordable for some workers, the cost of maintaining that home over time will continue to increase as the cost of living increases faster than wages.

Cost of purchasing a home
Using the rough estimate that households can afford a house that is three times their yearly income, a family with an income of $53,368 (median income in 2010) could afford a home with a sale price of $160,104. Affordability is determined by sale prices, not by property values; there may be plenty of affordable housing but if none of it is for sale, it doesn’t do a buyer any good. The median sale prices for Lamoille County are in the figure above. These prices were derived from property transfer tax information compiled by the State of Vermont. The number in parentheses indicates the number of sales in selected years Countywide, incomes increased 91% between the 1990 and 2010 Census counts. Table 3-8 attempts to determine whether or not local and regional income sources have been keeping up with increases in home sale prices. Home sale prices are a primary driver of housing costs, and increases in average wages can affect all local households, regardless of how many earners may be present. However this table does not take into account mortgage rates, utility costs, tax rates, and other non-wage income sources, including public subsidies. From 1995 – 2005, home sale prices exceeded wage increases, a trend that reversed with the collapse of the housing market after 2005. Rather than an increase in overall purchasing power, a precipitous decline in housing values ensued. In combination with low interest rates, the housing market decline has made home ownership more affordable in theory.
Despite the slow increase in home prices, the median family could not afford to buy the median priced house in Lamoille County. The State Department of Taxes tracks housing sale prices annually, categorized by parcel size. Median sale prices range from $185,250 for less than 6 acres to $230,000 greater than 6 acres. Housing prices on smaller parcels sold for less than their value in 2009 but have since risen, albeit to levels not seen since the early 2000s. For larger residential properties, prices have been variable since 1998, with regular peaks and valleys. The price drop in 2010 has been slower to recover.

Still, housing prices are above affordability for the average Lamoille County worker. The tenuous balance between median sale price and median income could easily swing in either direction given the current condition of the economy and housing market. Also, the needs and preferences of individual households may not be able to be met within this tight window of affordability. When adjusted for 2012 inflation, the cost of a residential house and property in 1995 would be $130,000- $177,000 – still less than the current median.

Rental Housing Costs
Renters in particular struggle to afford housing in Lamoille County. As demonstrated in Table 3-9, housing affordability exceeds 30% of a household’s income in most Lamoille County towns and villages.

Table 3-9. Rental housing costs as percent of household income

<table>
<thead>
<tr>
<th>Municipality</th>
<th>2000 Median Gross Rent ($)</th>
<th>2000 % of Household Income</th>
<th>2010 Median Gross Rent ($)</th>
<th>2010 % of Household Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belvidere</td>
<td>625</td>
<td>33.8%</td>
<td>988</td>
<td>41.7%</td>
</tr>
<tr>
<td>Cambridge</td>
<td>603</td>
<td>24.4%</td>
<td>888</td>
<td>24.9%</td>
</tr>
<tr>
<td>Cambridge Village</td>
<td>682</td>
<td>28.1%</td>
<td>782</td>
<td>35.7%</td>
</tr>
<tr>
<td>Jeffersonville</td>
<td>503</td>
<td>23.9%</td>
<td>867</td>
<td>29.7%</td>
</tr>
<tr>
<td>Eden</td>
<td>566</td>
<td>26.3%</td>
<td>1,305</td>
<td>37.5%</td>
</tr>
<tr>
<td>Elmore</td>
<td>738</td>
<td>19.2%</td>
<td>1,167</td>
<td>28.3%</td>
</tr>
<tr>
<td>Hyde Park</td>
<td>588</td>
<td>22.4%</td>
<td>790</td>
<td>32.5%</td>
</tr>
<tr>
<td>Hyde Park Village</td>
<td>529</td>
<td>24.4%</td>
<td>800</td>
<td>27.0%</td>
</tr>
<tr>
<td>Johnson</td>
<td>481</td>
<td>30.3%</td>
<td>758</td>
<td>31.0%</td>
</tr>
<tr>
<td>Johnson Village</td>
<td>451</td>
<td>29.6%</td>
<td>719</td>
<td>40.3%</td>
</tr>
<tr>
<td>Morristown</td>
<td>493</td>
<td>25.9%</td>
<td>931</td>
<td>28.7%</td>
</tr>
<tr>
<td>Morrisville</td>
<td>475</td>
<td>25.6%</td>
<td>841</td>
<td>31.0%</td>
</tr>
<tr>
<td>Stowe</td>
<td>714</td>
<td>26.5%</td>
<td>1,318</td>
<td>34.0%</td>
</tr>
<tr>
<td>Waterville</td>
<td>513</td>
<td>33.1%</td>
<td>940</td>
<td>25.9%</td>
</tr>
<tr>
<td>Wolcott</td>
<td>537</td>
<td>27.7%</td>
<td>758</td>
<td>20.0%</td>
</tr>
<tr>
<td>Lamoille County Average</td>
<td>543</td>
<td>26.2%</td>
<td>930</td>
<td>31.8%</td>
</tr>
<tr>
<td>Vermont Average</td>
<td>553</td>
<td>26.2%</td>
<td>843</td>
<td>30.9%</td>
</tr>
</tbody>
</table>

Source: 2000 and 2010 U.S. Census

Housing plus Transportation
The decision about where to live and where to work is based on a number of individual factors. Employment in Chittenden County may pay more but it also costs more to buy a home there. Lamoille County’s communities are within driving distance to Burlington but housing costs have historically been much lower. The same can be said for living and working within Lamoille County. Housing values, as opposed to sale prices, are varied throughout Lamoille County towns.

Over 60% of 2012 property transfers in Lamoille County were in Stowe, Morristown, and Cambridge. These three communities are also closest to Burlington and Barre-Montpelier, two major, statewide employment centers. While housing is generally more affordable further from employment centers, longer commutes often result in increased transportation costs (including fuel costs, vehicle repairs, and other related expenses, Table 3-10).

Table 3-10 Costs of Commuting*

<table>
<thead>
<tr>
<th></th>
<th>40-mile round trip commute</th>
<th>15-miles round trip commute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monthly Costs</td>
<td>$452</td>
<td>$169.50</td>
</tr>
<tr>
<td>Yearly Costs</td>
<td>$5424</td>
<td>$2034</td>
</tr>
</tbody>
</table>

*Assumes commute is 5 days per week x 2013 IRS rate ($0.565 per mile)

The financial costs of commuting show that an average 40 mile round trip per workday will cost a worker about $452 a month, or $5,424 a year (using the Internal Revenue Service’s 2013 standard mileage rate) while a worker who has a 15-mile round trip commute will spend significantly less, $170 a month or just over $2,000 annually. Commuting also impacts quality of life, traffic, air pollution, and time spent with families or in the community (for more information, see the Transportation Section). Development patterns that locate housing further from jobs and services cost residents time and money, and also reduce the amount of disposable income that residents have to spent at local businesses.

This combination of housing plus transportation costs is at the root of a new affordability index developed by the Center for Neighborhood Technology (CNT). CNT realized that there are more cost burdens associated with housing than just income, or income and commuting costs. Neighborhoods that are efficient also cost less. This means compact neighborhoods with mixed-uses, access to jobs, services, and transit are more efficient. After housing costs, transportation is the second greatest cost to a household. Combined, housing and transportation should be no more than 45% of a household’s income.

The CNT website, www.htaindex.cnt.org, discusses housing and transportation costs in greater detail and features an interactive platform that allows users to gauge their housing plus transportation affordability index. The index includes incomes, household size, and average number of commuters per household. An example from the site is Washington County. Washington County residents spend about 22.85% of their incomes on housing costs. When combined with transportation, they spend over 52% of their incomes on those two costs. This has been deemed unaffordable by the CNT index.

Lamoille County’s housing values are $240,000 and the household income is $53,368. Using a Washington County example, the average value of a house is $203,100 and the typical worker earns $54,227 annually. The idea of housing plus transportation costs can roughly be figured in the following for Lamoille County homeowners:

Table 3-11. Housing + Transportation Affordability in Lamoille County*
### Cost Summary

<table>
<thead>
<tr>
<th>Cost</th>
<th>$</th>
<th>% of income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median Mortgage payments</td>
<td>1,512</td>
<td>56.6</td>
</tr>
<tr>
<td>Commuting costs</td>
<td>5,424</td>
<td>16.9</td>
</tr>
<tr>
<td>Total</td>
<td>23,568</td>
<td>73.5</td>
</tr>
</tbody>
</table>

*Based on the average annual wage of $32,047; mortgage payments based on 2010 U.S. Census Bureau ($18,144 annually)*

Housing values of towns in adjacent regions provide varied options for potential Lamoille County residents. In the northeastern regions and towns, housing values are lower and more diverse than the western and southern towns which border Lamoille County. Owner-occupied housing values in Lowell and Hardwick are less expensive than Craftsbury, for example. The southern towns of Franklin County, all of Chittenden County’s towns adjacent to Lamoille County, and most of Washington County’s bordering towns have median housing values in the upper end of the spectrum.

Housing values in adjoining regions are an important consideration for communities bordering other counties. As housing costs in Chittenden County continue to increase, development pressure may be put on Cambridge and Jeffersonville. Waterville, Belvidere, and Eden are all currently relatively affordable communities within reasonable commuting distance to the Jay/Newport area. Major developments proposed in this area may have an impact on housing costs and/or increase development pressures on these Lamoille County communities. Monitoring workforce projects will be important for LCPC as these development proposals unfold to the north.

### Specialized Housing Options

Within every community are individuals or families with special housing needs. The elderly, individuals, and families with children in poverty are examples of groups with special needs that are found in most communities. The disabled or infirmed may also require special arrangements. A final category of special needs housing is group quarters or institutional care. Living arrangements such as college dormitories, nursing homes, group homes, and homeless shelters fall into this category. If diverse housing options are not available, some residents may be forced to relocate outside of Lamoille County as they age and need additional levels of care.

High housing costs adversely affect young families and the elderly more than the general population. For the elderly who may be living on fixed incomes, the cost of utilities, health care, or other monthly costs can be difficult to maintain. For the elderly, who may live alone or with another person, their homes may be larger than what one or two people need or can maintain. This increases costs of heating and maintenance. The draw for elders to remain in their homes may be economic (an older person is more likely to own his or her home rather than pay a mortgage) or social (comfort of knowing the house, the neighborhood, and the community).
Young families may require more bedrooms. Ramifications of inadequate bedroom counts may impact, among other factors, wastewater treatment systems in communities without municipal sewer or cause overcrowding. For a 4-bedroom house, it is estimated that a family needs to earn about $33.58 an hour, or $69,846 annually. This is well above the county median income.

Listed below are groups with special needs which are found in Lamoille County and an evaluation of how well their needs are being met. Generalizations are made throughout this section based on characteristics and they are not intended to be derogatory in any manner. With each generation, individuals are staying healthier longer and can live independently much later in life. But, in general, taking care of oneself and one’s home get significantly more difficult as one gets older especially if someone loses a spouse.

For elderly assisted living facilities, there are four levels based on the amount of care and assistance necessary. The amount of special care required may be more or less depending on the situation. Some individuals need only special construction (such as handicapped accessibility) while others need assisted living arrangements (visiting nurses) while still others may require full institutional care.

Source: Housing Vermont
www.housingdata.org
This group would need Level IV care.

- **Seniors 70-85**: Most seniors between 70 and 85 continue to live independently, but many require some assistance especially as they get older. These may be situations where seniors have difficulty driving or require a visiting nurse periodically. This age group may require Level III care.

- **Seniors 85 and over**: Beyond age 85, seniors increasingly need more intensive care. In the most serious cases, full institutional care is required. There are relatively few individuals in this category but this may be due to the fact that anyone who requires assisted living are forced to move to towns which have these facilities available. These individuals would require Level II or Level I housing. Level I nursing homes are generally located near hospitals where emergency services can be available.

- **Mobility and self-care limitations (disabilities)**: Individuals would require assistance with day-to-day functions such as eating, dressing, and bathing. Depending on the severity of the limitations presented by one’s disability, human services, transportation services, or special construction (handicapped accessibility) may be required. Social services are available in Lamoille County although special living situations for those in serious conditions do not exist.

- **Families, Children, and Seniors in Poverty**: The average rate of poverty in Lamoille County, based on 2010 estimates, is 12%. Poverty affects individuals, families, and the elderly. It is a compound of income, cost of living, and the ability to provide basic needs to survive.

- **Homelessness and Transitional Housing**: Homelessness is when people are unable to acquire or maintain housing they can afford. Despite the resiliency of Vermoneters, homelessness continues to afflict many in Lamoille County.

- **Student housing**: Contrary to State trends, Lamoille County’s percentage of 20 – 24 year olds is increasing and is projected to continue growing. It is unclear to what level that age group is enrolled in post-secondary education but enrollment trends at nearby institutions continue to increase. However, housing a student population requires different expectations than housing for elderly or families, for example. With Johnson State College in Johnson and the Vermont Woodworking School student population housed in Jeffersonville, these two communities face especially different housing challenges related to housing affordability and availability than many other Lamoille County communities.

- **Seasonal workers**: As an economy which benefits heavily from tourism related industries, Lamoille County has a unique challenge in housing seasonal workers who may only spend 5 – 8 months in Lamoille County. There is no definitive characterization of the type of seasonal worker who may need housing in the region so housing should accommodate a variety of needs on the housing continuum.

- **Veterans**: Lamoille County has a population of veterans who live here year-round. The housing needs of veterans, individually or a family, are unique to this group. While military benefits are generally available, veterans often need an holistic approach to address their needs, particularly veterans of active duty. The incidence of post-traumatic stress disorder, substance abuse, or mental health illness is high in this group, making stable, affordable, and safe housing an issue of concern for many.

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**Older and Disabled Residents**

The proportion of Lamoille County households with household members over 62 years of age is growing at a faster rate than for all households (20 percent compared with 18 percent, respectively) (Table 3-12 below). The rate of change for low-income older households (below 80% of median income) is increasing quickly, with more than 1,350 households estimated in 2010, representing a change of 23% between 2000 and 2010. This reflects the general household growth in this popular destination county, the first decade of the “baby boom” population cohort as it begins to affect elder households, and generally longer life expectancies.
In 2000, more than 575 Lamoille County elderly households had some type of mobility and/or self-care limitation. The problem was pronounced for elderly or extra-elderly (age 75+) owner households. However, non-elderly households experienced even higher levels (39% of owner and 20% of renter households). The total number of households with mobility and/or self-care limitations represents 15 percent of all Lamoille County households.

And, the 2005 Lamoille County Housing Needs Assessment confirmed: Lamoille County has not met the state 40%/60% long-term care goal in which 40% of long-term care services are available within the community. Lamoille County does not have access to assisted living or some forms of unlicensed special needs housing. Elders report difficulty in locating the special needs housing they need and some providers are exploring the feasibility of adding units to existing special needs housing projects.

According to the 2010 Census, there were 962 seniors (65+) living alone in Lamoille County, about 4% of the population. This group is important for social reasons as being retired and living alone in northern Vermont can be hard. In many cases, opportunities to rent apartments in senior housing are desired. The average monthly payment for Supplemental Security Income (SSI) is $762. There are over 500 individuals in Lamoille County receiving these federal benefits. As already demonstrated previously, this monthly income is not sufficient to provide housing and food, at a minimum.

**Homelessness and Transitional Housing**

Homelessness is difficult to measure, particularly in a region like Lamoille County, with limited social services, a scattered population, and proximity to major social service centers like Burlington and Barre. While data is limited, based on the best available information, we know:

- There is 1 domestic violence shelter in Lamoille County
- At any given time, there are approximately 12 families staying in hotels in the county
- There are 45 families in shelters at peak times
- People find places to live such as personal automobiles or tents
- Seasonal work leads to homelessness in off seasons
- Most people who are homeless are employed at some level

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3 Supplemental Security Income Supplemental Security Income (SSI) is a Federal income supplement program funded by general tax revenues (not Social Security taxes) that is designed to help aged, blind, and disabled people who have little to no income. It provides cash to meet basic needs for food, clothing, and shelter.
There are a number of causes for homelessness. It is not often that there is only one factor that causes an individual or family to become homeless but rather it is a culmination. Some factors include:

- Domestic violence or threatening situation
- Lack of affordable housing
- Rental policies are difficult (requiring first/last and security deposit is unaffordable; lack of 2, 3, or 4 bedroom rental units; landlords uneasy to rent to families)
- Undiagnosed mental health issues
- Substance abuse
- Gap between income needed to purchase or rent a home is growing
- Low or stagnant wages are not keeping up with rising costs of heating, housing, or transportation

Point in Time data collection counts the number of individuals and families receiving State assistance at any given point. For all counties except Chittenden, roughly 1000 people were in Emergency Shelters or transitional housing for homelessness, or shelters not adequate for human habitation. This is an increase from 750 the year before, and an increase from 655 the year before that. Statewide, homelessness is a serious issue that continues to grow, even as the economy appears to improve. As of January 30, 2013, the number of individuals seeking assistance in Lamoille County was 13. Of these 13 individuals, only 1 person sought services for one time, meaning those seeking assistance are often seeking assistance on multiple occasions, highlighting a need for continued assistance. Chittenden County, with its high population, has the highest rates of services sought. Lamoille County, Caledonia County, and Franklin County all have similar numbers of individuals seeking shelter.

<table>
<thead>
<tr>
<th>County</th>
<th>Total Persons</th>
<th>%</th>
<th>Totals Persons –</th>
<th>HUD Homeless*</th>
<th>Chronic Homeless</th>
<th>Precariously Housed</th>
<th>Motel Vouchers</th>
<th>VT Rental Subsidy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caledonia</td>
<td>107</td>
<td>4.1%</td>
<td>106</td>
<td>61</td>
<td>5</td>
<td>45</td>
<td>40</td>
<td>2</td>
</tr>
<tr>
<td>Chittenden</td>
<td>739</td>
<td>28.6%</td>
<td>610</td>
<td>465</td>
<td>97</td>
<td>173</td>
<td>218</td>
<td>55</td>
</tr>
<tr>
<td>Franklin</td>
<td>117</td>
<td>4.5%</td>
<td>70</td>
<td>43</td>
<td>10</td>
<td>30</td>
<td>3</td>
<td>39</td>
</tr>
<tr>
<td>Lamoille</td>
<td>136</td>
<td>5.3%</td>
<td>108</td>
<td>36</td>
<td>1</td>
<td>75</td>
<td>23</td>
<td>12</td>
</tr>
<tr>
<td>Orleans</td>
<td>24</td>
<td>0.9%</td>
<td>21</td>
<td>17</td>
<td>3</td>
<td>4</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Washington</td>
<td>249</td>
<td>9.6%</td>
<td>196</td>
<td>141</td>
<td>25</td>
<td>64</td>
<td>67</td>
<td>19</td>
</tr>
</tbody>
</table>

HUD Homeless includes Chronically Homeless. Precariously Housed includes people doubled-up, couch surfers etc. Unknown/Not Recorded are not shown separately, but are included in Totals. All client counts are unduplicated unless otherwise noted. Statewide Unduplicated counts may not equal the sum of County or AHS District Totals. For example, if a person with the same unique identifier was counted by an agency in Addison County and by an agency in Chittenden County, statewide unduplicated counts will count this person as one, and breakdowns for Addison County and for Chittenden County will each count this person.

As of the writing of this Plan, there are no year-round, 24-hour homeless shelters available in the County. In addition to emergency shelters, transitional housing plays a key role in moving a family or individual from a homeless condition to permanent housing. In addition to shelter, transitional housing offers accompanying services coordinated by support agencies to manage the housing, coordinate with partners, and expand beyond finding a housing unit and into life skills training. The ultimate goal of transitional housing is to help individuals or families become independent and successful in finding permanent housing. There is no definition of a transitional housing unit; it can be a motel, apartment, a unit in a multifamily structure, a room in a house, or a facility built...
specifically as transitional housing. Residency generally lasts between six months and two years. Because it is an amorphous issue, it can be difficult to quantify people served by transitional housing. Service providers (those working for non-profits or for State or Federally funded social service programs) have identified a need for more transitional housing spread out around Lamoille County rather than concentrated in one or two buildings in one or two towns.

The State, through the Reach Up program, offers motel vouchers for emergency situations, to families. These vouchers are not handed out freely, but eligibility must be determined by income, resources, living expenses, and number of family members. If temporary assistance is sought, recipients must show they are likely to be self-sufficient in 4 months or less.

Other State assistance programs include the Vermont Rental Subsidy Program, is similar in structure to the Federal Section 8 program. Applicants must be pre-screened by regional Housing Review Teams and meet eligibility requirements. Approved renters pay a portion of rent while the state pays the remaining portion. Apartments selected must be priced below fair market rent and pass an inspection. Federal programs provide housing assistance under the Section-8 Housing Choice Voucher. A family or individual can apply to the Vermont State Housing Authority for rental assistance (called a "voucher") that would enable them to afford a privately-owned apartment of their choice within the Housing Authority’s jurisdiction. Affordable housing developments such as Brewster River Housing (Jeffersonville) and Section 8 Housing Vouchers are, in many cases, the housing of last resort for some families before becoming homeless. These housing and support programs are necessary to help families keep a roof over their heads until a more permanent arrangement can be made.

Social service providers, through the Agency of Human Services, Department of Corrections, non-profit organizations, United Way, the Lamoille Family Center, clergy, and other programs, have identified barriers to finding housing for those in desperate need. Lamoille County’s dependence on tourism has made it difficult for public places to be open to the public when the need is greatest. Shelters often have limited hours. The availability to find showers, maintain a mailing address or phone number, and to receive assistance during non-business hours are consistent barriers preventing individuals and families from taking steps to improve their situations. Landlord relationships with service providers and potential renters are strained. There is often a misunderstanding and miscommunication between the parties, buoyed by public misperceptions of those receiving State assistance. Further, as state and federal funding is often tenuous and unpredictable, service providers are stretched thin and working to triage clients’ needs.

**Student Housing**

The population of 20 – 24 year olds continues to increase in Lamoille County, a trend not seen in most other regions of Vermont. For people in this age group who are receiving post-secondary education, there are unique housing challenges. The housing continuum identifies this age group as having lower incomes and high mobility, likely living in apartments or rental housing.

Lamoille County is home to Johnson State College, one of five schools in the Vermont State College system. Enrollment has increased steadily since 1985, now educating about 1,800 individuals. JSC’s campus includes on-campus dormitories with 550 beds and on-campus apartments for 50 people, including students with families. An increasing proportion of the college’s student population is classified as “non-traditional college age”. These older students are more likely to seek off campus housing, often in Johnson Village.
Johnson Village contains 662 housing units. Out of the 589 occupied units, 11% are renter occupied. Out of those 662 housing units, 53% are in multi-unit structures. Large village homes have frequently been converted into apartments, which encourages a denser village center but also poses other challenges to public safety and neighboring property values. The high rate of housing conversions often results in absentee landlord situations. Renters spend about $720 a month on housing costs, which is below the median county average. Despite the lower cost of housing, the majority of renters in Johnson (62%) spend more than 30% of their household incomes on housing, making it unaffordable.

Another educational institution providing student housing in Lamoille County is the Vermont Woodworking School, located in nearby Fairfax. The Woodworking School leases a in Jeffersonville to provide dormitory housing. Students who live off-site may also tend to seek housing in Jeffersonville given its high rate of rental units.

With lower housing costs in Lamoille County than neighboring regions, students who attend schools in Burlington or Montpelier may choose to either live at home with parents residing in Lamoille County, or rent their own apartments and commute to school in other regions. Data has not been collected to verify whether or not this is occurring. Expanding the availability of accessory apartments is one way to accommodate a commuter/student population without overtaxing an already limited rental housing market.

**Seasonal Worker Housing**

The regional economy is dependent upon tourism, especially the winter ski industry. This economy can bring unique challenges to municipalities that host major ski resorts and related service-based businesses. In particular, Cambridge and Stowe must consider issues related to housing for seasonal workers. Stowe Mountain Resort, Smugglers’ Notch Resort and other companies rely on seasonal employees. These workers generally need inexpensive housing with short-term or no leases. Providing affordable housing for seasonal workers is essential for the success of the tourism industry. The high demand for seasonal housing in Stowe and Jeffersonville has caused the price of rental units to be significantly higher than what can be afforded by those who are employed in these areas. The result is a spillover, which increases rents in neighboring communities as well.

Seasonal worker housing can be constructed and maintained in a manner that has a positive impact on the area’s aesthetics and the towns as a whole. A trend in both Stowe and Cambridge suggests old motor lodges are being converted to seasonal worker housing. Poorly kept facilities could degrade the character and health of host towns. These issues could be addressed through zoning regulations by requiring site plan and/or conditional use review for these types of units. Zoning regulations could further identify appropriate locations for such types of housing (for example, along Route 108 in proximity to major resorts). By locating such housing in specific areas or along specific corridors, it becomes more feasible to provide transit and other services that benefit seasonal employees.

**Municipalities and Housing**

As residents age, many may wish to remain in their communities, but it will become more difficult to take care of large, rural properties. At the same time, housing costs may be prohibitively expensive for younger families and individuals seeking their first home. Some Lamoille County towns lack the infrastructure to support large senior housing or affordable housing developments while others must balance housing affordability and housing stock with other factors such as parking, infill development, and/or natural resources. There are several strategies a municipality may employ to address housing, some of which are presented below.
**Planning**

Through plans, municipalities have assessed their housing needs and goals. While each community has its own housing needs, challenges, and opportunities, the following common themes are found among plans:

- Safe, quality housing for all residents, including those with specialized housing needs
- A variety of housing needs should be available, including accessory apartments and manufactured housing
- New housing should be located near existing facilities, infrastructure, and utilities and should not place an undue burden on the capacity of the municipality to provide services
- New housing should be built in a way to lessen the impact on natural and fragile resources, including along elevations unsuitable for development and in flood hazard areas
- Housing should follow the land use policies identified in the municipal plan
- Identify appropriate locations for locating types of housing to accommodate the continuum of housing needs
- Identify needs and set goals for achieving housing affordability and needs
- Set policies to guide municipal housing planning
- Describe possible funding mechanisms to encourage new housing developments, improve safety conditions, or lower costs for residents
- Develop land use policies that may impact where and how housing can be located in the community
- Set the agenda for municipal actions over the next five years
- Provide a statement on affordable / fair housing
- Outline incentives for developers to encourage fair housing

**Education and Outreach**

- Municipalities can educate property owners of their rights and responsibilities, renters of their rights and responsibilities, and the rights and responsibilities of landlords
- Municipalities can provide updated information on any changes to housing laws or discrimination practices
- Provide public spaces for homeless residents to bathe, rest, or stay warm in the winter

**Regulation**

- Revise limits on lot sizes / lot requirements
- Allow permitted uses to include multi-family, single-family, manufactured, co-operative, senior housing, and other housing types in all districts where residential housing is appropriate
- Allow accessory apartments at the State minimums or larger, which may affect square footage, number of occupants, bedrooms, etc.
- Allow a variety of building styles, such as encouraging clustering to save costs, burying utilities, sharing driveways, etc.
- Inclusionary zoning for affordable housing units
- Instate flexible regulations, including, where appropriate zero lot-line development, small lots, and easing parking requirements
- Allow mechanisms in regulations to encourage transitional housing or homeless shelters
Funding
Few Lamoille County communities have large enough tax bases to provide local funding for new housing development. However, communities can assist in securing funds for housing that meets their local needs. For example, many senior and affordable housing developments are funded through Community Development Block Grants, which require the municipality to serve as the applicant. In addition, tax credits provided through the Vermont Downtown and Village Center programs can be used to facilitate the adaptive reuse of historic buildings and offset the costs of making code and other improvements to the existing housing stock.

Specifically, for communities with land use regulations, state law requires that zoning bylaws cannot discriminate against certain types of housing, such as mobile homes. Well-planned mobile home parks can provide affordable, entry-level homeownership housing options. The Sterling View mobile home park in Hyde Park is an example of such a park. A developing trend in other regions of the Country are “cottage” neighborhoods, which consist of relatively small (sometimes less than 1,000 sf), owner-occupied dwellings located close together on small lots. These developments often include central buildings with common cooking and recreation facilities.

Another area where zoning can help create affordable housing is through clustered housing. State statute allows clustered housing through a mechanism called a “Planned Unit Development.” This provides communities with another means of regulating density in downtowns and village centers from the traditional use of minimum lot sizes. Clustered housing can decrease costs by minimizing infrastructure investment, such as shorter roads and fewer power lines. Density bonuses for affordable units have also been used in other towns and regions.

State Programs
The State program “Vermont Neighborhoods” is another option to increase the supply of affordable housing. The program offers relief from Act 250 and certain state taxes for projects that contain affordable housing and are located in proximity to state “designated Village Centers and Downtowns”. It also provides a small amount of financial incentives for communities that host new affordable housing. Municipalities may wish to investigate if participation in this program would help to further their communities’ goals.

Brownfields
Brownfields Programs assist property owners and investors in overcoming environmental challenges related to past use. Brownfields projects prioritize sites for assessment. Working with consultants, property owners, prospective developers, and state and federal agencies, projects move from assessment phases to redevelopment phases. The Arthur’s Main Street Block in Morrisville is a brownfield redevelopment using historic buildings for housing and commercial use. The Johnson Village Housing on School Street in Johnson is another example of a brownfield redevelopment project. In both cases, the Lamoille Housing Partnership was the key organization for moving the projects to redevelopment. Brownfields projects are excellent models of adaptive re-use of buildings and land.

Housing Resources
There are many resources available for renters, homeowners, potential homeowners, municipalities, and others interested in housing. The Lamoille Housing Partnership (LHP) is a regional, non-profit organization serving residents of Lamoille County in funding, managing and developing attractive, affordable housing opportunities. LHP develops projects in Lamoille County communities that:

- Are financially feasible
- Meet perceived or real social needs
• Serve community interests

LHP has developed affordable housing projects in several communities (Jeffersonville, Morrisville, and Stowe) and is available to work with town government, businesses and individuals to discuss developing other affordable housing opportunities. They have 300 units in their portfolio, with some projects focusing on Section 8 housing units, units for seniors, or units dedicated to eligible low-income individuals and families. LHP also supports a limited equity homeownership program, in which grants are offered to first time homebuyers meeting income eligibility guidelines. When the homeowner is ready to sell, they receive a portion of the appreciation of the home, while the remainder is passed on to the next homebuyer, allowing the home to remain “perpetually affordable.”

The land use provisions of this plan can help create opportunities for housing developers and service providers, to do their part to encourage fair and affordable housing. These provisions will be discussed in detail in the Land Use section of this plan.

Capstone Community Action helps people achieve economic sufficiency with dignity through individual and family development. Since 1965, Capstone has worked with low-income families, those who are impoverished, government agencies, and other non-profits to provide services and programs for low to moderate income Vermonters. Capstone provides outreach, and works to empower individuals to take control of their economic futures. Capstone also organizes to identify common problems, establish goals, and take action to address social and community issues.

More information
More housing information is found in the Appendix, which includes: a detailed list of service providers able to assist with affordable housing, homelessness, transitional housing, emergency housing, housing for veterans, or housing for those with substance abuse, mental illnesses, or developmental disabilities, as well as Options and Opportunities to address housing needs.
Transportation: Strategy

An effective transportation network provides safe, efficient, accessible and environmentally sound transportation options that connect residents and workers to their jobs, schools, recreation, shopping, and other community activities. The following strategies must be taken into consideration in order to achieve an efficient transportation system:

**Address Safety Issues**: Priority should be given to transportation projects or programs that address identified safety issues.

**Maintain and Manage Existing Infrastructure**: The existing transportation system is vital for moving people and goods within the region. Given the extreme cost of transportation investments, maintaining the existing infrastructure should be given priority.

**Enhance Mobility by Providing Transportation Alternatives**: In order to provide meaningful transportation choices to children, seniors, residents, visitors, and businesses, creative effort must be focused on alternatives to single occupancy auto travel whenever feasible. Such alternatives should incorporate healthy community design and be enhanced by a land use pattern where the everyday needs of residents can be satisfied within concentrated, mixed use developments served by a network of bicycle and pedestrian routes and connected by public transportation.

**Maintain the Lamoille County Aesthetic, Environment, and Quality of Life**: Transportation investments should be consistent with the overall character of the region. This should be reflected in all projects from bridge designs and highway facilities, to transit bus size, sidewalks and bike-paths.

**Integrate Land Use Planning and Transportation Planning**: There is a direct relationship between land development and the transportation system. The existing transportation system is a major influence on land use decisions. In many instances, this has resulted in the fragmentation of the region’s scenic, agricultural, natural, and social resources. For example, effective access management enables municipalities and the State to maximize the capacity of the existing transportation network. By considering the transportation aspect of land development, we are more likely to be successful in making the best use of our limited land resources and preserving regional character.

**Support Regional and Local Economic Vitality**: The transportation infrastructure of Lamoille County is an integral component of the regional and local economy. Larger projects such as the Morrisville Alternate Truck Route, the Morrisville-Stowe State Airport, and the Lamoille Valley Rail Trail promise great opportunity for the regional economy.

**POLICIES & ACTION ITEMS**

**Policy**: Ensure the region’s transportation infrastructure is resilient.

**Action Items**:

- Engage Vermont Agency of Transportation (VTrans) early in the project development process to ensure that local concerns are addressed.
- Work with municipalities to identify vulnerable transportation infrastructure and facilities; identify recommendations to increase resiliency.
- Work with municipalities to identify “flood resiliency” improvements to the transportation network, especially as they relate to Center Areas, such as but not limited to constructing bridges and culverts to accommodate a 50-year flood event.
• Advocate for increased funding for maintenance of existing roads and bridges.
• Roads and bridges should be built to locally defined specifications.

**Policy:** Improve safety on Lamoille County roads.

**Action Items:**
• Encourage municipalities to develop transportation infrastructure inventories and capital budgets in an effort to effectively manage municipal highway infrastructure and prioritize improvement projects.
• Utilize data such as traffic volumes, highway sufficiency and bridge sufficiency ratings, and high crash location data to assist in the regional project prioritization process.
• Encourage and assist in the implementation of low-cost safety improvements such as signing, pavement markings, and educational campaigns as short-term or interim solutions to identified highway safety issues.
• Ensure the transportation network is designed to safely accommodate all users, including pedestrians and bicyclists, particularly in Center Areas.
• Encourage and assist in the implementation of traffic calming measures at appropriate locations throughout the region.
• Continue to support the implementation of projects that improve conditions for the truck freight industry.

**Policy:** Foster efficient and convenient public transit service that addresses local and regional needs.

**Action Items:**
• Continue to support and assist local transit providers in obtaining needed funding.
• Continue to actively represent Lamoille County on the CCTA and RCT Boards of Directors.
• Assist regional transit providers in identifying areas where services should be expanded.
• Advocate for increased overall public awareness of the Elderly & Disabled Persons transportation program and the future needs of the program.
• Conduct periodic needs assessment to determine whether the region's various public transit services are meeting the needs of Lamoille County.
• Investigate the feasibility of new services and actively seek funding for them.
• Continue to support the Jeffersonville Commuter Service and work with partners to secure adequate parking facilities for commuters.
• Continue to support public transit service within Morristown and between Morristown and Stowe.
• Work to establish regular transit service between Johnson and Jeffersonville and between Morristown and Johnson.
• Work to extend the schedule of the existing Mountain Road Shuttle in Stowe to the summer months, as proposed in the CCTA Transit Development Plan.
• Work with regional partners to establish public transportation service between Lamoille County and Burlington International Airport.
• Work with regional partners to extend public transit service to Johnson State College.
• Coordinate with local transit providers to ensure connectivity between transit providers.
**Policy:** Improve the connectivity of the bicycle and pedestrian network in Lamoille County and ensure regional bicycle and pedestrian needs are met.

**Action Items:**
- Promote the removal of roadway hazards to bicycle travel during routine maintenance.
- Encourage the integration of bicycles with other transportation modes through techniques such as bicycle racks on transit vehicles, bike parking, improvement of shoulders, and construction of multi-use paths.
- When reviewing projects, recommend that shoulder widths follow the VT State Design Standards and Bicycle Facility Planning and Design Manual, or the most recent State Standards.
- Work with municipalities, VTrans, and other stakeholders to develop a Bicycle and Pedestrian Master Plan for Lamoille County. As part of this process, revisit and update the 1997 “Regional Bicycle Routes” map.
- Road shoulders are a necessity in rural communities for biking and pedestrian travel. LCPC will routinely update its road shoulder inventory and encourage expanded shoulders for paving projects.
- Upon request, work with municipalities to identify areas where bicycle parking or storage facilities should be established. When feasible, coordinate the location of bicycle parking/storage with existing or planned public transit service.
- Identify roadways where bicycle improvements are needed in order to link employment and population centers.
- In conjunction with municipalities, support creation of bicycle lanes, especially in Center Areas.
- Assist municipalities in planning for the improvement of existing and future sidewalk network, as well as pedestrian accommodations including benches, lighting, and information kiosks.
- Work with municipalities to design intersections and public walkways to meet ADA requirements for curb ramps, accessible traffic signals, and crosswalk enhancements.
- Assist towns and interested organizations in performing community walkability audits to identify pedestrian barriers and needs.
- Continue to work with municipalities to inventory sidewalks; identify missing links.
- Coordinate with VTrans to ensure that pedestrian accommodations are included in intersection improvement projects and roundabouts.
- Pedestrian needs shall be included in state highway projects, especially in and near Center Areas.
- Advocate for continued and increased funding for programs providing resources for bicycle and pedestrian programs.
- Encourage municipalities to require consideration of bicycle and pedestrian transportation in development plans through local ordinances.
- Encourage municipalities to apply Complete Street principles, appropriate to the setting, to provide safe access and circulation for pedestrians, bicyclists, transit riders, and motorists.
- Encourage schools to promote educational programs that support walking and bicycling and its health benefits.
- Work with municipalities and schools to map safe walking and bicycling routes.

**Action Items:**
- Continue to actively participate in the implementation of the Lamoille Valley Rail Trail (LVRT) and promote its economic benefits.
- Pursue municipal connections to the LVRT, as well as other direct pathway connections between municipalities.
• Support the planning, design, and implementation of the extension of the Stowe Recreation Path to Stowe Mountain Resort and other destinations.
• Continue to work with the towns of Stowe and Morristown to investigate opportunities to connect the towns with a multi-use path.
• Continue to support community organizations and non-profits seeking to implement recreational trail connectivity, trail mapping, multi-use trails, bike racks, etc., by providing grant writing and technical assistance.
• Study and assess impacts of trails over time on transportation patterns, property values, crime, and other quality of life factors.

**Policy: Support regional efforts to make air travel a safe, attractive, efficient, and competitive mode of shipping and transportation.**

**Action Items:**
- Support expansion of the Morrisville-Stowe Airport and the implementation of the Morrisville-Stowe Airport Master Plan.
- Support efforts to improve the viability of cargo and freight transportation from the Airport, including establishment of a Foreign Trade Zone in Lamoille County.
- Support the development of appropriate, cargo related uses and facilities at and in the vicinity of the Morrisville-Stowe Airport.
- Promote the various activities offered at the Morrisville-Stowe Airport.
- Enhance public awareness of the benefits of having a regional airport.
- Encourage the use of airport facilities to enhance economic development.

**Policy: Back statewide upgrades to rail infrastructure for freight and passenger service.**

**Action Items:**
- Support continued Amtrak services through Waterbury, Essex Junction, and St. Albans as a benefit to the Lamoille County region. Support expansion of this service to Burlington.
- Support reestablishment of passenger rail service to Montreal.
- Encourage efforts to upgrade existing rail infrastructure.
- Encourage continued efforts to maintain and improve a functional statewide freight and passenger rail system.

**Policy: Support regional multi-modal opportunities.**

**Action Items:**
- Assist municipalities in identifying needed Park and Ride improvements.
- Educate regional businesses about Transportation Demand Management (TDM) strategies.
- Work cooperatively with VTrans and regional transit providers to make Park and Ride locations as multi-modal as possible.
- Encourage non-motorized travel, public transit, carpooling, telecommuting, and alternative fuel vehicles.
- Develop a comprehensive regional TDM plan and work with regional partners to implement the plan.
• Work to install electrical vehicle charging stations in each of the region’s Designated Downtowns and Village Centers and at park and ride locations.
• Study successful TDM programs and identify portions suited for Lamoille County.
• Work with regional partners to coordinate, promote, and implement rideshare and transit programs.
• Continue to participate in regional activities that promote alternative transportation.
• Participate in the design phase of State highway projects to address multi-modal connectivity with roundabouts and other traffic calming devices. Roundabouts shall include pedestrian crossings and improve bicycle mobility.

Policy: Ensure transportation projects are compatible with regional land use planning efforts.

Action Items:
• Continue to coordinate with appropriate agencies and municipalities to ensure that land use and transportation decisions are linked so that land uses are supported by the appropriate types, levels and timing of transportation improvements.
• Coordinate with municipalities on land use and transportation projects to address local transportation needs, including regional access management issues.
• Assist municipalities in establishing land use patterns that encourage alternative modes of transportation and multi-modal connections.
• Work with municipalities to establish a variety of transportation options as part of the development review process.
• Continue to participate in regional and state transportation planning efforts to ensure Lamoille County's transportation needs are addressed in regional and state plans.

Policy: Ensure roadway improvement projects enhance scenic and environmental resources while maintaining safety and mobility and suit the character of Lamoille County.

Action Items:
• Evaluate regional transportation corridors and determine whether or not they need corridor management plans.
• Continue to work with VTrans and municipal road and highway departments, to design, construct, and maintain roadways in a manner which preserves the character of the region.
• Develop design guidelines to be utilized when planning road improvement projects on designated scenic highways and byways.
• Continue to work with the Green Mountain Byway Steering Committee and the Smugglers Notch Partnership to implement recommended projects; including updating the management plans.
• Work with interested communities to extend the Green Mountain Byway north to Morrisville, and potentially to Hyde Park and Eden.
• Monitor the progress of implementation of corridor plans and re-evaluate recommended projects.
• Update the Rt. 100 Corridor Plan and Access Management Plan, including the northern section through Eden. Address access management, bicycle/pedestrian mobility, wildlife connectivity, and scenic resources.
• Preserve the region’s character by encouraging the use of context sensitive design standards on state highway projects.
• Inventory the scenic resources along Lamoille County roads.
• Support the development of a Rt. 15 Access Management Plan and a Rt. 12 Corridor Plan.
Transportation: Background and Inventory

Highway System
In Lamoille County, as in many rural areas, the highway system provides much of the region’s transportation needs. The highway system, including roads and bridges, has also been the focus of the majority of transportation improvements within the region.

The region’s highway system serves many purposes. It is the primary freight network for the county but also often serves as the village “Main Street”. The combination of these uses can sometimes create safety issues and pedestrian and vehicular conflicts. These issues must be addressed to continue to provide a safe and functioning transportation network.

Table 3-13. Total Highway Mileage in Lamoille County, 2012

<table>
<thead>
<tr>
<th>Highway Classification</th>
<th>Description</th>
<th>Miles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>The state is responsible for the surface management of these facilities, otherwise they are town maintained. These are extensions of state highways and carry state highway route numbers.</td>
<td>4.4</td>
</tr>
<tr>
<td>Class 2</td>
<td>Selected based on their through connections between towns and typically have more traffic than Class 3 roads. These roads are generally of regional significance.</td>
<td>95.1</td>
</tr>
<tr>
<td>Class 3</td>
<td>All traveled town highways other than Class 1 or 2; must be passable under normal conditions all seasons of the year by a standards manufactured passenger car. Provide local access to town and are often interconnected with other local network roads.</td>
<td>381.6</td>
</tr>
<tr>
<td>Class 4</td>
<td>All other town highways; need not be kept open year-round by the town, but bridges and culverts are to be maintained.</td>
<td>89.4</td>
</tr>
<tr>
<td>Legal Trail</td>
<td>Public rights-of-way which are not highways are not a required responsibility of the town for any construction, maintenance, repair, or safety.</td>
<td>15.9</td>
</tr>
<tr>
<td>State Highway</td>
<td>Highways exclusively maintained by the state.</td>
<td>119.7</td>
</tr>
<tr>
<td>Total Class 1-4 Highways</td>
<td></td>
<td>570.5</td>
</tr>
<tr>
<td>All Highways</td>
<td></td>
<td>706.1</td>
</tr>
</tbody>
</table>

Source: Vermont Agency of Transportation, 2012 Highway Mileage Report, February 2012

Road Classification
Highway systems are characterized and classified by various means to serve many purposes. Roads can be classified in two ways, at the local level by *Town Highway Classification* or by *Functional Classification* at the state and federal levels (see map on next page).

*Town Highway Classification*
All town highways in Vermont are classified as Class 1, 2, 3, or 4 and decline from 1 to 4 in order of significance. Table 3-13 shows the composition of all town and state highway mileage in Lamoille County.
Map: Highway Functional Classification
A majority of the highway network in Lamoille County is Class 3. Maintenance of existing highways is often the largest item in a municipal budget. For this reason, it is important for municipalities to plan for, monitor, and manage their highways as effectively as possible. Road surface management, bridge and culvert inventories, and capital budget planning are all tools to help municipalities manage their highway networks. The Agency of Transportation (VTrans) also offers a variety of road and bridge grant programs to assist funding municipal highway projects. The Handbook for Local Officials, published by VTrans, is an excellent resource and provides an overview of grant programs. This publication known as the “orange book” is available through VTrans and online.

Functional Classification

Functional classification is the process by which all streets and highways are identified based on how efficiently they serve the overall channelization of traffic within a network. Rural highways are categorized by function into principle arterials, minor arterials, major and minor collectors, and local roads. All roads serve dual functions of providing mobility and access. Arterials are primarily for moving vehicles from one place to another. They may still provide access to some adjacent lands, but accesses should be kept to a minimum in order to maintain a high level of mobility service. Local roads are primarily oriented toward providing access to adjacent land; while they do serve to provide some degree of mobility, they are not generally designed to process the volume and speed of traffic on a principle arterial. Keeping functional classifications in mind when considering access permitting issues and land development can help maintain an efficient highway system and avoid safety and congestion issues. Functional classification can also be used when deciding where investment priorities to be are made.

Both state and federal governments use the functional classification system. The map below shows the functional classification of the regional highway network. For the purposes of this plan, the state highways and town-highway major-collectors are referred to as the “regional” highway system.

<table>
<thead>
<tr>
<th>Functional Classification</th>
<th>Purpose</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arterial</td>
<td>Maximize speed and volume of vehicles, few access points</td>
<td>Roads designed primarily to carry through traffic or large volumes of traffic for long distances. Characterized by controlled access, channelized intersections, and restricted parking. These roads function to distribute traffic to and from collector streets serving all land uses.</td>
</tr>
<tr>
<td>Collector</td>
<td>Moderate speed and mobility</td>
<td>Intended to collect and channel traffic from lesser traveled roads in the arterial system and provide access to adjoining parcels. Major collectors generally serve traffic between towns and communities, and minor collectors operate within a town.</td>
</tr>
<tr>
<td>Local Road</td>
<td>Lower speeds and volume, many access points</td>
<td>Provide access to adjoining land and generally have little to no through traffic. These can be considered “neighborhood” type streets and have a higher share of access points or driveways.</td>
</tr>
</tbody>
</table>

Vehicle Miles Traveled

Lamoille County’s highway network carries approximately 261 million vehicle miles traveled (VMT) annually. The annual average daily traffic volume or “AADT” is a measure of the total annual volume of vehicle traffic on a
particular highway. This information is useful in tracking growth pressures, travel patterns, and other trends related to regional development. The map on page 74 provides an overview of the region’s AADT.

**Highway Sufficiency**

The Agency of Transportation rates state highways and town highway major collectors for their adequacy in terms of structural condition, safety, and service. A section of road that meets all minimum design standards and is completely adequate in all other respects, rates a 100. The score decreases based on actual deficiencies in each of these areas. Sufficiency ratings are useful in identifying road sections which may have various types of deficiencies. Table 3-15 provides an overview of sufficiency ratings for the region’s highway network. To determine a highway sufficiency number contact VTrans.

<table>
<thead>
<tr>
<th>Sufficiency Rating</th>
<th>Category</th>
<th>Mileage</th>
<th>% Total</th>
<th>Mileage</th>
<th>% Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-39</td>
<td>Bad</td>
<td>10.7</td>
<td>6.0</td>
<td>177.0</td>
<td>6.7</td>
</tr>
<tr>
<td>40-59</td>
<td>Poor</td>
<td>46.8</td>
<td>26.3</td>
<td>889.0</td>
<td>33.8</td>
</tr>
<tr>
<td>60-79</td>
<td>Fair</td>
<td>103.2</td>
<td>58.1</td>
<td>930.0</td>
<td>35.4</td>
</tr>
<tr>
<td>80-100</td>
<td>Good</td>
<td>17.0</td>
<td>9.6</td>
<td>633.0</td>
<td>24.1</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>177.72</td>
<td>100</td>
<td>2629</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Vermont Agency of Transportation, 2008 Highway Sufficiency Rating Report

**Bridge Classification**

Bridges are classified according to their length and whether they are owned and maintained by the state or a municipality. Bridges longer than 20’ in length are classified as “long” structures, while those between 6’-20’ in length are considered short. Structures shorter than six feet are classified as culverts. Lamoille County’s highway system includes 122 bridges.

**Bridge Sufficiency**

VTrans inspects all state-highway bridges and town highway bridges 20’ in length or longer. The Federal Highway Administration calculates bridge sufficiency ratings based upon the inspection sheets completed by VTrans. These ratings, known as the Federal Sufficiency Rating (FSR) are based on:

- Structural Adequacy
- Serviceability and Functional Obsolescence
- Essential to Public Use
- Special Reductions (catchall for factors such as detour length and so forth)

The FSR provides a uniform means of comparing bridge conditions among multiple structures. It is important to note that a low FSR does not necessarily indicate that a bridge is in danger of physical failure. Bridges with a FSR of 0-50 are eligible for federal reconstruction funds while bridges with a FSR of 50-80 are
eligible for federal rehabilitation funds. Bridges listed as structurally deficient and/or having restrictions should be considered first when prioritizing bridge projects. Prioritization should also consider the bridge’s relevance to the overall regional highway system. The map on page 75 indicates the region’s FSR for bridges.

Movement of People
Lamoille County residents rely heavily upon the automobile as their primary means of transportation. Given the nature of development in the region, this reliance on the automobile has formed a trend toward the separation of employment areas, commercial services, and housing opportunities. This separation has resulted in greater auto-dependency.

Table 3-16. Travel Time to Work 1990-2010

<table>
<thead>
<tr>
<th>Travel time to work</th>
<th>1990</th>
<th>2000</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percent</td>
<td>Number</td>
</tr>
<tr>
<td>Workers not working at home</td>
<td>8,762</td>
<td>100</td>
<td>11,306</td>
</tr>
<tr>
<td>Less than 5 minutes</td>
<td>1,108</td>
<td>12.6</td>
<td>807</td>
</tr>
<tr>
<td>5 to 9 minutes</td>
<td>1,568</td>
<td>17.9</td>
<td>1,539</td>
</tr>
<tr>
<td>10 to 14 minutes</td>
<td>1,318</td>
<td>15</td>
<td>1,584</td>
</tr>
<tr>
<td>15 to 19 minutes</td>
<td>1,199</td>
<td>13.7</td>
<td>1,569</td>
</tr>
<tr>
<td>20 to 29 minutes</td>
<td>1,133</td>
<td>12.9</td>
<td>1,579</td>
</tr>
<tr>
<td>30 to 44 minutes</td>
<td>1,238</td>
<td>14.1</td>
<td>1,940</td>
</tr>
<tr>
<td>45 or more minutes</td>
<td>1,198</td>
<td>13.7</td>
<td>2,288</td>
</tr>
<tr>
<td>Mean travel time (minutes)</td>
<td>19.5</td>
<td>(X)</td>
<td>25.7</td>
</tr>
</tbody>
</table>


Access to Highway System
Although majority of Lamoille County residents have access to one or more vehicles, there continues to be many auto-less households that rely on public transportation as the primary means of transportation. These residents must also be considered in the development of our future transportation system.

Commuting Travel
Based on 2010 census data, 75% of Lamoille County residents commute alone to work by automobile. The American Community Survey indicates that Lamoille County residents are also commuting a greater length of time to work. Although in more developed areas this is often attributed to congestion, in rural regions it is primarily the increasing distance between home and places of employment. Table 3-16 shows that from 1990 to 2010 the average travel-time-to-work in Lamoille County has increased from 19.5 minutes to 24.4 minutes.

Freight Transportation
The primary source of freight transportation in Lamoille County is the regional highway system. The Vermont Statewide Freight Plan (Revised August 2013) concluded that the majority of all freight in Vermont is transported by truck. This puts a tremendous strain on the highway network in terms of needed maintenance and also adds to perceived congestion. Truck traffic counts conducted by VTrans provide information regarding the region’s highway network and those being used for moving freight. Truck traffic counts have identified VT Route 100 and VT Route 15 as the primary freight and truck routes throughout the region.
Map annual average daily traffic
Local Transportation System Planning
The condition and safety of the highway network is an area of great concern at the town level. To address these concerns, LCPC works closely with regional towns to provide resources that will enable maintenance tracking of current roads, culvert and bridge conditions, along with needed improvements. In an effort to maintain the region’s highway network, LCPC encourages towns to adopt minimum design standards for town highways. Adopting design standards can help reduce future maintenance costs, provide eligibility for grant programs, and sets a standard for private roads that connect into the municipal highway network. Typical road standards address design features such as ditching and culvert requirements, right-of-way, roadway crown, travel lane width, and so forth. A road policy outlines processes such as the acceptance of a private road into the town highway system, driveway and access standards, and the procedure for laying out, reclassifying, or discontinuing a highway. Adopting design standards or a local road policy can help prolong the life of existing infrastructure, as well as save on future costs. Assistance with these programs is available through LCPC and the VTrans District Administrator’s office.

Transportation Resources (see map, page 77)

Vermont Byways Program
Lamoille County is home to the Green Mountain Byway, as well as the Smugglers’ Notch Scenic Highway. Both byways are tailored to preserve scenic road corridors and significant landscapes. According to the Vermont Scenery Preservation Council, a byway is defined as “a highway or other public road that may be associated with other transportation resources that have special scenic, historic, recreational, cultural, archeological and/or natural qualities, and that has been formally designated by the Vermont Transportation Board.”

Green Mountain Byway
The Green Mountain Byway stretches from Stowe to Waterbury along VT Route 100. This section of highway was designated in 2009 for its scenic, historic, cultural and economic importance to the region. Intrinsic resources found all along the byway include historic structures and landmarks, scenic views, recreational facilities, local businesses and other popular tourism attractions. The Green Mountain Byway Corridor Management Plan (2008) identifies the importance of this section of highway and ideas for preserving its valuable assets for future generations and all users to enjoy.

Smugglers’ Notch Scenic Highway
The Smugglers’ Notch Scenic Highway is a 3.7 mile portion of VT Route 108, beginning in Stowe and ending in Cambridge. Scenic highways are designated for their representation of valuable natural resources including ecologically sensitive habitats, recreation areas, and productive scenic working landscapes. The Smugglers’ Notch Scenic Highway is best known for its intriguing cliff formations, scenic vistas, variety of hiking trails and narrow, winding roadway. Smugglers’ Notch, listed on the Vermont Fragile Areas Registry, is home to a variety of rare species such as the Peregrine Falcons. This scenic highway is managed in a manner that protects the ecological, geological, and recreation assets of the area. Proposed projects along the highway should conform to the Smugglers’ Notch Scenic Highway Corridor Management Plan (1995). Efforts should be made to update the plan and re-evaluate the project recommendations.
Map transportation resources
Public Transportation
Throughout Lamoille County and the state, public transportation provides basic mobility service to all ages of Vermonters. Vermont has made great strides in public transportation in recent years. Many regions are now benefiting from fixed-route transit services that have never before been offered. Demand-response transportation, serving our more dispersed population and rural areas, is very successful thanks to a large network of volunteer drivers and well-organized transit operators utilizing the latest management tools.

The public transit system in Lamoille County consists primarily of two providers: the Green Mountain Transit Agency (GMTA) and Rural Community Transportation (RCT). The transit system is comprised of both traditional “fixed route” services, operated by GMTA, as well as a “demand response” network operated by RCT. GMTA and RCT have implemented many of the recommendations from previous “short range transit plans” and both providers updated their Transit Development Plans in 2012. These plans provide a 10-year program for service and operations.

Though the region has seen many improvements in public transit, there are still many challenges. The relatively dispersed population of Vermont, the rugged terrain, and the seasonal variation pose challenges to the establishment, maintenance, and upkeep of viable transit operations.

Existing Transit Services
The Green Mountain Transit Agency (GMTA), managed by Chittenden County Transit Authority (CCTA), operates the majority of the traditional fixed route and deviated fixed route transit routes. Traditional fixed routes operate on a set schedule, along a pre-
determined route, and do not deviate from that route, and as best as possible, from the timetable associated with the pre-determined bus-stop locations. Deviated fixed routes follow a fixed route and timetable, but upon 24 hours’ notice, travel off route for passenger pick-up or drop-off.

Rural Community Transportation, Inc. (RCT) is a private, non-profit organization created through a grant from the Federal Urban Mass Transportation Administration (UMTA) to coordinate Medicaid transportation services. RCT uses all modes of transportation including buses, cars, taxis, vans, and volunteer drivers. RCT offers demand response services as well as a shopping shuttle, Medicaid transportation, Reach Up transportation, and services for the elderly and disabled. RCT’s service area includes Essex, Caledonia, Orleans, and Lamoille counties. RCT’s main office is located in St. Johnsbury with branch offices in Newport and Morrisville. See Table 3-13.

Several fixed route services are provided throughout Lamoille County- the Rt. 100 Commuter, Morrisville Loop, Mountain Road Shuttle, the Morrisville Shopping Shuttle, Ridge Runner Shopping Shuttle, and the Johnson Shopper. For routes and schedule information please contact GMTA or RCT.

Lamoille County’s latest public transit addition is the Rt. 15 Jeffersonville Commuter Bus offered by CCTA. The Jeffersonville Commuter, which began in October 2013, provides weekday service along the Rt. 15 corridor, serving Jeffersonville, Cambridge, Underhill, Jericho, and Essex Town as it heads into Winooski and Burlington. The route offers two morning round trips and two afternoon/evening trips, arriving and departing from downtown Burlington.

The Jeffersonville Commuter route was included in CCTA’s Transit Development Plan as a needed service along a major commuting corridor into Chittenden County. The route was selected as a project by the Circ Alternatives Task Force to improve transportation options and is operated with federal Congestion Mitigation Air Quality funds (80%) and State operating funds (20%).


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Demand Response

Demand Response or “on-demand service” is primarily oriented towards serving regional seniors and persons with a disability. Demand Response services provide flexible routing and scheduling according to the passenger needs. These services are most often used in rural areas or in areas where there is low passenger demand.

Demand-response transportation services are available for Medicaid-eligible residents of Lamoille County through RCT (Lamoille County’s designated Medicaid transportation provider). Dedicated volunteer and professional drivers deliver several hundred rides to medical services each year. To serve the need of the region effectively, RCT has developed a program of trip combination that combines riders that are reimbursable through
various funding sources. This trip coordination increases efficiency and reduces costs, since the cost to operate a vehicle is approximately the same regardless of whether one person or multiple people occupy the vehicle.

**Elderly & Disabled Persons Transportation Program**
The Elderly & Disabled Persons Transportation Program, formerly known as “5310”, provides funding for transportation of persons age 60 or over, and/or persons with disabilities as defined by the American’s with Disabilities Act. The E & D program is intended to serve a wider range of transportation needs, including shopping, meal-site transports, and social trips. Various human service agencies in Lamoille County, including Vocational Rehabilitation, Council on Aging, Meals on Wheels, Lamoille County Mental Health, and Out and About Adult Day Center, assist their clients in accessing these funds. Service is provided throughout Lamoille County and in some instances extends outside the county.

Since RCT is the provider for both Lamoille and the neighboring northeastern Vermont counties, there is some overlap in services. Residents of Hardwick, for example, are transported into Morrisville to Out & About Adult Day Center since this is the closest service. Eligible trip purposes include kidney dialysis, medical trips not covered by the Medicaid program, trips to senior meal sites, shopping and personal trips, vocational transportation, and social and recreational trips. However, the level of funding devoted to this program is simply not sufficient to cover all needs. In many circumstances, the most immediate needs, such as life-sustaining medical trips, are the priority over other types of non-medical trips.

**Other Human Service Transportation Programs**
Throughout Vermont there are a number of other transportation programs that have specialized services. For an overview of providers and associated human service transportation programs, please see the 2008 Vermont Human Service Transportation Coordination Plan.

**Bicycle & Pedestrian Network**
In the past fifty years the vast majority of transportation projects have been primarily aimed toward improving the mobility and safety of automobile travel. In many cases, this has been without consideration for pedestrians and bicyclists. More recently, the growing popularity of bicycling, running, walking, and general concern for health, has increased demand for appropriate bicycle and pedestrian facilities.

**Current Use of System**
Current Census data (2010) for Lamoille County indicates that 715 commuters, or approximately 6% of commuters walk or bicycle to work. This figure has increased from approximately 676 commuters in 1990. Over the past 20 years, the number of people traveling by bicycle or foot in Lamoille County has increased by 5.8%. Most often bicycle or pedestrian trips are made in village centers or in areas of compact development with adequate travel space for pedestrian and cyclists.

**Feasibility of Pedestrian and Bicycle Travel**
Most bicycle travel in Lamoille County takes place on the region’s highway network. A common concern is that road shoulders are often too narrow to safely accommodate shared use. The provision of adequate shoulders for bicycling along highways is an important step in encouraging bicycling as a viable form of transportation. As a general rule, bicycling is considered a feasible transportation option for trips of less than five miles. College towns, such as Johnson, often see a great deal of bicycle users, as there is a concentration of residents who do not own cars and must rely on other modes of transportation. Bicycle use is also common among school-age
children, where bicycles provide important mobility to get to school, as well as social and recreational activities. Safe, pleasant and convenient facilities (bike lanes and trails) and amenities (bike racks and bike lockers) should be provided to encourage bicycle travel.

The decision to walk rather than drive is highly dependent on distance, the condition of the pedestrian environment, and weather. Studies have indicated that pedestrians have general walking threshold of roughly a quarter-mile, or approximately 5 minutes for regular trips, and a 1-mile radius or approximately 20 minutes for a commute trip. Majority of regional pedestrian trips tend to be concentrated in compact village centers where the distance to destination points is likely shorter. The Vermont Pedestrian and Bicycle Facility Planning and Design Manual should be consulted when making decisions regarding designs for pedestrian facilities. Improvements to street and highway design in both village centers and on rural roads will assist in increasing pedestrian safety and providing more comfortable walking environments.

**Existing Bicycle Facilities**

In 1997, the Lamoille County Transportation Advisory Committee designated official regional bicycle routes. Routes designated as preferred regional bicycle transportation routes were limited to state routes and class 2 and 3 town highways; these routes align with the system of rural arterial and collector roads (see the map below). These designated routes were chosen as the most direct connections between local development centers that provide the services cyclists need such as food, water, shelter, and technical support. In 2000, LCPC inventoried road shoulder conditions along these regional bicycle routes to get a baseline of existing conditions. Although often used by cyclists, the shoulder facilities along most of the designated routes are deficient for bicycle and pedestrian uses according to the VT State Design Standards. These standards suggest minimum widths based on factors such as the amount of traffic, the posted speed limit and other variables. Note that VTrans is currently in the process of updating these standards.

To ensure that improvements occur, LCPC’s road shoulder inventory should be routinely updated with a windshield survey of shoulder conditions. This will assist municipalities and the region in identifying opportunities to improve shoulders for bicycling. The road shoulders that are in need of improvement should be coordinated with other transportation projects, particularly paving projects that can address shoulder deficiencies for bicyclists.
Existing Pedestrian Facilities
Walking is most commonly used for short trips and is part of nearly all transportation trips. Walking can also form the beginning and end of public transit trips. Given the short distances people are likely to walk, walking is primarily a local-level means of transportation. Facility improvements should initially focus on villages, town-centers, neighborhoods and compact developments.

Walking in Village Centers
The historic land development patterns of village centers provide a foundation for a pedestrian-oriented environment. Lamoille County is home to numerous historic village centers such as Hyde Park, Cambridge, Jeffersonville, Johnson, and Morrisville. Both designated village centers and downtown areas throughout Lamoille County tend to be characterized by compact mixed-use development; these activity centers are the most suited areas for walking and making connections to multiple destinations.

Several municipalities have made vast improvements to their pedestrian environment by planning and constructing extensive sidewalk networks in the village centers and outward extensions. In Stowe, sidewalks have been extended along the Route 108 corridor from the village, and sidewalks are planned for the Lower village commercial areas along Route 100 and along Route 108 from Cape Cod Road to Cottage Club Road. Morrisville has made continued improvements to sidewalks in the village center and has connections to People Academy, as well as the commercial district north of town. Morristown is currently planning a sidewalk extension along Route 100 from A Street in the village to the Bishop Marshall School. The village of Hyde Park has been implementing a village enhancement plan with the aim of constructing connections from Main Street to adjacent residential areas on both ends of the village. Finally, Johnson has recently completed a streetscape improvement project along Main Street that included traffic calming measures. Johnson has also built connections from the village center west along Route 15 to connect the Town Offices and residential development. These expansions to the pedestrian network encourage non-motorized connections between the village centers and nearby destinations.

Walking in Rural Areas
In many smaller villages and rural areas, widened road shoulders or a separated path may in some cases be the most appropriate pedestrian facility. Village centers that lack sidewalk facilities include Belvidere, Cambridge Village, Eden Mills, Elmore, Waterville and Wolcott. In the case of Cambridge Village, Route 15 is difficult for pedestrians to cross, particularly during commuting hours. This area was recommended for a village enhancement design as part of the VT15 Corridor Management Plan. Such an effort would address deficiencies by identifying locations for crosswalks, sidewalks, appropriate signage, and other modifications that would enhance the overall experience in the village for pedestrians.

Many of these village centers also serve as summer recreation destinations such as Eden Mills and Elmore. With Lake Eden situated near the core of Eden Mills, this village center generates a fair amount of pedestrian activity and could benefit from having a safe pedestrian connection from the lake. With the State Park located near the village center, Elmore also serves as an area with notable pedestrian activity to nearby businesses, as well as connections to the school. Much of this activity is concentrated along the lake front off of Route 12. Improving pedestrian connections between the Lake Elmore School, Elmore Store and Elmore State Park is desired by the community.
Waterville Center and Belvidere both lack safe pedestrian connections to the school from the village center. These towns have less compact village centers making such connections a challenge, as schools are located half a mile or more from the village core. In some rural areas, which lack pedestrian improvements, local town highways with low-traffic and low-speeds can sometimes serve as pedestrian routes for walking. In the case of Wolcott, the village is comprised of several large and small commercial businesses and residential development along Route 15. Both the high traffic along the state highway and the open accesses to the adjacent businesses create a safety concern for pedestrians utilizing the shoulder. Wolcott has procured studies of on-road facilities and shared-use path opportunities to link the village area to the school and the Lamoille Valley Rail Trail.

**Recreation and Transportation**

The connection between recreation and transportation is often overlooked. The Stowe Recreation Path plays an important transportation role in Stowe providing an alternative non-motorized transportation facility for much of the length of the Mountain Road (VT108). Similarly, the Lamoille Valley Rail Trail (LVRT) will be a regional transportation facility connecting many of the towns and villages throughout the region and beyond. These facilities, while perhaps perceived as primarily recreational facilities, should also receive attention for their role and importance as transportation corridors. Towns not directly served by the LVRT will most likely wish to develop safe connections to the trail. Some will choose to gain access to the LVRT via highway connections, but others may wish to develop off-highway connections, contributing to a region-wide trail network.

The railbanking of the Lamoille Valley Rail Corridor provides an opportunity for the development of a multi-use path the length and quality of which is unprecedented in Vermont. This 96-mile state-owned right-of-way parallels Vermont Route 15 and the Lamoille River for much of length of the county. Providing an off-highway link between many villages along the way, the trail is poised to become a destination facility for walkers, bicycle tourists, and other recreation purposes, but also presents a real transportation alternative to VT Route 15. The economic benefits of the trail are potentially very high as well, with much opportunity for service industry along the way including food, lodging, and technical support for the various users of the trail.

The Stowe Recreation Path, constructed in the 1980s, parallels VT Route 108 from the historic village of Stowe and extends 5.3 miles toward Stowe Mountain Resort. This paved pathway serves locals and visitors alike and accommodates a variety of modes including walkers, bicyclists, roller-bladers, and families with strollers. Although the path is contained within the town of Stowe, it provides a transportation alternative to VT108 for users traveling to and from work, as well as access for the year-round tourism population. Spurs off the path to access other municipal facilities such as the recreation fields and the high school, have been studied over the years and should be implemented as funding is identified. In addition, an extension to the Stowe Mountain Resort should also be examined.

LCPC and municipalities have been working to make additional connections and build upon these two resources. LCPC, in collaboration with towns of Morristown and Stowe, is studying the potential shared-use connection between the Stowe Recreation Path and the LVRT; this pathway would provide a safe alternative to traveling along the Route 100 corridor for pedestrians and cyclists and serve to connect the transportation networks between these communities.

Additionally, communities throughout the region recognize the importance of existing local connectors and their ability to provide a safe travel link to village centers, as well as regional pathways and bicycle routes. Local connectors across the region serve in the form of extended sidewalks, local roadways and recreational pathways.
In some cases these links serve as connectors for regional bike tours such as Gold Brook Road, Stowe Hollow Road, and the River Walk Path in Stowe. See the Regional Trails map on page 83 for more trails.

Planning for Facilities
VTrans developed and adopted the Vermont Bicycle and Pedestrian Facility Planning and Design Manual in 2002. This manual provides extensive background and guidance on the specifications of bicycle and pedestrian planning and facility design. This manual, or the most recent Vermont Standard, should be consulted whenever planning for, or designing, bicycle and pedestrian facilities in addition to the Vermont State Design Standards.

In addition to these guidance and standards, the principle of incorporating all transportation users into the existing road network was backed by “Complete Streets” legislation. The Complete Streets Law (Act 34) which went into effect July 1, 2011, requires both the state and municipalities in Vermont to consider the needs of all users (e.g. bicyclists, pedestrians, transit users) in all transportation plans and projects. This new policy mandates that all new and renovated paved roads consider the needs of motorists, bicyclists and pedestrians of all ages and abilities. Examples of design elements encouraged through the Complete Streets program include:

- Adding and maintaining sidewalks that are connected to public services
- Improving lighting, signage and pavement markings
- Installing curb ramps and sidewalk seating.

LCPC annually coordinates with municipalities to inventory Complete Street projects and identify how towns are incorporating the new requirement into their local project planning process. In some rural areas, communities should be allowed to use improved widened shoulders in lieu of sidewalk facilities to meet the “Complete Street” mandate.

Air Transportation
Aviation provides an important function in the region’s transportation system. Convenient access to passenger and freight air service is vital to many businesses in Lamoille County and is important to the tourist economy and business sectors. A functional airport is a tremendous asset and an integral component of an intermodal transportation system.

Regional Airport Facilities and Services
Lamoille County is home to the Morrisville-Stowe State Airport (MSA), located in Morristown on VT100, north of Stowe and south of the Village of Morrisville. Owned by the State of Vermont, VTrans manages the administration of the airport, and contracts with a private fixed-base operator that handles daily operations of the facility. The MSA is classified as a Regional Service airport with a focus of connecting the local and regional economy to the state and national markets. This general aviation airport services charter and air taxi service for business class travelers and tourists, similar to many of the other small State-owned aviation airports scattered around Vermont. The airport hosts charter activity from local businesses including Burton Snowboard Company, various foodservice and restaurant owners in the Morrisville and Stowe area, as well as business executives from the New York and Boston areas. MSA also contracts with the Stowe Soaring Company to host glider rides. This operation is very popular with tourists during the summer and fall-foliage seasons.

Morrisville-Stowe Airport Master Plan
VTrans completed the most recent Master Plan update for Morrisville-Stowe Airport in January 2005. Many of the improvements are oriented toward meeting FAA safety requirements for operation of the current fleet-mix of
Regional trails
aircraft. The planned improvements will address current deficiencies, allowing safe and efficient operations for the existing fleet of small aircraft. MSA is not eligible for subsidization of commercial air passenger service under current federal regulations due to the close proximity to Burlington International Airport. Therefore, MSA will likely continue to operate in its present function; serving private aviation, charter service, and air taxi service.

There are a variety environmental and development constraints limiting the ability to expand MSA and operational service. The airport’s close proximity to Elmore Mountain and the adjacent Ryder Brook, prevent MSA from extending the runway beyond 4,200 feet. Additional limitations to expansion include the lack of developable state-owned land, limited taxiway availability, minimal terminal space, and limited aircraft storage space. These limitations make it unlikely that the function of the airport will change much in the future. Future improvements listed in the airport’s Master Plan and the VTrans 2012 Status Report, include adding a parallel taxiway to the southern portion of the runway, replacing taxiway lighting, extending the runway by 300 feet, expanding terminal space, and constructing new additional hanger space for air craft storage. With the exception of the terminal and hanger space expansions, these improvements are underway and will aid MSA in increasing the availability of current private and charter service.

Public Safety and Health Functions
The Morrisville-Stowe Airport also serves as a base for specialized trainings. MSA assists Vermont State Police by providing volunteer pilots to aid in local law enforcement and serving as training grounds for annual drug patrols. MSA is also utilized by the Air National Guard to host flight trainings, helicopter practice, and search and rescue operations. In addition to hosting flight trainings, the Morrisville-Stowe Airport supports local aviation activities by providing air craft parking and storage, a jet fueling station and rent-a-car service. Additional health and safety trainings hosted at MSA include rabies control programs sponsored by the USDA and the Canadian government. Local pilots also volunteer on occasion for medical emergency transports.

Regional Economic Impacts of MSA
Situated in between Morrisville and Stowe, MSA is a vital contributor to attracting visitors and increasing business revenue in these two municipalities. According to the 2010 VTrans Morristown-Stowe Airport Business Plan, in 2003 the MSA was estimated to have a direct and induced economic impact of $11,982,500 in terms of business sales and public expenditures. If the proposed improvements in the Business Plan are to be implemented, which includes a runway extension, new 1500-foot hangar space, and additional staffing, the economic benefit is estimated to rise to $15,245,700. For more information on the economic impacts of the Morrisville-Stowe Airport consult the 2010 MSA Business Plan.

Airport Service Outside Lamoille County
While MSA serves as a vital regional connector for Lamoille County visitors and part-time residents, the airport does not provide commercial service. Currently, Burlington International Airport and the Rutland State Airport are the only airports in Vermont that provide scheduled commercial air service; larger airports in Massachusetts, New Hampshire, New York, and Canada provide additional commercial service. Clearly, Morrisville-Stowe State Airport serves a different level of activity than Logan International or Trudeau in Montreal. Still, all of these airports provide services that benefit Lamoille County. Many resort hotels in the region provide shuttle transportation to the Burlington International Airport.
Rail Transportation
The State of Vermont was the first state in the nation to own a railroad when it purchased the abandoned Rutland railroad in 1962. A pioneer in the rail industry, Vermont now owns approximately half of the 600 active miles of rail in the state. Rail activity has, however, declined in Vermont even with these efforts to preserve a functional rail system.

Since 1992, rail transport, of both passengers and freight, has steadily declined as much of the nation transitions to a service-based economy. Although rail is a cost-efficient transportation option, many factors have created less than favorable conditions for rail industry success. Highly unequal subsidizing of highways over rail infrastructure, complex ownership and operating structures of railroad companies, and a continually restructuring of the general economy have all contributed to the railroad industry’s difficult existence.

Freight Transport
In recent years, freight transportation in Vermont has been transitioning from rail to truck. Freight rail transport is most competitive for long-distance hauls of bulky, lower-value commodities such as coal, grain, paper, wood and minerals. The transport of products such as agricultural, building and earth resource materials, including petroleum products, as well as retail items, comprise the majority of Vermont rail freight. Although railroad transportation is generally less expensive for high-bulk commodities, railroads have less flexibility for delivery schedule and locations, making truck transportation more appealing to many industries. Truck transportation is generally more cost effective for higher value items, due in part to higher inventory costs that are saved by more timely truck freight schedules.

Passenger Rail
Vermont passenger rail service has also suffered a decline in recent years. The Amtrak “Montrealer” has been replaced with the shorter run “Vermont” and the Ethan Allen Express still operates on the western side of the state. Although passenger rail service has been declining in Vermont, the State contributes annual operating funds to Amtrak in order to retain the existing passenger service. Maintaining and developing a functional rail system is challenging at all levels of government. There is great potential for rail to relieve pressures of congestion and wear on our highways, and passenger rail provides mobility to many people with limited long distance travel options. Although Lamoille County has no active rail lines, it serves the region’s interests to support continued Amtrak service through Waterbury, Essex Junction, and St. Albans, as well as to support Vermont’s general efforts to maintain a functional rail system.

Lamoille Valley Railroad
The Lamoille Valley Railroad, formerly known as St. Johnsbury and Lake Champlain Railroad, served as a vital east-west transportation corridor from 1877 till its closing in 1994. Despite efforts to upgrade the railroad in the late 1970s, this line faced difficulty continuing due to various
circumstances including the rerouting of the New England Railroad, and the loss of local freight industries, such as the asbestos mines in Lowell and the talc plant in Johnson.

In 2000, the Vermont Agency of Transportation requested proposals for the use of the corridor. The process resulted in the recommendation that the State railbank the corridor through the Federal Surface Transportation Board, and pursue the development of a multi-use trail with Vermont Association of Snow Travelers (VAST). By the fall of 2002, VTrans had begun the railbanking process which requires Federal Surface Transportation Board (STB) ruling in Washington, D.C. After a lengthy process, the railbanking became official in January 2005. VTrans and VAST have signed a lease and VAST is working on developing the Lamoille Valley Rail Trail (LVRT) into a four season recreational trail.

**Multi-Modal Connectivity**
Creating a connected transportation system that supports cars, bicycles, pedestrians, rail service, and public transit is a primary strategy for developing a comprehensive and efficient transportation network. Transportation Demand Management, or TDM, is a general term for strategies that increase transportation system efficiency by encouraging reduced auto trips, increasing travel options, providing incentives to modify travel behavior, or by simply reducing the need to travel by promoting compact mixed-use developments. TDM strategies most often focus on identifying alternatives to single occupant vehicles during commuting hours.

Perhaps the most attractive characteristic of these strategies is that they are significantly less expensive and controversial than large highway construction projects. TDM provides an opportunity to address many of our highway management issues while continuing to improve facilities and services. To improve the efficiency of the region’s overall transportation system, all future transportation projects and TDM strategies should consider three main factors reliability, convenience and connectivity to other transportation modes.

**Transportation Demand Management**
There are many strategies that allow us to preserve the capacity of our existing highway network, increase mobility, conserve energy, and reduce transportation-related emissions, while still allowing us to go about our daily lives without too much difficulty. Traditional TDM strategies include carpooling, vanpooling, transit use, walking, and bicycling. More recent TDM measures that have been well received by the commuting public include flexible scheduling, compressed work week, and telecommuting. Advances in communications technology make these strategies possible; however these strategies do rely on the flexibility of employers and the ability and willingness of employees to alter their typical daily schedules.

**Ridesharing**
Ridesharing programs encourage drivers to share rides with those traveling the same commuting patterns. Vermont has an excellent rideshare program that is organized, maintained, and promoted by Go Vermont in collaboration with Vermont public transit providers. Currently, Go Vermont offers an online carpool matching service known as Zimride, allowing commuters to make easy and safe connections with other professionals commuting to the same general location. This program assists in reducing the number of single occupancy vehicles on the road, thereby reducing traffic congestion, wear and tear on the roads, cutting individual fuel costs up to 50%, and reducing carbon emissions. Based on current registered Zimride commuters, if all members were matched and took advantage of carpooling, 304,271 pounds of carbon dioxide emissions would be eliminated each year.
Employer Based Programs
Employers can offer a variety of opportunities to encourage ride sharing and alternative means of transportation. Examples include providing preferred parking spaces to carpoolers, installing bike racks for cyclists or offering prize-based incentive programs recognizing employees’ efforts to carpool, bicycle or walk. Larger employers may also wish to stagger shifts to reduce congestion of the roadways during typical peak-hour traffic times. Promoting employer-based programs that encourage the use of alternative transportation modes can yield a variety of benefits including a reduction in travel costs, reduced wear and tear on personal vehicles, increased physical health, reduced healthcare costs, and increased productivity by reducing commute-related stress. Employer sponsored telecommuting programs also have noted environmental and employee benefits.

Park and Rides
Vermont has seen significant success with the establishment of park and ride lots. Typically placed at the junction of major State Highways or Interstate exits, Park and Ride lots provide a facility for travelers and commuters to leave their vehicle and connect to public transit or carpool for the remainder of their trip. VTrans and public transit providers operating throughout Vermont have made great efforts over recent years to coordinate fixed route transit services with these lots to encourage and facilitate their use.

Lamoille County currently has three formal Park & Ride lots; one co-located in the parking lot of the Morrisville-Stowe Airport on VT100, one located at the Hyde Park Municipal Offices along Route 15, and one west of Cambridge Village on VT15. There are also a number of informal park and rides such as the Elmore Town Store parking lot and a dirt pull-off along VT 15 in Jeffersonville. These lots, while not formally recognized as Park & Ride facilities by VTrans do provide parking space to rideshare. VTrans offers a Municipal Park-and-Ride Grant Program that provides funding for upgrades and improvements to new and existing park and ride facilities.

Transportation Connections to Adjacent Regions
Services provided through the region’s existing transportation network, including public transit, park and ride lots, and recreation trails, allow for both commuters and leisure travelers to make connections not only within Lamoille County, but also to adjacent regions. Public transit connections can be made to Montpelier and Burlington through the Route 100 Commuter operated by GMTA. Residents and commuters can connect from the Route 100 Commuter to the Montpelier Link Express or Waterburry Commuter bus routes. Park and ride lots located along Route 15 in Cambridge and Hyde Park also allow Lamoille County residents to make more viable and cost savings connections to adjacent counties including Chittenden, Franklin and Caledonia County. Additionally, extended shared-use recreation paths such as the Lamoille Valley Rail Trail will allow travelers to make easy connections to adjacent communities such as Hardwick in Caledonia County.

Transportation-Land Use Connection
Traffic volumes and transportation mode choices are influenced by the location, density, and mixture of land uses. Dispersed low density development patterns rely almost solely on the automobile as the primary mode of transportation. As housing, employment centers, shopping and service opportunities become further separated, roads become more congested and the region’s landscape loses its revered rural aesthetic.

By encouraging concentrated, mixed-use development within existing developed centers or within designated growth areas, commute trips can be shortened, and other modes of transportation can be promoted. Municipalities can implement this strategy through infrastructure investments as well as zoning and subdivision ordinances. Promoting this type of development will minimize the need for highway network expansion while...
facilitating trips made by walking, bicycle, and public transit. An important component of this strategy is ensuring that all public buildings and facilities - post offices, schools, public meeting facilities, recreational fields, etc. are located within walking distance of village/commercial centers. Another aspect of this strategy is the concept of mixed-use development. Mixed-use developments offer opportunities to live, work, shop, and recreate close together and encourage bicycle and pedestrian transportation.

Within Lamoille County, the VT Route 15 and VT Route 100 corridors provide vital access to employment and housing opportunities. By promoting access management strategies, the look and function of the rural areas along these corridors can be preserved while still allowing well-planned development.

Access Management
Access management is a strategy for managing physical connections and development along roadways by regulating the frequency or location of access points along road corridors. Frequent curb cuts and driveways decrease the efficiency of streets by creating additional turn movements and increasing congestion. Access points also increase the risk of crashes among vehicles and lead to bottlenecks and added congestion, reducing roadway capacity and overall mobility. Safety and capacity concerns can be mitigated by implementing effective access management strategies. Strategies include limiting the number of access points along regional roadway corridors or acquisition of development rights to limit unsafe access points.

By incorporating access management regulations into local zoning or subdivision ordinance, towns can maintain the capacity and ability to process traffic while preserving roadway level of service. Safety is also increased with access management strategies by reducing the number of potential conflict points between vehicles and non-vehicular traffic.

Traffic Calming and Streetscaping
Many of Lamoille County’s villages have developed around state highways. These highways play the dual role of providing access and mobility. The complicating factor in many of these villages is that the state highway often also serves as “Main Street”. Traffic calming has proven a popular mechanism to balance the needs of the villages with that of the state highway. Traffic calming features are visual and physical cues to reduce speed, be cautious, and alert drivers to change their behavior. These features such as village gateway signs, street markings, curb-extensions, and other physical features also serve as refuge for bicyclists and pedestrians. VTrans has developed a Traffic Calming Planning and Approval Process and standard drawings of traffic calming features considered acceptable for use on state highways in village areas. VTrans should consider including traffic calming elements as a component of major roadway projects on the State highway system, especially in village and downtown areas.

Healthy Community Design
There are several aspects of healthy community design that directly relate to transportation planning. The basic principles consider the integration of commercial and residential developments and the location of destinations such as schools and employment centers. Both of these factors can strongly influence the way people tend to
travel to access destinations. Policies that support healthy community design include compact development, interconnected streets, and a network of connected sidewalks and bicycle routes. Towns are encouraged to incorporate healthy community design principles into their municipal plans, promote alternatives to automobile travel, as well as increasing physical activity by providing access to parks and bicycle and pedestrians facilities.

**Corridor Planning**

Corridors serve as vital connectors to statewide highways, intra-regional corridors and local roadways. Understanding the existing functions and characteristics of each corridor can help guide prioritization and design of future transportation improvement projects. Improvements to primary corridors should consider both community concerns and the most efficient way to move goods and people throughout the region.

Lamoille County’s primary corridors include Vermont Routes 100, 15 and 12. While each route has its own unique land use patterns, a large portion of primary corridors situated within the region are characterized by scenic rural landscapes, historic village centers, and small clusters of commercial development at the fringe of villages. As communities along these connector routes continue to grow, transportation investments and improvement projects should consider all modes of transportation, especially biking and walking. Existing pedestrian and bicycle facilities along state routes are unable to safely accommodate pedestrian and cyclists. Towns in the region are encouraged to design future transportation and land use projects in a manner that will meet the needs of all users, while preserving scenic and intrinsic resources, especially along designated byways and scenic highways.

**VT Route 100 - Stowe to Morristown**

The VT Route 100 Corridor begins in Waterbury and intersects with Route 15 in Morristown. This corridor passes through two of Lamoille County’s largest employment centers; Stowe and Morristown/Morrisville. These two towns alone account for approximately 40% (9,541) of the County’s total population. The overall pattern of development along the corridor is characterized by historic villages connected by a scenic two-lane rural highway. Rural portions of the highway are dominated by large parcels of farm, forestland, and single family homes. Transitional areas along the periphery of village centers are commonly characterized by a mix of commercial uses, while the historic centers of Stowe and Morrivismile are dominated by mixed-use development.

According to the Vermont Route 100 Access Management Plan, traffic delays along the corridor are most concentrated in downtown Stowe near Route 108, in the Village of Morrisville, and Cady’s Falls Rd in Morristown. VTrans traffic count data indicates overall traffic along the corridor is dominated by passenger vehicles accounting for 68-71% of vehicles traveling from Stowe to Morristown. Medium trucks/vans account for the second most common (25-28%) vehicle type traveling the corridor. Meanwhile, heavy truck and tractor trailers with more than 2 axles only account for approximately 1-3% of vehicles traveling this section of the VT Route 100 corridor.

The 2004 Vermont Route 100 Access Management Plan identified multiple transportation improvements to address current access and safety issues along the corridor. Recommended improvement projects include the following:

- The construction of the Route 100 Alternative Truck Route in Morrisville (currently under construction);
- Applying the standards of the *2003 Vermont Pedestrian and Bicycle Facility Planning and Design Manual* when designing new road projects;

Section 3: Where We Live | Page 89
A mix of proposed turn lanes, traffic signals, roundabouts, bike/pedestrian facilities, and defined driveway access improvements (See Figures E1-3 in the Access Management Plan).

**VT Route 100 - Hyde Park to Eden**
The northern portion of the Vermont Route 100 Corridor begins in Hyde Park and extends to the Eden/Lowell townline. This corridor passes through two municipalities, Hyde Park and Eden. This section of VT 100 is comprised of vast farmland, single family homes, and pockets of mixed-used development situated in North Hyde Park, Eden center and Eden Mills. Near Eden Mills, the corridor passes by more recreation-oriented development centered around Lake Eden.

Although North Hyde Park and Eden are not major employment centers, they are increasingly serving both commercial and residential land uses. As a result of increased development in the Northeast Kingdom, both truck and overall traffic volume have increased along the VT 100 Corridor. According to 2010 VTrans traffic count data, medium sized trucks and vans account for approximately 28-32% of vehicles traveling this segment of VT 100, while heavy trucks and trailers ranged from 1.5-8% of vehicles.

As both truck traffic and commercial and residential development continues to sprout up along Route 100, accommodating multiple transportation modes becomes increasingly difficult. In many areas along VT 100 in North Hyde Park and Eden, road shoulders are narrow and unsafe for pedestrians and cyclists. To improve bicycle and pedestrian facilities and reduce vehicle conflicts the following improvements are recommended:

- Widen road shoulders along Route 100 in Hyde Park and Eden;
- Improve and define driveway access near commercial developments;
- Where possible, widen road width to incorporate a truck passing lane.

**VT Route 15 - Cambridge to Wolcott**
VT Route 15 Corridor begins at the Essex/Jericho townline and extends east to Hardwick in Caledonia County. This corridor passes through a total of nine municipalities, five of which are located in Lamoille County; Cambridge, Johnson, Hyde Park, Morristown and Wolcott. Cambridge’s close proximity to Chittenden County has made it one of the fastest growing towns in Vermont. Overall, the Route 15 Corridor is dominated by rural, scenic, agricultural sections of highway passing through several historic village centers (Cambridge, Johnson and Wolcott) and commercial clusters. In Lamoille County, commercial areas along Route 15 are commonly located on the fringe of historic village centers including, Morrisville, Jeffersonville, and Hyde Park.

As VT Route 15 continues to serve development and population growth in both Lamoille and its suburban counterpart Chittenden County; traffic volumes will continue to increase along the corridor. According to 2010 VTrans classification traffic counts, this two-lane corridor is dominated by passenger cars (ranging from 65-69% of vehicles traveling the corridor at selected count sites). Medium weight truck traffic volumes were recorded slightly higher west of 15A, accounting for 31% of vehicles counted. Heavy weight truck traffic ranged from 2-5% of traffic flow along Route 15 within Lamoille County.

Currently, with the exception of certain village areas such as Main Street in Johnson, a large part of the corridor lacks proper bike and pedestrian facilities. Road shoulder widths tend to be narrow along the corridor, providing inadequate access and unsafe routes for pedestrians and cyclists. To reduce traffic congestion and increase bicycle, pedestrian and motorists safety, the 2004 Vermont Route 15 Corridor Management Plan identified the following transportation improvements:
Where possible, create truck traffic passing lanes to increase mobility;
• Widen road shoulders to increase motorists and bike/pedestrian safety;
• Make use of turn-outs where widening the road shoulder is not possible to allow slower traffic to pull off the road;
• Improve bicycle and pedestrian facilities in village centers including installing sidewalks, bike racks and implementing traffic calming measures such as streetscape vegetation;
• Improve access management in Jeffersonville and Morristown by sharing driveways, parking and directing traffic to off-street parking rather than along Route 15;
• Locate new Park and Ride facilities in village centers;
• Promote ridesharing along Route 15 to reduce traffic demand.

VT Route 12 – Elmore to Washington County
The Route 12 Corridor begins in Morrisville along Upper Main Street and ends in Montpelier. Within Lamoille County, the corridor passes through both Morristown and Elmore. This two-lane corridor is becoming an increasingly more popular travel route for both commuters and visitors traveling to Montpelier. Aside from Morrisville and Elmore center, the Route 12 Corridor passes through predominantly rural areas dominated by recreation, farm and forestland.

As Route 12 serves as a scenic commuting route from Morrisville to Montpelier, the corridor, like others in Lamoille County, is dominated by passenger vehicle travel. According to VTrans 2010 traffic count data, passenger vehicles accounted for approximately 68% of cars traveling Route 12 from Morristown to Elmore. Similar to other primary corridors in the region, Route 12 has experienced an increase in truck traffic. Medium weight trucks and vans accounted for approximately 30% of vehicles traveling the corridor within the County. Meanwhile, heavy truck and tractor trailer traffic tends to be lower along Route 12 than on VT Routes 15 and 100.

VT Route 12 serves as the gateway to popular recreation destinations including Elmore State Park and Lake Elmore. Future road improvement projects must consider the safety of all users along the corridor. Similar to portions of VT Routes 100 and 15, Route 12 lacks adequate bicycle and pedestrian facilities. With the exception of a few areas such as Elmore center, road shoulder widths tend to be narrow along the corridor, placing non-motorist users at a higher risk of conflicts with automobiles. To improve safety along VT Route 12 the following projects are recommended:
• To accommodate cyclists and pedestrians, widen road shoulders along VT Route 12 in Morristown and Elmore where sidewalks are not present;
• Study the feasibility of installing sidewalks in Elmore Center to provide safe pedestrian access for users traveling from the Elmore Town Store to Elmore State Park.

Regional Transportation Projects
The Lamoille County Transportation Advisory Committee (TAC) prioritizes regional transportation infrastructure projects annually. When prioritizing infrastructure projects, TAC reviews information such as functional classification, annual average daily traffic volume, and safety issues associated with each project. This information provides a general framework to review each project within its respective project category, such as town highway bridges, roadway, safety improvements, paving, and park and rides.

The TAC also considers the following when prioritizing regional projects:
• The impact of the project on congestion and mobility conditions in the region;
• The availability, accessibility and usability of alternative routes;
• The functional importance of a highway or bridge as a link in the local, regional or state economy;
• The functional importance of the facility in the social and cultural life of the surrounding communities;
• Conformance to the local and regional plans;
• Local support for the project; and
• Other factors (community character, quality of life, etc).

The prioritization list for regional transportation projects is updated annually. The most recent prioritization list is available at the LCPC office.
Energy: Strategy

Although Lamoille County is the third smallest and second least populous of Vermont’s fourteen counties, it is of strategic importance in the state energy economy. In addition to long term residential growth – as the State’s second fastest growth county – Lamoille County hosts an ever-growing number of tourists.

Four-season resorts and other nearby recreational amenities help support a substantial seasonal home market, lodging, shops, restaurants, and nightlife. Johnson State College in Johnson enrolls students from across the Northeast, while shopping plazas in Morrisville attract customers from several neighboring communities. Lamoille County’s location makes commuting attractive for the Chittenden and Washington County employment centers. In short, the breadth of energy demands within Lamoille County exceeds the permanent population.

While Lamoille County is a net importer of energy, the region has expansive potential for future generation. When harnessed in a sustainable way, these resources can be leveraged to create jobs, generate revenue for property owners, and lower consumer energy costs. This chapter provides data and information to aid public and private sector decision-makers in charting a sustainable energy course for Lamoille County. When used in consultation with local municipal development plans and other parts of the Lamoille County Regional Plan, the following strategies, which are anticipated to further the priorities in the Vermont Comprehensive Energy Plan, may be used to guide and implement energy policies:

**Reduce Lamoille County’s dependence on non-renewable energy sources.** The availability of clean, affordable energy is critical to maintaining the superb quality of life that attracts people to Lamoille County. Census data indicate the vast majority of recent growth has occurred outside traditional village areas. Lamoille County residents spend, on average, nearly 17% longer commuting to work than other Vermonters. Reducing dependence on non-renewable energy sources will allow Lamoille County’s commercial and industrial markets to expand new business ventures, reduce taxpayer and commuter spending, and protect a finite supply of natural resources.

**Energy generation, transportation, and consumption should be cost efficient and economically beneficial to residents.** The price and availability of energy contributes to determining where people live, work, and move in-between. To achieve this Plan’s primary goal of guiding growth into compact settlements, cost-efficient infrastructure must be developed and maintained, especially to succeed in the retention and recruitment of major employers.

**Diversify the region’s large and small scale energy production.** To compete in a rapidly changing economy, the county will be forced to offer 21st Century amenities to remain an attractive place to live, work, and play. Historically, dependence on a few, finite energy sources reduces the competition and attractiveness of a region. The relationship between energy policies and the natural environment is often overlooked. The force of rivers, height of ridgelines, richness of minerals, and strength of the sun are all determinants in how power is generated. To the same extent, the ways these resources are utilized in the production and consumption of energy greatly impact the quality of life for residents.

**Encourage local energy production by utilizing existing assets.** The diverse landscape of forests, lakes, rivers, and mountains represent potential for renewable energy, including hydroelectric, solar, wind, and biomass. The power of these Lamoille County resources can be utilized to the benefit of residents, tourists, businesses, and utilities. Reducing dependence on fossil fuels provides opportunities for local energy production through renewable natural resources, making our region more resilient and self-sustaining. Local energy production
should be in conformance with the Regional Plan, the host municipality’s municipal plan, and neighboring communities’ municipal plans.

Energy generation projects are sited in a way that minimizes impacts to natural resources and aesthetics while encouraging efficient land use design, as identified in the Lamoille County Regional Plan, and respecting goals and objectives of municipal plans. As new energy generation projects are sited, they should be consistent with this Regional Plan and respect the goals and objectives of municipal plans.

One measure of meeting the strategies identified in this Energy Plan and throughout the Regional Plan is by participating in State permitting processes. LCPC reviews and assesses proposals for new energy generation projects through Section 248 of the Public Service Board as well as other projects requiring a Certificate of Public Good or telecommunications projects seeking an Act 250 permit. When reviewing these proposals, and prior to providing comment on them, LCPC will meet with municipalities when appropriate and review projects based on conformance with the Regional Plan as well as using a set of criteria to weigh impacts. LCPC’s energy and telecommunications tower siting criteria include impacts to:

- Forests, particularly increasing fragmentation of contiguous forest land or decreasing available forest land
- Agriculture, particularly increasing fragmentation of contiguous agricultural land or decreasing available agricultural land
- Wildlife and wildlife habitat, such as deeryards, moose and bear habitat, bird migration patterns, wildlife corridors, and endangered and threatened species
- Water quality
- Soil degradation
- Aesthetic viewsheds, including the following ridgelines and scenic views:
  - Mount Elmore and the Worcester Range
  - Mount Mansfield and the Sterling Range
  - Woodbury Range
  - Butternut Mountain
  - Belvidere Mountain
- Recreation
- Road network
- Location and extent of mitigation from the proposed project
- Economic impacts, such as gain or loss of revenue, from proposed project

POLICIES AND ACTION ITEMS

Policy: LCPC recognizes that for Lamoille County to continue to grow in population and to enrich economic opportunities, energy production facilities and transmission capabilities must be improved.

Action Items
- Research and identify state, federal, and cost-sharing opportunities to fund local transmission line upgrades and expansion of existing 3-phase power.
- Partner with electric utilities and communities to establish a capital plan for the County to upgrade transmission lines to better meet energy demands.
• Participate in and work closely with local Energy Committees, including semi-regular LCPC Energy Committee meetings to assess LCPC’s progress towards achieving the goals identified in this plan.

**Policy:** *Transportation is a high use of non-renewable energy. To this end, LCPC supports carpooling, public transportation, and other means of reducing single occupancy vehicle trips.*

**Action Items**
- Work with certified CO2 credit and incentive opportunities for local residents and businesses.
- Collaborate with transit companies, local businesses, and town officials to create ridership and carpooling incentives at the employee level.
- LCPC supports public transit as a more efficient use of fuel. To that end, LCPC encourages expanded public transit systems, Park and Ride facilities, and will continue to represent Lamoille County to transit providers in order to facilitate partnerships and expand transit service.
- Increase the number of electric vehicle charging stations in Lamoille County, with a goal of at least one public charging station in each Designated Downtown and Village Center.

**Policy:** *Energy conservation is fiscally responsible. Commercial and residential power consumption should be conserved and improved efficiencies should be promoted.*

**Action Items**
- Work with local utility developers to overcome Section 248 road blocks to producing electricity.
- Map and analyze the locations of existing utilities and infrastructure to determine the relationship between utilities and an efficient power grid system in order to meet gaps and address barriers for future planning and development.
- As municipalities update their zoning, ordinances, and municipal plans, LCPC will work with planning commissions to encourage and promote the use of alternative energy.

**Policy:** *Encourage land use patterns that promote the conservation of energy and reduce dependency on the automobile.*

**Action Items**
- Encourage local job opportunity expansion in Center Areas, as identified on the Future Land Use Map.
- Land use policies and practices supporting compact settlements are encouraged, including, but not limited to: expanded broadband network, mixed-use developments, density transfers, cluster development, pedestrian and bike facilities, and increased connectivity of residences, work, transit, and civic functions.
- Work with municipalities, utilities, and other entities to plan for the efficient location and use of infrastructure necessary to support denser, mixed use land use patterns in Center Areas.
- Municipalities are encouraged to promote energy efficient site designs through their local development review processes.

**Policy:** *Improve the energy efficiency of public and private buildings in Lamoille County.*
Action Items
- Encourage municipalities and residents to take advantage of financial incentives offered by organizations such as Efficiency Vermont to promote property owner and municipal energy sufficiency.
- Identify cost effective improvements to reduce energy consumption and cost at public and quasi-publicly owned buildings through professional energy audits.
- Assist municipalities with inventories of street lights and other public lighting. Upgrade or replace public lighting fixtures with new, energy efficient models.
- Encourage municipalities to include energy efficiency retrofits at public buildings in their capital budgets. Provide technical assistance to municipalities pursuing grants, bonds, and low interest loans to fund retrofits.

Policy: LCPC supports a diverse array of power generating facilities in Lamoille County with the goal to increase residential, municipal, and commercial energy independence to promote the region’s resilience against volatile energy markets.

Policy: The extraction of timber and other local natural resources for energy production should be managed with careful consideration for the long-term sustainability of Lamoille County’s forests.

Action Items
- LCPC will work with municipalities and local economic development partners to identify appropriate locations for and funding mechanisms to encourage a biomass production facility in Lamoille County.
- Provide technical assistance to local utility companies, developers, and municipalities to identify where new energy producing facilities should be located. Preserve viability of existing capacities and encourage expansion of future local hydroelectric facilities, as permitted within environmental standards.
- Promote neighborhood energy co-ops and other community solar and wind projects that are developed in conformance with municipal regulations and municipal plans.
- Work with municipalities to develop residential and small-scale energy standards for zoning and municipal planning.
- LCPC supports efforts to utilize local forest resources in the manufacture of wood and biomass fuels, which supply renewable energy to local residences and businesses.
- LCPC will provide technical assistance and support to municipalities and utilities seeking to diversify their energy portfolios through renewable energy projects that lessen the financial burdens on ratepayers and promote energy independence.

Policy: The transportation network is vital to maintenance of power generating facilities. Truck traffic from new and existing facilities should consider the impact to roads.

Action Items
- Work with municipalities to develop impact fees for utility/private enterprises that build commercial wind projects in the municipality or in adjacent municipalities that utilize Lamoille County highways.
- Work with developers of new and existing energy generating facilities with techniques that minimize and mitigate the impact to local roads.
- Any large-scale biomass facility sited in Lamoille County should be reviewed with careful consideration for the impact fuel shipments and deliveries have on the regional transportation network.
Policy: All commercial, large-scale, and renewable energy projects must adhere to a high environmental standard that includes avoiding negative impacts to forests, agricultural land, wildlife habitat, water quality, soil degradation, aesthetic views, recreation, the road network, economic impacts such as gain or loss of revenue from any proposed project, and encourages adequate mitigation to those impacts that cannot be avoided.

Action Items
- Comment on all Section 248 applications and work closely with affected municipalities to ensure consistency with the Regional Plan and respect the goals, objectives, and vision of municipal plans.
- Work with municipalities, neighboring property owners and municipalities, and reference this Regional Plan to address all areas of concern regarding proposed commercial or large-scale energy projects.
- Encourage thorough and proper analyses of anticipated socioeconomic and environmental impacts, both positive and negative, of proposed commercial or large-scale energy projects, and assess impacts during project review.
- Effectively and adequately address issues related to new energy facility operation and reliability, recognizing that in some instances they are inextricably intertwined with public health and safety concerns.
- Work with utility companies to eliminate or mitigate erosion on energy generating sites or elsewhere to compensate the impacts of on-site erosion and to adjacent land owners.
- Develop clear, concise regulations and municipal plan goals in municipal plan updates and bylaw revisions for siting energy facilities.
- If energy generation facilities are located in a public water supply source protection area, the facility shall comply with all state and local regulations, and shall be designed to prevent groundwater contamination and ensure adequate groundwater recharge.
- LCPC will work with municipalities to revise regulatory documents that address energy siting as legislation evolves.

Policy: Private land should not be converted to state owned land for energy projects unless sufficient mitigation of lost tax revenue is provided.

Action Items
- In municipalities where State land purchase is proposed to mitigate the impacts of energy projects, LCPC will work with the municipality to identify appropriate mitigation techniques and locations.
- Encourage towns to adopt financial mitigation requirements with any commercial energy project.
Energy: Background and Inventory

Balancing environmental values with economic and residential growth is essential to ensuring future prosperity in Lamoille County. To compete in a rapidly changing economy, the county will be forced to offer 21st century amenities to remain an attractive place to live, work, and play. Business start-ups and telecommuters demand broadband access; industrial and commercial sites seek high-capacity water, sewer, and electric connections; and prospective homeowners scrutinize an array of energy-related factors. The growing demand for services must be balanced with the need to preserve the values and rural character that defines Lamoille County.

Current Energy Profile

Energy consumption across the state is split among three primary sectors: electricity (38%), transportation (31%), and thermal (heat – 31%). While these statistics provide a useful frame of reference, consumption patterns fluctuate seasonally and across regions. Energy sectors also frequently overlap (such as in the case of electric heating units), making it difficult to differentiate among uses. In general, consumption patterns are constantly changing based on a range of variables. This plan seeks to identify those variables that will directly impact the current and future energy footprint of Lamoille County.

Electricity

On a per capita basis, Vermont electricity consumption ranks 40th among all states, largely because of the small percentage of homes relying on electric heat and relatively low demand for air conditioning. Still, consumers across the state pay among the highest electricity rates per kilowatt-hour (kWh) in the country. According to November 2011 data from the U.S. Energy Information Administration (EIA), residential consumers in Vermont were assessed the third highest electricity rates among the lower-48 states. While Vermont’s rates are competitive with other New England states, this reality is a competitive disadvantage in the nationally-integrated economy.

Sources of energy used throughout this chapter

- **Biomass:** Derived from living organisms, including: algae, food waste, grasses, methane, oilseed crops, and wood that can be converted into energy sources such as biodiesel, ethanol, firewood, and wood chips / pellets, which can run vehicles, heat buildings, or generate electricity
- **Geothermal** (or “ground source”): The potential of using the Earth’s near constant temperature (45—58 degrees F) a few feet below the surface for heating and cooling applications
- **Hydroelectric:** Uses the moving or falling power of water to generate electricity
- **Wind:** Using the kinetic energy of high altitude wind as power
- **Solar:** Converting the sun’s power into energy through photovoltaic or thermal (passive) systems
- **Methane:** Recovering a gas produced through anaerobic digestion of manure, farm waste, and other organic material
- **Combined Heat and Power:** Trapping excessive heat produced by wood burning devices and using the trapped heat to generate power
According to 2009 data published by the Vermont Sustainable Jobs Fund (VSJF), Lamoille County accounts for 3.2% of the state’s total commercial and industrial electricity consumption and 4.2% of statewide residential electricity consumption. Since 2004, these percentages have slowly increased as Lamoille County adds population, while other areas of the state lose population. Population growth and the corresponding increase in industry and commerce have historically resulted in year-to-year increases in electricity consumption throughout the region. Yet, the county’s electricity consumption actually fell between 2007 and 2008 before rising again in 2009. This blip is most likely attributable to the beginning of the economic recession in the last quarter of 2008. Other factors, such as higher electricity rates and greater public awareness regarding the benefits of energy efficiency and conservation have also contributed to less per capita consumption, especially in the residential sector.

**Transportation**

While households have a wide range of heating alternatives, the regional transportation profile is far less diverse. As a predominantly rural county at the edge of the Burlington and Montpelier job centers, residents of Lamoille County are almost entirely dependent on the automobile for everyday transportation needs. Estimates from the 2010 U.S. Census Bureau indicate that Lamoille County residents commute an average of 24 minutes to work each direction. More than 85% of Lamoille County residents commute to work by automobile, with nearly 76.7% of commuters driving alone. Currently, less than 20% of Lamoille County workers carpool, utilize public transit, and walk to work. Only an additional 1.8% was recorded as having the opportunity of working from home. For residents of smaller towns and remote areas of the county, trips to major grocery stores or schools can also be in excess of one hour, roundtrip.

From the perspective of energy planning, much of this data reflects traditional Lamoille County settlement patterns as 21st century, rural households rely almost exclusively on the automobile for transportation. At the Statewide level, Vermonters as a whole spend approximately one billion dollars a year on gasoline/diesel fuel for transportation needs.\(^4\) In light of current development trends, there are opportunities for Lamoille County to reduce its transportation-related energy consumption by promoting more efficient infrastructure, modes of transportation, and economic development patterns.

**Thermal**

Thermal energy is consumed for the purpose of generating heat. Clearly, demand for thermal energy is seasonal, with peak load occurring in winter. In Lamoille County, all thermal energy is generated from private systems, primarily through fuel-burning furnaces. As Figure 3-18 indicates, more than 70% of households rely on petroleum (heating oil or propane) to heat their homes. In addition to its adverse environmental impacts, petroleum is among the least cost-effective heating sources available.

As evidenced by the comparison chart in Figure 3-19, on a per MMBtu basis, petroleum is more expensive than

several more environmentally-friendly alternatives. However, the vast majority of existing structures in Lamoille County are equipped with fuel oil burners. Half of all Lamoille County housing was built prior to 1980. During the 1990’s and 2000’s, the County’s housing units increased significantly. During this time, the number of structures heated by wood alternative fuels actually declined.

Figure 3-19. Cost of home heating fuels ($/ MMBtu costs)

Comparatively, the popularity of fuel oil can be attributed to the low price of crude oil throughout much of the 1990s. In the last ten years, as the price of crude oil has risen dramatically, so too has the cost of fuel oil. For reference, in January 1992 the average price of fuel oil in Vermont was $0.96 per gallon, representing a cost of $624.00 for a household that consumes 650 gallons per year. By January 2012, fuel oil prices across the state averaged $3.85 per gallon, for an equivalent cost of more than $2,500. These economic incentives, coupled with renewed interest in environmental stewardship, have raised the profile of energy efficient “green technologies” and alternative fuel sources. At a minimum, residents of Lamoille County can anticipate the cost structure which shaped the region’s thermal energy profile over the previous two decades will be vastly different in the future.

Supply

Electric Suppliers

As previously noted, current energy consumption in Lamoille County far exceeds local production. Likewise, only a small amount of electricity is generated locally. Electric customers in Lamoille County purchase electricity from one of several local providers. See map at end of chapter for the distribution of electric service provider areas in Lamoille County. Presently, there are four municipally-operated electric utilities in the county:

- **Village of Hyde Park Water & Light Department**: Providing electricity to the Village and western half of the Town of Hyde Park, Hyde Park Water & Light serves approximately 1,325 customers. The Department does not own any electric generating capacity, purchasing all of its power from external sources.
Village of Johnson Water & Light Department: With a service area slightly larger than the Village limits, including Johnson State College, Johnson Water & Light provides electricity to more than 900 electric customers. Similar to Hyde Park, the Department does not operate any electric generating facilities.

Village of Morrisville Water & Light Department: With a service area covering most of Morristown and northeastern Stowe, Morrisville Water & Light provides electricity to approximately 4,000 customers. The Department operates three hydroelectric generating plants: Cadys Falls Dam (c. 1906), Morrisville Dam (c. 1924), and the Sanders Plant at Green River Reservoir (c. 1946).

Stowe Electric Department: Providing electricity to more than 90% of Stowe’s residents and businesses, the Stowe Electric Department serves more than 3,900 customers. Like Hyde Park and Johnson, it also does not generate any of its own electricity.

In addition to the four local municipal utilities, Lamoille County is served by the Hardwick Electric Department (in Wolcott and eastern Elmore) and the Village of Enosburg Falls Electric Department (with a small franchise area in Belvidere).

The majority of Lamoille County residents outside the franchise area of a municipal utility are served by Vermont Electric Cooperative (VEC), a member-owned co-operative headquartered in Johnson, with 34,000 customers located across 71 towns in northern Vermont. In geographic terms, VEC covers roughly half of Lamoille County, including much of Belvidere, Cambridge, Eden, Johnson and Waterville, as well as parts of Hyde Park and Morristown.

Washington Electric Cooperative and Green Mountain Power also serve small franchise areas in outlying parts of the county. Collectively, Vermont’s public and private power producers own the Vermont Electric Power Company (VELCO), which represents the state in the New England Power Pool (NEPOOL). Both VELCO and NEPOOL provide important power distribution services that impact the quantity and cost of electricity supplied to the region.

Transportation Fuels
Over 90% of Vermont’s vehicle fleet relies exclusively on petroleum-based fuels. All petroleum products consumed for transportation and thermal energy are imported. The combustion of these fuels for transport needs account for over 47% of greenhouse gas emissions emitted in the State of Vermont. Over the past five years, Vermont’s vehicle fleet has slowly transitioned to include hybrid, electric, and biodiesel vehicles, with hybrid vehicles (a combination of gasoline and electric fuel) increasing 73% from 2007 to 2010 and gasoline powered vehicles decreasing 11% over the same time.

As of October 2014, Lamoille County had the highest per capita electric vehicle ownership in the state, with 72 electric and plug-in hybrid vehicles registered to Lamoille County residents. As Vermont transforms its vehicle fleet, electric vehicle charging stations are becoming more prevalent across the state. As more companies, municipalities, and individuals switch to electric vehicles, the demand for additional charging stations will rise over time. LCPC is available to assist municipalities by applying for grant and/or loan funding to identify appropriate locations and facilitate in the installation of electric vehicle charging stations.
Public Transit
Although only a handful (0.2%) of Lamoille County residents currently utilize public transit, there are a variety of transit options in the region. Transit providers in the county include Chittenden County Transit Authority (CCTA), Green Mountain Transit Agency (GMTA), and Rural Community Transportation (RCT). In 2013, CCTA began commuter service from Cambridge to Burlington. GMTA provides bus and shuttle service throughout the county along Routes 100 and 108. Additionally, RCT provides shuttle service to transport Medicare and Medicaid patients to doctor appointments. In an effort to reduce the county’s carbon footprint, Lamoille County residents are encouraged to take advantage of these valuable public transit resources. For more information on public transit options in Lamoille County, refer to the Transportation chapter of this plan.

Heating Fuel
There are a variety of heating fuel providers servicing Lamoille County, the majority which provide delivery of petroleum-based fuels only such as oil, propane, and kerosene. However, certain providers, such as Bourne’s Energy, have recently come out with a new biofuel heating product. Bourne’s Bioheat fuel mix is comprised of 5% biofuel from salvaged vegetable oil and 95% petroleum-based heating oil. This new product is available via delivery or customers may fuel up at nearby biodiesel fueling stations.
Generation

Electric

The only municipally-owned power generating facilities in Lamoille County are three hydroelectric dams operated by the Morrisville Water & Light Department and the Pottersville Dam in Wolcott, owned by the Hardwick Electric Department. Overall, the three facilities owned by Morrisville Water & Light have generating capacity equivalent to 20% of Morrisville’s peak customer demand. The remainder of electricity consumed in Lamoille County is supplied by outside sources. Statewide, major contributors to Vermont’s electric grid include a statewide contract with Hydro Quebec, Seabrook Station nuclear plant in New Hampshire, and the wood burning McNeil Station in Burlington. At the residential-scale, Lamoille County has an estimated 37 net-metered solar-electric sites (with total capacity of 249kW) and 9 net-metered wind-power sites (with total capacity of 68kW). In 2011, the Vermont legislature streamlined the permitting process for small-scale solar systems (initially up to 5kW, expanded to 10kW in 2012), which is expected to increase the number of solar installations throughout the state. Ultimately, the cumulative capacity of Lamoille County’s current wind, solar and hydro-electric production accounts for a small fraction of the local electricity demand, estimated at more than 175,000 megawatt-hours (MWh) annually.

Thermal – Biomass

Prevalent biomass fuels used in Lamoille County include wood, ethanol, biodiesel and gas from municipal solid waste (MSW). The burning of wood biomass is a common and abundant source of energy, such as locally harvested firewood. Due to the fact that households may burn wood as either a primary or secondary source of heat, it is difficult to quantify the precise amount of energy generated from local firewood or other types of wood, such as wood pellets. Despite its long history in Vermont, burning wood for space heat may be decreasing in popularity: as recently as 1985, 48% of Vermont households utilized wood for some level of space heating (primary or supplemental). By 1998, this figure had fallen to 31.3%. According to recent Census estimates, only 21% percent of Lamoille County households utilize wood as a primary heating source.

Beyond the residential scale, there are two high capacity wood burning systems within the county, both at public schools. Lamoille Union High School/Middle School in Hyde Park has a 7 MMBH wood-fired system that consumes 1,200 tons of wood biomass annually and Johnson Elementary School utilizes a 1 MMBH wood-fired system that consumes an additional 198 tons annually. According to Lamoille Union staff, since first installed in 2007, the wood furnace has generated savings of $80,000 to $100,000 annually over previous fuel oil cost.

In addition to wood products, other lesser utilized biomass energy sources include methane digesters, perennial grasses, and biofuels (derived from ethanol or waste cooking oil). Prior to the expiration of a $1.00/gallon federal blender’s tax credit in 2010, “biofuel-heating oil blends” were widely distributed to homes across the state. With the loss of this subsidy, the price of biofuels increased and demand plummeted. When available at a competitive price, biofuel-heating oil blends represent a viable alternative heating source, as they can be burned in most standard fuel oil furnaces, with reduced environmental impacts.

Thermal – Geothermal

Geothermal or “ground source” installations are among the most cost-efficient heating and cooling systems available. Utilizing technology similar to that of a home refrigerator, geothermal units pump coolant, which can

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switch between hot and cold, from below the earth’s surface. While the cost of an initial installation varies by site, the investment payback is typically estimated at three to ten years on new construction. As an added benefit, the excess heat from a geothermal system can generate a share of a household’s hot water needs. Currently, there is no comprehensive database of geothermal sites in Vermont. The Vermont Sustainable Jobs Fund and Lyndon State College have partnered to collect this information in coming years.

**External Supply**

As Lamoille County generates only a small portion of the energy it consumes locally, residents and businesses are greatly impacted by fluctuations in global energy markets, which largely dictate electric, heating, and transportation costs. An overview of long-term economic and environmental considerations across energy sectors is outlined below.

**Future Electric Supply**

The Vermont Yankee nuclear power plant (closed as of 2014) energy contribution has been largely replaced through outside sources, but these contracts may not promise the same long-term rate stability as recent Vermont Yankee contracts. Similarly, the state’s contract with Hydro Quebec is a variable rate agreement, tied to the prevailing market conditions. While wholesale electric rates are currently low, the lack of local production leaves Lamoille County vulnerable to market volatility. In addition, electric transmission costs have increased at a near-exponential rate in recent years. Increasing local production is the only way to hedge against the rising cost of transmission.

**Transportation Trends**

As a petroleum-based fuel source, trends in gasoline prices have largely mirrored those of home heating oil over the last two decades. Generally, gas prices retailed below $1.50 per gallon through the 1990s. Since 2005, prices have been consistently above $2.00 per gallon, with summer 2008 prices peaking above $4.00 per gallon.

Compared to home heating, transportation habits, while still somewhat resilient to price fluctuations, are far less rigid. When gasoline prices spiked during 2008, transit ridership across the country swelled, with drivers favoring fuel-efficient compact cars and—according to the Federal Highway Administration—Americans simply drove less. The new theory of “Housing + Transportation” seeks to quantify the costs of living further from where you work (see Housing Chapter).

Should gasoline prices reach $4.00 per gallon for an extended length of time, commuting patterns across the region are subject to change. With increased prices, workers are unlikely to migrate to new jobs, but there would likely be greater utilization of park-and-ride stops and public transit. In the long-term, were high gas prices to persist, many workers would likely re-visit their decision on where to live, work, or both. Vermont would also have a ridership incentive to explore more options for rural transit. Overall, as a region built to accommodate automobile travel, higher or continually volatile gas prices would fundamentally change future development patterns.

**Thermal Energy**

With the vast majority of Lamoille County households relying upon petroleum-based fuel sources for heat, future thermal energy costs in the region are largely tied to the price of crude oil. As demonstrated during the summer of 2008, crude oil is subject to extreme price volatility. In general, the price of petroleum-based fuel sources,
including home heating oil (Figure 3-20) have trended upward sharply over the last decade, despite remaining relatively stable in the previous decade. Price spikes in the heating oil market prompted some consumers to switch to wood burning furnaces. Since home heating elements are long-term, fixed investments, it generally requires a prolonged run of unexpectedly high prices to convince consumers to invest several thousands of dollars in a new home heating system. The fact that so many homes are still heated by fuel oil, even after the record prices levels reached in 2008, is evidence of this reality.

![Figure 3-20 Price of Home Heating Fuel, 1991 – 2011](image)

**Production and Transmission**

With the region’s current dependence on energy suppliers, it will be critical for Lamoille County to diversify its energy profile and expand renewable energy production to reduce carbon emissions and enhance long-term price stability. With the combination of rising energy prices and the lagging economic recovery, there appears to be great momentum across the state in support of this cause. Opportunities for expanded generation within Lamoille County include hydroelectric, wind, solar, biomass, combined heat and power (CHP), and methane projects. Ultimately, any grid-connected installation is subject to the review and approval of the Vermont Public Service Board under 30 VSA §248.

**Biomass**

Wood—in the form of cordwood, pellets, chips, and sawdust—is a commonly used energy source in Vermont. Wood biomass is a versatile fuel that provides energy at a wide range of scales, from heating small homes to powering the 50MW McNeil electric generating plant in Burlington.

As previously noted, on a $/MMBtu basis, wood biomass is one of the most cost-efficient heating sources available. In Lamoille County, wood also represents an opportunity to generate renewable energy from the region’s natural resource base, while supporting the local forest economy. Although estimates on the amount of biomass that can be sustainably harvested from Vermont’s forests vary, a moderate-scenario published by the Biomass Energy Resource Center estimates that Lamoille County is covered by more than 61,000 green tons of Net Available Low-grade Growth (NALG). NALG is defined as wood that would be appropriate for use as biomass fuel, above the current harvest levels. Lamoille County ranks sixth among Vermont counties in this category,
despite its comparatively small land area. For existing and potential biomass sites in Lamoille County see the map at the end of the chapter.

The installation of wood-fired heating systems, rather than propane and fuel oil furnaces, can provide a more efficient, viable way of delivering heat to Lamoille County homes and businesses. Future efforts to produce biomass for widespread consumption within the county must be coordinated with local forest management plans to ensure the continued sustainable harvest of the region’s forests.

**Hydroelectric**

Prior to the 1920s, Vermont relied almost exclusively upon local hydro-power to supply the state’s electricity needs. In Lamoille County, the availability of hydro provided a foundation for 19th century industry and was the primary reason why several villages were initially founded. Although hydro declined in popularity through much of the 20th century, it regained favor during the early-2000s. Undeveloped hydro potential estimates have yet to be quantified, but several sites in Lamoille County could support some scale of micro-hydro generation. Many of these potential sites are actually existing inactive or non-producing dams, which can often be developed with minimal environmental impacts but at a great financial cost. See Map labeled Existing and Potential Hydroelectric Sites in Lamoille County. When designed with sensitivity to water quality and wildlife passages, such projects could generate clean, renewable electricity for communities. Prospective developers, public or private, should consult with the Vermont Agency of Natural Resources to conduct a pre-feasibility assessment and gauge the economic viability and environmental impacts associated with a potential hydro site.

**Wind Power**

Vermont has significant potential for the generation of electricity through large-scale wind turbine installations, otherwise known as wind farms. Only a handful of operations exist in the state, with a 21 tower, 61.5 MW Kingdom Community Wind project recently completed in the neighboring town of Lowell. This project is an example of the scale of commercial wind generation that could potentially be developed in the Green Mountains and north-central Vermont. Ultimately, such operations have the potential to generate vast amounts of renewable energy, but must be planned with sensitivity towards their impacts on aesthetics and local bird and wildlife populations, as well as noise disturbances for surrounding property owners.

A map of 30-meter wind resources produced by the Vermont Environmental Research Associates in 2004 reveals Lamoille County is predominantly characterized by Class 1, 2, and 3 (See Map Potential for Wind Power and Existing Wind Sites) wind zones, whereas Class 6 and 7 are desirable for commercial wind generation. The few places in Lamoille County with wind speeds suitable for commercial generation (generally, elevations greater than 2,000 feet), would likely raise significant aesthetic and environmental impact concerns. The State of Vermont, which owns much of the land most suitable for commercial wind generation, prevents putting energy projects on ridgelines. Any efforts to site a commercial wind operation within Lamoille County will be reviewed in light of all visual, environmental, and economic impacts associated with the proposed project. Please reference LCPC’s specific siting criteria in the Strategy section, page 2.

While large-scale wind installations typically trigger regional impacts, smaller applications can be discreetly sited at residences, businesses, farms, and schools. When compatible with the character of the surrounding area, such smaller turbines can be an economical way to reduce consumer energy costs. Municipalities are encouraged to establish policies regarding small-scale wind generation within local bylaws and municipal plans.
Solar Energy

Despite Vermont’s temperate climate, photovoltaic (PV) and thermal solar applications represent a potentially viable source for generating electricity and heat. PV solar panels convert the sun’s energy into direct electric current, which is net metered back to the grid. Alternatively, thermal applications are generally connected to a network of pipes, wherein water is cycled to a mounted panel (typically on the roof of a structure), heated by the sun and then stored in a tank to supply various household uses. Most often, solar panel applications in Vermont are used as supplemental electric or heating sources. Self-sufficient systems are usually supported by a back-up generator for times when solar and wind exposure is low.

A 2012 amendment to net-metering legislation allowed residential systems to take advantage of net-metering policies long implemented by commercial utility providers. In the case of solar, private investors can now not only get renewable energy credit payments for excess electricity produce by their PV system, but can sell credits to residential neighbors, allowing multiple households to buy and utilize power from the same photovoltaic system.

Over time, the cost of solar panel installations has decreased while the efficiency of these systems has improved. As solar panels become even more cost-effective to operate, it is anticipated they will continue to grow in popularity. PV systems are already installed at private companies and municipal electric departments around Lamoille County, and many have plans to expand. To view the location of existing and potential solar project sites in Lamoille County, see the map at the end of the chapter.

In 2011, the Environmental Protection Agency selected the Vermont Asbestos Mine Group site in Eden/Lowell to conduct a solar power feasibility study. The National Renewable Energy Laboratory and the EPA assessed 4 Photovoltaic system and placement scenarios, calculating a variety of economic and performance factors for each situation. These factors include but are not limited to: Net Present Value, site remediation costs, number of homes powered, and jobs created. The scenario with the greatest financial return for installing a PV system at the mine site would yield an estimated Net Present Value (Value of investment after price discounts) of $2,199,995 per year and an Investment Return Rate of 24%.

The report found that: “For multiple reasons—the high cost of energy, the dropping cost of PV, and the existence of a reasonable solar resource—...a PV system is a reasonable use for the site when partnered with the Vermont SPEED standard offer” (30). Unfortunately, the SPEED offer is no longer a feasible funding source. To make this project financially feasible, there are two considerations for this site: 1) the purchase price of the electricity produced and 2) the safety of the workers who will install the solar system. If the site must be remediated prior to panel installation, construction costs increase significantly. If state flexibility allows the system to be installed without remediation, other safety precautions could increase costs but would make the project more financially attractive. A copy of the complete report may be obtained upon request from LCPC.

As communities in Lamoille County continue to explore new opportunities for implementing solar power systems, including on the mine site, there is a variety of financing models to consider. Table 3-21 demonstrates some of the more common finance structures used to install large-scale community solar projects.

Solar is a desirable alternative fuel source because it converts the inexhaustible energy of the sun into clean electricity and heat with minimal byproducts. With the variety of sizing and design options, solar panels can be...
installed with little to no off-site visual impact. Beyond panel installations, solar energy can also be utilized passively in energy efficient building designs that collect and retain the sun’s heat.

Maximizing south-facing window exposures, utilizing solar-absorbent construction material, and incorporating natural modes of heat transfer into construction represent just a few strategies for passively harnessing solar energy. In new construction, such designs represent a relatively low-cost, low-impact option for maximizing energy efficiency.

Table 3-21. Solar Finance Models

<table>
<thead>
<tr>
<th>Financial Model Type</th>
<th>Owner/ Project Costs Structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner/Operator Financing (private investor)</td>
<td>Private investor owns/ pays for project costs and utilizes cash flow/ tax benefits. Investor takes out loan to pay for initial project costs.</td>
</tr>
<tr>
<td>Owner/Operator Financing (Municipal)</td>
<td>Municipalities can own/ pay for a solar project through a tax exempt lease structure/ stand-alone bond.</td>
</tr>
<tr>
<td>Third Party Developers, Purchase Power Agreements</td>
<td>Developer pays for project then owns and operates the system before selling electricity back to site hosts or utility at a negotiated price.</td>
</tr>
<tr>
<td>Third Party Flip Agreements</td>
<td>Site host works with a developer that solicits an investor to pay for and own a project until cash flow the agreed amount of return on investment. Once the agreed cash flow is met on site the host owns the system.</td>
</tr>
<tr>
<td>Solar Service Agreement Operating Lease</td>
<td>Private party (nonprofit/utility) sells energy credits to a municipality. Utility purchases solar system upfront. In a separate transaction a municipality can buy out the system once the third party has accrued tax credits.</td>
</tr>
<tr>
<td>Sale/Lease Back</td>
<td>Public or private entity (town, resident) installs PV system, sell it to a tax investor and leases the system from the investor. In exchange for use of system, the private entity makes lease payments to the investor.</td>
</tr>
<tr>
<td>Community Solar Gardens</td>
<td>A site owner makes land available for a solar project. For large solar projects, a local utility company owns the PV system. Costs/ benefits are shared among all participants. Utility customers have a pro-rated share of the system’s energy output. Shares are acquired through leasing “x” number of panels/ energy output.</td>
</tr>
</tbody>
</table>


Methane Recovery

Methane recovery is an alternative to producing electricity that does not involve the burning of fossil fuels. Farms across the state are harnessing methane gas to produce electricity through the use of digesters. Methane digesters are comprised of various containment systems where manure is collected and heated to produce methane gas. The solid by-product of these systems can yield farmers additional savings by using the material as bedding for cows and other farm animals.

Currently, there are two digesters located on farms in Lamoille County: Joneslan Farm in Hyde Park and Keewaydin Farm in Stowe. Two other potential digester sites have been identified in Lamoille County by the Vermont Renewable Energy Atlas. According the USDA, there are no set minimum input requirements for digesters to operate on farms. Any size farm could operate a digester, however, certain variables make investing
in a methane digester more cost effective. Working with local power companies to transfer power to the “grid” and the ability to provide capital for installation are a few cost considerations. Other factors may include:

- Distance to three-phased power
- Quality of one-phase power
- Location of central manure collection point
- Cattle dietary needs such as liquid-based diets to ease manure transport
- On-site staff capacity
- Ability to apply for state permits
- The need for bedding, electricity, and heat

Due to the above financial considerations, methane digesters are more commonly found on Medium and Large Farm Operations (farm operations hosting 200 to 699 mature dairy cows or 700+ cows). Presently, there are zero designated Large Farm Operations and three Medium Farm Operations in the County. For the location of existing and potential digester sites in Lamoille County see the map at the end of the chapter. Eligible farms may be eligible for financial assistance to install a methane digester through the USDA’s Environmental Quality Incentives Program.

Combined Heat and Power

While large-scale biomass facilities that produce electricity reduce Vermont’s dependence on out-of-state, non-renewable energy sources, they fail to harness the full potential of their fuel supply. In isolation, the process of burning wood for electricity achieves less than 25% combustion efficiency, with the remaining energy lost in the form of heat. However, when coupled with a mechanism to capture this excess heat, wood burning facilities can realize efficiencies of up to 75%. For decades, such combined heat and power (CHP) systems, also known as cogeneration, have been installed in industrial facilities across the world. These systems produce electricity both for on-site consumption and sale back to the grid, while piping excess heat to help meet the thermal needs of the facility. At the community-scale, centralized CHP systems can supply heat to households and businesses within a limited radius, in what is commonly known as “district heating” systems. In addition to wood-fired systems, CHP can also be developed for gas-powered turbines. This technology is widely utilized in Europe and in large cities across North America.

Similar to biomass, wood-fired CHP systems are of particular interest in Lamoille County given the amount and quality of timber in the County. To provide an attractive return on investment to any prospective developer, they must be sited in proximity to a facility or group of buildings capable of utilizing a large, year-round heat and power supply. Ideal sites include hospitals, hotels, apartment complexes, and industrial sites. As the county continues to grow, opportunities for CHP installations concurrent with new development should be created.

With funding from the Vermont Clean Energy Development fund, LCPC has produced a set of maps (available at the end of the chapter) that identify potentially viable CHP sites, based on criterion such as appropriate zoning and land use designations; proximity to electric transmission lines; buffering from environmentally-sensitive areas; and access to municipal water and sewer. Potential CHP sites identified for Lamoille County include Copley Hospital in Morrisville, Johnson State College, Fisher Bridge Industrial Park, and the Johnson and Hyde Park Industrial Parks. Additionally, Smugglers’ Notch Resort has assessed their property as a feasible CHP site. The full report on CHP in Lamoille County is available on LCPC’s website.
Transmission
The primary service provider for transmission lines in Vermont is the Vermont Electric Power Company (VELCO). VELCO currently owns over 732 miles of transmission lines across New England. Many of these transmission lines are desperately in need of an upgrade. As large new developments, such as the expansion of Jay Peak Resort, and commercial renewable energy systems increase throughout the state, increasing pressure is placed on the current grid system. The rise in energy demands of these new developments and projects bring the state as a whole one step closer to reaching transmission capacity. Without the ability to store renewable energy produced, our current grid system is limited in terms of the electrical load it can withstand.

In 2012, VELCO issued its most recent Long Range Transmission Plan. Four main areas in Vermont were selected for transmission line upgrades and/or newly constructed lines in Green Mountain Power’s service area; none of which fall within the borders of Lamoille County. VELCO’s current plan not only lacks a plan for upgrading lines in the Lamoille Region, but bases upgrades solely on existing lines rather than proposed new developments. As a result, new developers in the County are forced to pay for transmission line upgrades to ensure appropriate electric capacity will be supplied to their development. The costs of VELCO’s proposed upgrades varies widely, making it difficult to estimate these costs for Lamoille County without a detailed analysis provided by qualified consultants.

<table>
<thead>
<tr>
<th>Regional Grouping and Transmission Solutions</th>
<th>Estimated Transmission Project Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Southwest Vermont: Rebuild Vermont portion of the Vernon to Northfield 345 kV line as part of larger VT/NH/MA upgrades</td>
<td>$6 Million</td>
</tr>
<tr>
<td>Connecticut River Valley: Construct a second 115kV line between Coolidge and Ascutney</td>
<td>$93 Million</td>
</tr>
<tr>
<td>Central Vermont: Construct a second 345kV line between Coolidge and West Rutland</td>
<td>$157 Million</td>
</tr>
<tr>
<td>Northwest Vermont: Rebuild the West Rutland to Middlebury, New Haven to Williston and Williston to Tafts Corner, 115kV lines</td>
<td>$221 Million</td>
</tr>
</tbody>
</table>

Source: VELCO’s 2012 Long Range Transmission Plan

Energy Siting
The siting of all energy generating facilities and transmission or pipeline projects in Vermont must comply with 30 VSA §248 requirements. The siting process involves obtaining a Certificate of Public Good through the Vermont Public Service Board. Criteria examined during this process include: orderly development as stated in the Town and Regional Plans; demand for service, system reliability, and economic benefits; and the impact on communities and a set of environmental criteria. Municipalities and RPCs may participate in the siting process by 1) submitting written comments to the Public Service Board on proposed projects 45 days before they’re reviewed by the Board, 2) speaking at public hearings, and 3) register as a formal party to attend site visits and testify at public hearings. For more information on the Section 248 process visit www.publicservice.vermont.gov.

Due to changes in state legislation and a rebound of the national economy, renewable energy projects have gained in popularity in recent years. Energy siting has been a major topic of discussion at local, regional, and state
levels. While the Public Service Board only has to consider what is contained in local and regional plans, it is critical to establish a standard by which to review projects to give voice and value to municipal and regional bodies. LCPC’s criteria include a review of the following impacts to:

- Forests, particularly increasing fragmentation of contiguous forest land or decreasing available forest land
- Agriculture, particularly increasing fragmentation of contiguous agricultural land or decreasing available agricultural land
- Wildlife and wildlife habitat, such as deer yards, moose and bear habitat, bird migration patterns, and endangered and threatened species
- Water quality
- Soil degradation
- Aesthetic viewsheds, including the following ridgelines and scenic views:
  - Mount Elmore and the Worcester Range
  - Mount Mansfield and the Sterling Range
  - Woodbury Range
  - Butternut Mountain
  - Belvidere Mountain
- Recreation
- Road network
- Location and extent of mitigation from the proposed project. If mitigation is proposed, LCPC supports developers working with the municipality receiving the mitigation.
- Economic impacts, such as gain or loss of revenue, from proposed project

Electricity generating projects up to 15kW (or 150kW for farm methane) are entitled to sell electricity back to the grid for credit under Vermont’s net metering statute (30 VSA §219), passed in 1998. According to the statute, net metered sites must be credited for electricity sold back to the grid up to the amount of their annual consumption; no credit is given for any amount generated beyond annual on-site consumption. For larger projects, developers may negotiate tariffs or other rate agreements directly with their electric utility provider. Vermont’s net metering rules are regularly evolving. Anyone interested in learning more about net metering should contact their utility provider for more information.

**Future Trends in Energy**

In the last four decades, Lamoille County’s population has nearly doubled. This growth has been largely tied to the expansion of the local tourism industry and the growth of neighboring Chittenden County, where many local residents commute to work. Both of these economic drivers are highly dependent on an auto-oriented transportation network that allows both visitors and commuters to enter and leave the region at ease. With petroleum prices expected to increase over the long-term, the parallel rise in travel costs will burden the Lamoille County economy, absent a strategy to reduce fossil fuel dependence. Therefore, it will be critical for the region to find opportunities for greater energy efficiency in the region’s traditionally rural landscape.

**Natural Gas**

The availability of natural gas in Lamoille County is currently limited. Presently, natural gas is less carbon-intensive than other fossil fuels. It is available to a small number of Vermonters and accounts for approximately 5% of total energy usage across the state. New extraction techniques have raised significant environmental concerns – some
even being banned in Vermont, and constructions of pipelines have caused significant challenges for proposed projects. However, the price of natural gas has been lower than other forms of energy and could be an attractive option for commercial and residential properties.

Residential Land Use & Development Trends
Lamoille County’s population growth has largely been fueled by the construction of single-family homes in rural areas of the county. From 2000 – 2010, the number of housing units in Lamoille County grew by more than 31%, compared with a 24% population increase. This disparity can be attributed to a number of factors, including a decreasing average household size, a long-term expansion in the national housing market, and the growing number of seasonal homes within the county.

While LCPC encourages contiguous development within traditional village centers, it is likely that the bulk of future development in the county will occur in outlying areas, as has been the case for several decades. This development pattern will, out of necessity, lead to an increase in vehicle miles on the region’s roadways and have additional environmental impacts for on-site sewage and stormwater runoff.

Despite this trend, there are ways that the prevailing rural residential development pattern can be more energy efficient. Regulatory and non-regulatory practices can be implemented. Site layout and design, including orientation of buildings and vegetation, can promote the conservation of energy and permit the utilization of renewable energy resources, for example by maximizing southern exposure for passive solar gain, locating vegetation for shade / insulation, etc. Many municipalities throughout Lamoille County have provisions in development bylaws to encourage Planned Unit Developments (PUDs). PUDs allow for more flexibility in subdividing land by allowing developers to cluster housing units to preserve open space and create more economical site designs. Additionally, the Vermont Municipal and Regional Planning and Development Act (Chapter 117) also allows municipalities to develop other regulatory and non-regulatory land use policies that encourage more energy efficient development.

Lamoille County will long be characterized by rural development surrounding its compact village centers. While such a development pattern necessitates the use of automobiles for daily transportation, there are many ways to make this development pattern more energy efficient, through sound land use planning and infrastructure development. LCPC is available to assist all municipalities in the development of both regulatory and non-regulatory land use strategies to promote greater energy efficiency throughout the county.

Commercial & Industrial Development
While residential development throughout the county has spread outward, business activity remains largely concentrated in clusters. For example, tourism-based industries are clustered along the major transportation corridors in Stowe and Cambridge. Likewise, information and technology-based businesses requiring broadband access are centered in the growth centers of Stowe and Morrisville. Lamoille County residents are taking advantage of broadband internet access to either telecommute or operate a business out of their own home.

Ultimately, the future of commercial and industrial development within Lamoille County is largely tied to infrastructure capacity. To this end, the Future Land Use Map identifies future development nodes and the capacity of local water, sewer, and electrical systems. The primary nodes for commercial and industrial development include the Center Areas served by both water and wastewater infrastructure on the Future Land Use Map, as well as certain Enterprise Areas, such as the North Hyde Park Industrial Park. Additional development
within these areas, as designated by municipal plans and land use regulations, would expand the regional employment base and economize the county’s energy profile. Being located near existing services and transportation corridors will decrease energy transmission costs.

**Public Energy Expenditures/ Governmental**

Public facilities, including government offices, schools and municipal utility providers, represent a third sector of energy consumption in the county. With many municipal services operating in older buildings, energy efficiency retrofits represent an opportunity to invest in long-term energy savings. Other simple strategies, such as inventoried streetlights or conducting energy audits for public buildings, can reveal additional cost-saving opportunities. Ultimately, the energy demands of the public sector will mirror those of the private sector, as more efficient development patterns lead to a more efficient delivery of public services.

**Energy Efficiency and Conservation**

In addition to increasing local production, Lamoille County can streamline its regional energy profile by adopting a variety of energy efficiency and conservation strategies at the household-level. Efficiency Vermont, the country’s first ratepayer-funded energy efficiency utility, provides technical assistance, rebates, and financial incentives to help reduce consumer energy costs. It was created by the Vermont legislature in 1999 and is managed by the Vermont Energy Investment Corporation (VEIC), a private non-profit organization. Efficiency Vermont is funded through an energy efficiency charge assessed on electric bills across the state (with the exception of Burlington Electric Department, which provides its own energy efficiency services within the city). Since beginning operation in 2000, Efficiency Vermont’s services have saved an estimated 660 million kWh of electricity annually.

Beginning in 1997, Vermont has enforced Residential Building Energy Standards, referred to generally as the “energy code”. These minimum standards for energy efficiency apply to nearly all new residential structures less than three stories in height and additions greater than 500 square feet. The energy code was revised in 2011 to strengthen standards for building envelope efficiency. More information on Vermont’s energy code is available on the Department of Public Service website (http://publicservice.vermont.gov). New construction reviewed under Act 250 is also required to demonstrate utilization of the “best available technology” for energy efficiency, as specified in criteria 9(F).

Ultimately, there are a wide range of opinions on how Vermont should develop and implement a statewide energy policy, if at all. There is, however, no debate that reducing energy consumption—whether thermal, electric, or transportation-related—has a positive economic and environmental impact.

**Financial Incentives**

There are a variety of ways businesses, municipalities, and individuals can save energy including installing more efficient heating systems, improving insulation and air sealing in old buildings, replacing inefficient lighting or appliances, and by taking advantage of passive solar heating. Energy efficiency improvements on average can yield up to a 10-20% or greater return on your investment. Efficiency improvements in commercial, residential and municipal buildings not only save money on utility bills, but can improve indoor air quality and comfort.

A variety of programs, including Efficiency Vermont and the Weatherization Assistance Program (WAP), offer financial incentives for home or commercial multi-family weatherization projects. When weatherizing a home,
Homeowners can reduce their energy use by 30-40%. Funding is available to those who meet eligibility requirements. For more information on energy efficiency financial incentives visit [www.efficiencyvermont.com](http://www.efficiencyvermont.com).

**Local & Regional Energy Planning**
While consumer energy habits are primarily driven by national and global markets, local energy policies can, in fact, enhance energy efficiency in communities throughout Vermont. In addition to sound land use planning—which is an energy conservation strategy in and of itself—municipalities have an array of techniques at their disposal to encourage a more sustainable local energy profile. LCPC is available to assist municipalities to use these techniques while leading by example as a region.

To encourage energy efficiency and conservation, municipalities can:
- Increase public awareness on energy-related issues.
- Promote the efforts of Efficiency Vermont and other non-profits so residents have the opportunity to capitalize on subsidies and rebates that lower energy consumption and save money.
- Reduce public energy expenditures through baseline energy audits and the implementation of efficiency retrofits on buildings and equipment to lower the tax burden and yield a high return on investment.
- Encourage non-vehicle modes of travel, creating park-and-ride stops, and supporting carpool and “ride share” networks.
- Encourage and promote renewable energy projects and infrastructure investments.
- Establish a Property Assessed Clean Energy (PACE) district; this effectively allows property owners to borrow money to pay for energy improvements on a property, with loans attached to the property—not the individual.

Regionally, municipalities and interested residents are invited to participate in sub-committees of the LCPC Board of Directors, including the Energy Committee, Transportation Advisory Committee (TAC), Plan and Project Review Committee, and Regional Plan Committee. Each, to a certain extent, makes recommendations on programs and policies that influence the county’s energy future. By continuing to work with municipalities on land use, short- and long-term planning, transportation planning, and other areas, LCPC is able to facilitate a comprehensive regional energy strategy.
Map – biomass
Map – hydro
Map: wind
Map – solar
Map - methane
Map – CHP
Map – electric
Information about how energy-generating maps included in this section were developed

Solar Potential and Existing Solar Sites
Existing solar ground and roof mounted PV sites data was collected from the Vermont Clean Energy Development Fund, the Vermont Public Service Board, and other sources. Solar potential was mapped based on the following constraints:

- Only slopes less than or equal to 10% were considered for “South facing” aspect from 90 degree (East) clockwise thru 270 degrees (West),
- Only slopes less than or equal to 5% were considered for greater than 270 degrees (West) clockwise through 0 degrees (North) to less than 90 degrees (East),
- The following areas were excluded: frequently flooded areas, conserved lands, transportation infrastructure, 9-1-1 buildings, surface waters, wetlands, deer wintering areas, rare, threatened and endangered species, and natural community features,
- In order to model the constraint of wind loading on ground mounted panels, areas with a wind data class greater than “3”, from the AWS TrueWind “Residential Scale” 30m hub height dataset, were used as a surrogate to mask out these areas.

More detailed information can be found at http://www.vtenergyatlas-info.com/solar/methodology.

Potential for Wind Power and Existing Wind Sites
The wind speed dataset was produced by TrueWind Solutions and commissioned by the Massachusetts Technology Collaborative, in conjunction with the Connecticut Clean Energy Fund and Northeast Utilities. Wind speed predictions at 70, 50 and 30 meters were generated by a numerical model that simulates weather conditions over a 15-year period, taking into account geophysical inputs such as elevation, land use, and vegetation. Seventy meters is a typical height for the current generation of large wind turbines of 750 KW to 2 MW rated capacity. Generally speaking, commercial wind power projects using large turbines require a resource with a mean speed of at least 7 m/s or mean power of at least 400 W/m^2 (NREL class 4). Fifty meters is a typical height for the current generation of small-scale commercial wind turbines, while thirty meters is a typical height for small turbines up to 50 KW rated capacity used for residential power generation. Smaller wind turbines that are designed to operate at lower wind speeds, may be viable at mean speeds as low as 5-6 m/s (True Wind Solutions, Northern New England Project Report, 2003).

More detailed information can be found at http://www.vtenergyatlas-info.com/wind/methodology.

Existing and Potential Hydroelectric Sites
The existing hydroelectric dam data portrayed in this layer was extracted from the Vermont Dam Inventory for dams with currently operating hydroelectric facilities. Potential hydroelectric sites were derived from a study conducted by Lori Barg (Community Hydro) for the Vermont Department of Public Service entitled The Undeveloped Hydroelectric Potential of Vermont. Barg reviewed existing databases from 1980 to 2006 to determine undeveloped hydropower potential in Vermont. Barg reports that each previous study used different assumptions that yielded different results for power potential and that there is no reliable estimate of the undeveloped hydroelectric potential in the state. A spreadsheet that integrates the limited and conflicting data sets available was compiled by Barg and the Atlas uses middle of the road values identified in the spreadsheet (i.e., values presented by the New England River Basins Commission).

More detailed information can be found at http://www.vtenergyatlas-info.com/hydro/methodology.
**Existing and Potential Methane Digesters**

Methane digesters are oxygen-free tanks or containers that use microorganisms (i.e., different types of bacteria) to transform biomass (e.g., cow manure, waste-water) into ‘biogas’ (e.g., methane and carbon dioxide). This biogas can then be fed to a gas engine to generate electricity, or to a boiler to generate heat.

Existing methane digesters were compiled from the GMP Cow Power website, the Clean Energy Development Fund, and the Vermont Public Service Board. Potential methane digester locations were compiled by Stone Environmental, Inc. for the Vermont Compost/Biogas Data Viewer project. Stone obtained the farm location data from numerous sources: the large and medium farms information came from the Vermont Agency of Agriculture, Food and Markets, with the remainder coming from the Emergency 9-1-1 board’s “ESITE” dataset (Sitetype = “Commercial Farm”). The data was modified to present ranges of livestock and potential energy generation. For example, if a farm had 273 cows they are presented as a Medium Farm with 250 – 699 cows. If a farm had 1,000 cows, they are presented as a Large Farm with > 700 cows.


**Potential for Wood Biomass Production and Existing Wood Biomass Thermal Sites**

According to the Biomass Energy Resource Center (BERC), the most common source of woody biomass fuel comes from sawmills that chip wood as a by-product. Wood chip or pellet systems require fuel storage capability, a means of moving the fuel from the storage bin to the boiler, a boiler to burn the fuel and extract the useable heat from combustion, and a connection to a chimney to disperse the combustion gases.

The data source for the Woody Biomass layer was all forest land cover extracted from the 2006 National Land Cover Dataset (NLCD) and further filtered by Vermont Center for Geographic Information (VCGI) to remove “masked” portions of the land base that should not be included for various reasons (e.g., physical, ecological).

Telecommunications: Strategy

Today’s society makes access to a variety of communications mechanisms an absolute necessity. Lamoille County is covered by basic telecommunications infrastructure with significant gaps. Village areas often have cable television, broadband internet, and DSL phone coverage but coverage to the rural parts of the County is severely limited. Visitors, businesses, residents, job seekers, emergency responders, and utility workers rely on cellular phone coverage, high speed internet, and other forms of technology for day-to-day functions and services. Cellular coverage has improved since 2006 but is still limited in many locations due to terrain and service provider propriety. As integral as mobile devices and connectivity are to the future, this plan recognizes the limitations to universal coverage by federal regulation, Vermont’s dispersed population, and incomes. These are not insurmountable. To better position Lamoille County to attract visitors, retain residents, and build businesses, LCPC’s objectives for Telecommunications are:

**Complete cellular and mobile phone coverage for all of Lamoille County.** Today, 30% of Vermont adults live in a wireless household. The traditional landline is fading from memory in favor of multi-functional mobile devices. Four national carriers provide services in Vermont. Lamoille County’s mountainous geography and dispersed population has made it difficult for universal coverage along state highways and local or private roads. For emergency services, business, and tourism to thrive here, phone service must be available to all reaches. However, it must be recognized that infrastructure and federal regulation prevent the collapse of the telephone network. As technology changes, LCPC should follow the availability of this service.

**Complete Wi-Fi or broadband coverage, or future compatible Internet technology, for all of Lamoille County.** While many Center Areas of communities currently receive fast Internet connection and coverage, much of Lamoille County is underserved by affordable high-speed Internet. The state, nation, and world are moving towards a more technologically connected society, from how we are entertained to filling out job applications to conducting business, choosing healthcare, and paying taxes online. For Lamoille County to remain competitive and attractive, it must offer outstanding technological capabilities for all parts of the County.

**Adopt a 10-year plan for Lamoille County telecommunications towers and coverage.** Understanding that technology is advancing faster than this plan, LCPC should adopt a future plan for telecommunications, including tower siting, co-location potential, unserved areas, and a need assessment based on providers’ future plans. Rather than wait for towers to proliferate across the hills, valleys, and open spaces of the county, or for the economy to lag, LCPC should be strategic in where infrastructure is needed and what factors are needed to facilitate co-location.

This plan recognizes that technology is evolving at a rapid pace; therefore, technology may outpace recommendations before this plan expires. LCPC will need to plan for these infrastructure components and whatever components are developed in the future, based on advice from experts familiar with the latest in information technology.

**POLICIES & ACTION ITEMS**

**Policy:** All Lamoille County residents should have access to the benefits provided by expanded broadband coverage to bridge the “Digital Divide” between those with access and those without.
Action Items:
- Ensure children from rural areas and/or low income families are provided with the same digital opportunities as children from urban areas and/or more affluent families.
- Promote the development of affordable pricing structures to facilitate broadband adoption by elderly and low income residents.
- Encourage community service partnerships in which individuals with technology experience share their skills with others (for example, facilitating formal or informal connections between high school or college students to share technology skills with seniors) to ensure all populations have a working knowledge of new technologies.
- Working in coordination with regional partners, provide targeted outreach to people who are hesitant to embrace technology or have questions about its use, regardless of demographics and/or income level.
- Through collaboration with multi-sector service providers, develop a public outreach campaign on the benefits of technology specifically geared towards “late adopters”. Identify individuals in various communities to serve as ambassadors/advocates for technology.

Policy: Broadband internet, and other forms of internet access, should be used to strengthen and grow Lamoille County’s economy.

Action Items:
- Promote the County’s diverse assets, including its recreation and natural resource base, on the web, which may take the form of cooperative ventures between public and private parties.
- Encourage Lamoille County based businesses to increase their internet presence, such as assisting with the implementation of an online Lamoille County Directory, akin to the Lamoille County Phone Book.
- Promote the development of telecommuting, home-based businesses, and remote offices.
- Evaluate the feasibility and safety of establishing “Tele-centers” or centralized points of communications in Lamoille County.
- Actively promote Lamoille County to large firms located in urban areas of the Northeast and Canada as a desirable place to locate a remote office.
- Work with workforce development agencies and human service providers to provide training in essential digital skills among the County’s workforce. Ensure that efforts by various agencies are coordinated to minimize duplication of services.
- Assist municipalities with the creation of new or expanding existing Wi-Fi hotspots for residents and visitors.

Policy: LCPC encourages efforts that assess and coordinate educational and employment needs for ensuring a highly skilled workforce that will meet the needs of local businesses and emerging technologies.

Action Items:
- Work with schools, advanced education institutions, LEDC, and other economic development agencies to identify workforce training needs to prepare youth for employment in fields requiring use of technology, including computer literacy, internet, information technology, and telecommunications.

Policy: LCPC recognizes the potential benefits that broadband provides county residents and businesses, and will work to empower residents to take full advantage of these benefits.
Action Items:

- Promote widespread understanding that broadband offers more than entertainment. Engage County residents to understand ways in which broadband can be used as a creative rather than consumptive tool.
- Utilize the potential financial benefits of broadband for businesses, non-profit organizations, government agencies, and individuals.
- Provide and promote trainings tailored to the specific needs of individual sectors. All sectors are under intense pressure to fulfill their “core” functions. In order to be successful, technology training should be incorporated into existing programs.
- Support computer and internet literacy training opportunities for adults in the region at libraries, colleges, technical centers, and other areas with public computers. Coordinate training efforts by different organizations and sectors to ensure efficient use of financial resources and personnel. Develop model best practices and curriculum for information literacy and disseminate to the appropriate organizations.

Policy: This Plan recognizes that Broadband reinforces, strengthens, and builds community ties and is used as a tool to actively bring communities together rather than passively move them apart. Broadband should be used as a tool to revitalize Lamoille County’s rural villages and downtowns in order to reclaim historic roles as centers of commercial and civic life, and to function as incubators for new, high tech businesses.

Action Items:

- Encourage utilization of e-government tools to engage residents and improve the efficiency of government programs and services while continuing to use traditional means of communications to ensure that residents without broadband access are not disenfranchised or denied access to government records or services.
- Assist community anchors, such as libraries, schools, and community centers, to evolve their technological offerings to ensure the vitality of these institutions in the “Digital Age”, while preparing youth for a more technologically advanced society.
- Broadcast government hearings, public meetings, and other important public gatherings online. Develop mechanisms for residents who cannot physically attend meetings to participate remotely. Provide local governments and other public entities, upon request, with technical assistance on best practices for developing and maintaining a municipal website, including issues such as ADA accessibility.
- Equip existing community anchors with the equipment, tools, and training necessary to serve as technology and communication hubs. When feasible, provide public access to these facilities.
- Implement tools and provide resources for public, high speed internet access in villages and downtowns. Such tools include, but are not limited to, development of public access Wi-Fi zones, establishment of tele-centers, or development of publicly accessible “internet cafes.”
- Support the use of social media and online networking tools to increase community connections among residents, visitors, and local businesses.

Policy: This Plan recognizes that although much of Lamoille County is rural and dispersed, communications should be accessible to all residents, through cellular or mobile phone service, internet capability, and traditional means such as newspapers and broadcast television.
Action Items:
- Support older, traditional media transition to new forms of media.
- Cellular service should be available along all state highways in the County.
- Print media and broadcast television are encouraged as communication tools to reach a wide audience, particularly those transitioning to online, digital media.
- Support investment in telecommunication infrastructure in village centers, towns, and remote areas of the county.

Policy: Telecommunication towers should co-locate antennas to avoid tower proliferation, where possible.

Action Items:
- New and proposed replacement telecommunications facilities must be compatible with existing land uses.
- LCPC, municipal representatives, regional resources, and developers should work together to plan for the enhancement and expansion of telecommunication infrastructure. As technology advances, adjust plans for telecommunication improvements accordingly.
- Review all proposed telecommunications projects to ensure compatibility with the policies contained within this Regional Plan.
Telecommunications: Background and Inventory

Telecommunications are becoming increasingly more important in day-to-day functions for communication, business, education, and community relationships. Because of the growing need for and use of expanded telecommunications in Lamoille County, this section is added to draw needed attention to these facilities. This section consists of the following areas:

- Point Telecommunication Facilities (phone lines, cable lines, broadband, etc.)
- Mobile Telecommunication Facilities
- Newspapers
- Economic Development
- Flood Resiliency

Point Telecommunication Facilities

Point telecommunication facilities (or point to point networks) are those that are designed to provide telecommunication services to a fixed point (your home or business). Currently, most Vermon ters could potentially have up to three point facilities in their home—cable/satellite (for television), telephone lines, and wireless internet connection (if separate from telephone and television on a WISP network for instance). As mentioned above these point systems are consolidating such that it is now possible to have a single point telecommunication facility handling multiple roles—a cable line, internet, and phone (voice over internet protocol) simultaneously.

Phone lines

FairPoint is the incumbent telephone company for the region, including: Jeffersonville central office code, Johnson central office code, Morrisville central office code, and Stowe central office code. Small portions of Hardwick’s and Craftsbury’s central office codes also cover some small portions in Wolcott and Eden.

FairPoint is regulated by the Public Service Board through an Alternative Regulation Plan which runs for five year increments before being renewed.

Phone lines can also provide internet service over “dial up” or broadband speeds via DSL. DSL is limited to locations with certain types of phone lines and having distances within 3 miles from an office or, with newer technology, five miles or further depending on technology. DSL is available in most, but not all, communities in Lamoille County. A recent Back Roads Broadband Grant was awarded to extended DSL services to all areas of Cambridge and Waterville.

By contrast, there is little to no DSL service available in Belvidere and Elmore. Download speeds are generally slower than cable broadband (approximately 3-7 Mbps) and service is distance sensitive, meaning speeds are slower at more remote locations. Residential DSL service can
be purchased starting at $20 per month.

Available virtually anywhere there is telephone infrastructure, dial-up internet is widely used in rural areas of Vermont. Unfortunately, download speeds are insufficient (maximum of 56Kbps) for streaming media and large file downloads. While dial-up is undesirable for most businesses, it may not be possible or viable for casual internet users looking for a low-cost alternative to broadband, with prices starting at $10 per month.

**Broadcast Television**

Television is transmitted through two means: analog or digital. Each has a different set of parameters that enable broadcasting. “Broadcasting” is the transmission of information through a signal. Most digital transmissions require a compatibility system, replacing the traditional antennas that previously accessed signals through the airwaves. Cable companies are franchised by municipalities. Towns and villages can request changes to the franchise agreement when they expire. Changes could include adding public access channels or expanding service to new areas. Most municipalities have access to cable lines. Without access to a cable line, it is difficult for many televisions to receive a signal.

**Wireless ISP**

In rural locations Wireless ISP broadband (WISP) is being marketed to homes and businesses because it is cheaper than the cost of running cable or other high speed lines. In these situations each subscriber to the system would have a static antenna that would link to other antennas to provide the wireless network. The fixed antenna makes the system a point-system. This type of system is currently available in many places throughout Lamoille County but not in Belvidere, much of Eden, Elmore, Jeffersonville, and other remote parts of the region.

**Broadband coverage**

Some communities are broadband rich areas with respect to point communications. Some Lamoille County residents and businesses may have multiple options to receive broadband internet service while others, such as Wolcott, have none. Cable broadband is available in portions of Hyde Park, Johnson, Morristown, and Stowe. Cable broadband provides customers with the fastest download speeds and is generally regarded as the standard for “high speed” internet access in more developed areas. Cable broadband is generally available for about $45 a month.

FairPoint Communications has completed installation of Carrier Ethernet Service equipment at some locations (such as Jeffersonville). The installation allows data communications to be delivered across the internet to local businesses at speeds of 1 Mbps to 1 Gbps with products such as E-LAN (Ethernet Local Area Network), E-Line (Ethernet Point-to-Point) and E-DIA (Ethernet Dedicated Internet Access). The availability of Carrier Ethernet represents an opportunity to increase local business communication avenues and diversify the local employment base. It is important to note that many satellite or data plans have limits on how much data can be downloaded, uploaded, and used in a certain time period.

**Satellite Internet**

A higher speed alternative to dial-up service, satellite internet is generally more expensive (upwards of $85 per month) and slower than both DSL and cable broadband, with service also subject to interruption during rain storms. However, because satellite coverage is nearly ubiquitous, it remains an attractive option in rural and outlying areas of the state but it has a drawback in price and data transmission.
Mobile Telecommunication Facilities
As of the drafting of this plan, mobile communications are still divided into two categories- cellular and Personal Communications Service (PCS). A new emerging semi-mobile facility is that of Local Area Networks (more commonly known as “Wi-Fi” hotspots) but has limited application in terms of the distance range of wireless users. While telecommunications and broadband technology in Lamoille County have improved in recent years, there are still significant “drop zones” on several highway corridors, including Route 15 in Cambridge, Johnson, and Wolcott, Route 12 in Elmore, Route 108 in Cambridge and Waterville, Route 109 in Belvidere, Route 118 in Eden, and Route 100 in Eden (see the map at the end of the chapter).

Cellular phone service
Cellular service is defined as a subset of personal wireless service (PWS) employing modulation based on a spectrum of megahertz, which changes quickly with technological advances. Cellular’s advantage is the greater range for communication but it uses a narrower bandwidth (carries less data). Currently, cellular coverage in Lamoille County is provided by two main service providers, Verizon and AT&T.

Personal Communications Service
Personal Communications Service (PCS) are a subset of Personal Wireless Services generally employing digital modulation at higher (up to 2GHz) frequencies. PCS uses a wider bandwidth so it can carry a greater amount of information but at the expense of coverage.

Wi-Fi Hotspots
Providing Wireless Internet (or “Wi-Fi”) hotspots was a primary goal of the 2004 Vermont Telecommunications Plan. “Wi-Fi” hotspots are places where a computer or mobile phone user can access the internet wirelessly (sometimes for a fee and sometimes free). In the same way that PCS carries more information at the expense of coverage compared to cellular, Wi-Fi carries more information than PCS but with a significant loss of coverage. While Wi-Fi can carry voice (in the form of voice over internet protocol) it is generally used to send information. The State Telecommunications Plan set an ambitious goal of having 100% Wi-Fi coverage in downtowns and resorts by 2010 so that residents and visitors can access the internet and email while on vacation or on the road; 2014 updates to that Plan call for increasing the upload and download speeds statewide. Work is still underway to accomplish this goal.

Some municipalities have invested in or worked to provide Wi-Fi zones in village areas, including Cambridge, Jeffersonville, Johnson, and Morrisville. The development of public access Wi-Fi districts in core areas holds great potential for attracting new residents and businesses. A public Wi-Fi district could also help to attract visitors and tourists to villages as they would be able to access the internet while on the road.

Radio and Emergency Service Communications
Emergency service communications operate in the UHF bandwidth (460MHz) and VHF bandwidths (150 MHz) depending on the system. Other wireless communications may exist in these bandwidths including pager services (VHF) and other businesses with dispatch systems like buses and delivery companies. HAM radio operates with repeaters in these ranges as well as at High-Frequency (HF) bands.

One important consideration to any discussion of mobile telecommunication facilities is that of towers. In the past, towers for radio and television were hundreds of feet tall (thousands of feet tall in the west and mid-west of the US). Today towers rarely exceed 120 feet except for radio towers. Cellular companies have resorted to placing
antennas on farm silos, barns, church steeples, flag poles, or anything sufficiently off the ground. The cost of taller structures does not generally provide a large improvement in coverage.

Newspapers
Lamoille County residents have access to the following local newspapers: the News & Citizen, The Transcript, The Mountain Gazette, The Hardwick Gazette, and the Stowe Reporter. The News & Citizen and Transcript are published in Morrisville and issued to Lamoille County towns and villages every Tuesday and Thursday. The Transcript is provided to all postal patrons free of charge. LCPC and member municipalities often utilize these papers to warn the public regarding official notices and public hearings. The Stowe Reporter reports on happenings in the region although highlights primarily events and news within the town of Stowe. The Mountain Gazette reports primarily on the towns of Cambridge, Westford, Underhill, and Jericho. While focused primarily on the Hardwick region, the Hardwick Gazette offers significant weekly coverage of Wolcott. The closest paper with a daily circulation, upon request, is the Burlington Free Press. The Free Press provides limited coverage to events in Lamoille County. Residents also have access to several other news publications, including Seven Days and the Mountain Ear.

Communications and Economic Development
High-speed internet is a vital tool for home-based businesses, telecommuters, the cottage software and web development industries, the creative economy, high value-added professions or technical services careers, and even manufacturers, who increasingly rely on broadband for product specifications and advertising. Further, access to high-speed internet is pivotal to informational and transactional resources commonplace in any business in the 21st century. Access to reliable, affordable Internet service providers could be an important piece for growing the economic base and the sense of community camaraderie throughout Lamoille County communities. Social media can be a powerful tool for connecting individuals to one another. If initiatives to bring high-speed internet access are successful, they could represent an economic boon to towns and villages. The lack of broadband availability in many Lamoille County communities represents a divide between municipalities and the full capacity of the Internet to support access to information, e-commerce, and educational resources.

Roughly 12% of Lamoille County residents are employed in high value-added professional, scientific, and technical services careers. This sector includes architects, engineers, graphic designers, lawyers, veterinarians, and accountants, to name a few. This sector is highly concentrated in Stowe and Morrisville but is not exclusive to those communities. Numerous small businesses are included in this sector, about 120, employing close to 400 people countywide.

For those working in the “creative economy” (see Section 5), access to high-speed internet is essential. With the advent of online marketplaces and accessibility of personal websites, those in the creative economy, or artisans looking to supplement their primary income, rely on high-speed internet to conduct business.

Macro-Economic Trend: Technological innovation is advancing rapidly.
Technological innovation is making the labor force more productive and changing the way goods and services are transacted, allowing both the work force labor and investment dollars to make more with less. Encouraging continued growth in productivity (including new investment and a focus on work force preparedness) is key to the regional economy’s ability to compete. This will challenge the companies in the region to continuously improve the ability to apply knowledge and technology to the production process better than its competitors.
Example: Universal access to broadband internet is critical for new and established businesses. Internet access will increase online sales transactions, allow workers to telecommute, and increase marketability of products produced in Lamoille County. Efforts to improve workforce development and skill development are taking root in the school system by training students to use computers and computer programs, exposure to computers, tablets, videos, and other media, and strengthening courses in the sciences.

Communications and Flood Resiliency
Maintaining effective communications is essential during all phases of a disaster. In the height of a disaster, be it a major flood, fire, or medical emergency, response personnel require access to communications technology to coordinate the response. It is important to ensure that radio and telecommunications equipment used by emergency personnel is not located in an area where it is vulnerable to flooding. For this reason, telecommunications equipment serving public buildings and/or emergency response facilities should be elevated out of base flood elevations.

Flooding can also threaten telecommunications infrastructure itself. Utility poles located in hazard areas may be susceptible to both erosion and inundation hazards. For example, several utility poles located near the Brewster River in Jeffersonville are in jeopardy due to erosion. Loss of this infrastructure could compound the effects of a flooding disaster.

Telecommunications infrastructure can also assist a community in preparing for a flood. For example, river gauges provide advanced warning, allowing responders to mobilize and residents to secure themselves or evacuate. Emergency responders across the county are working to develop simple advanced warning systems to notify residents of impending flooding via email or text message. Utilizing the State of Vermont’s VTAlert system, anyone can sign-up to receive real-time alerts of impending emergencies via landline, cellular phone, text message, email, and pager. The system allows users to sign-up for notices about localized hazardous weather events, statewide hazardous weather events, or select from a menu of specific events (e.g. frost advisory, hot weather temperature warning, flash flooding watches and warnings, etc.). VTAlert can be used at the state level, regionally, locally, or through locally defined communities, such as emergency responders or all residents living on Main Street. The system is free and trainings are provided by the Division of Emergency Management and Homeland Security.

For further information on broadband in Lamoille County, please see the 2012 Broadband Technology Project, available online at: www.lcpcvt.org
Map – telecommunications
Land Use: Strategy

Land use provides the framework upon which many decisions related to growth, development, and conservation is built. Land use is shaped by many factors, including natural constraints such as soils and topography, economic forces, and decisions related to transportation and infrastructure. Existing land uses in Lamoille County are the result of historic settlement patterns. The policies in this section are derived from a comprehensive review of the land use policies of Lamoille County’s fifteen municipalities and the State planning goals defined by the Vermont Legislature. The intent of this Regional Plan is to support and supplement, rather than supersede, goals and policies regarding land use development at the local level while ensuring that decisions in one municipality are cognizant and address impacts on other municipalities and regional resources and infrastructure. The Regional Plan is guided by the following three overall objectives:

To guide growth into Center and Enterprise Areas: Centers may include new and existing settlements and range in size from small settlements such as Garfield in Hyde Park to the region’s largest urban area of Morrisville. Centers can be as small as a country store, a post office, school or church, and a cluster of homes. Centers may also include the base lodge areas of resorts and appropriately located enterprise areas. Growth is most likely where there is adequate infrastructure to support it. Infrastructure upgrades and modernization will be critical to achieving this objective.

To encourage compact development and protect the working landscapes: In recognition of the infrastructure limitations of many Centers, as well as the personal desires of many Lamoille County residents, it is likely that development will continue in rural areas of the County. Development in rural areas should be managed for efficient use of land: clustering to protect open space and the working landscape; shared facilities such as sewer, water, and roads; and avoidance of areas not suitable for development.

To protect the region’s natural systems and valuable agricultural and silvicultural resources: As discussed elsewhere in this Plan, Lamoille County’s natural environment and diverse agricultural and silvicultural resources are among the assets that distinguish the region from other areas of the country and neighboring regions of Vermont. Protection of these resources will likely take a variety of forms – from stewardship by private landowners, to purchase of easements by conservation organizations, to fee simple ownership by municipal or State entities. In light of limited public resources, public conservation funds and mitigation efforts should be targeted toward those areas that best support the goals of local and regional plans.

Regional Plan Future Land Use Map and Planning Areas

State Statute directs Regional Plans to include a “land use element, which shall consist of a map and statement of present and prospective land uses” (24 V.S.A. § 4348). The Future Land Use Map (page 145) identifies Planning Areas that will be used to guide land use and development in Lamoille County over the next eight year regional planning cycle. In keeping with the spirit of local control upon which this Plan is based, these Planning Areas are derived from municipal plans. The Future Land Use Map is intended to complement local plans and is not intended, nor should it be used, to supplant any local planning effort. The Planning Areas focus on the overall pattern and form of development rather than on specific densities or use categories, which are more properly defined at the local level. Since transportation infrastructure and investments can play a major role in shaping land use patterns, each Planning Area also contains a discussion of transportation related issues.

The Future Land Use Map also provides guidance to the District Environmental Commission relative to agricultural soils mitigation. When a development subject to Act 250 impacts agricultural soils, mitigation of these
soils is required. In general, Act 250 is structured to prefer “on-site” mitigation – that is, modifying the site design of the project so that the soils are not impacted (See VSA §6093(a)(2)). However, the District Commission may authorize “off-site” mitigation if “that action is deemed consistent with the agricultural elements of local and regional plans” (See 10 VSA § 6093(a)(3)(b)). Each Planning Area defines appropriate circumstances under which “off-site” mitigation may be approved by the District Commission. A map of agricultural soils is on page 146.

For a discussion of methodology used in developing the Future Land Use Map, please see Appendix B.

Center Areas
General Description: This area consists of Lamoille County’s traditional village and downtown centers as well as areas identified as nodes for compact and/or mixed use development in local plans. This area includes, but is not limited to, State “Designated Downtowns and Village Centers”. In general, these areas contain the highest densities and greatest diversity of uses found in the County. While local plans may designate zoning districts with varying permitted uses (residential, commercial, etc.), the overall pattern of development within Center Areas is one of mixed uses. All areas within the Center Area shall be considered an “existing settlement” for the purpose of Act 250 review. In recognition of the significant difference in density and diversity of uses enabled by municipal sewage and water infrastructure, this area is divided into the following four distinct Planning Areas on the Future Land Use Map:

- Centers with Wastewater and Water Infrastructure
- Centers with Water but without Wastewater Infrastructure
- Centers with Wastewater but without Water Infrastructure (as of 2015, there are no such Centers in Region)
- Centers without Wastewater or Water Infrastructure

Note: The Centers with Wastewater and Water and Centers with Water may include some areas in proximity to municipal sewage or water service that are not currently connected to the system.

Transportation: The transportation network within the Center Area should be designed to serve diverse user groups. Formal sidewalks, bike lanes, and bike paths are strongly encouraged in Centers with Wastewater and Water Infrastructure and should be required for any development within a Center with Wastewater and Water that requires Act 250 review. In the more rural setting found in most other Centers, expanded/wide shoulders, trail networks, and off road paths may also be used to accommodate pedestrians and cyclists. Such facilities should be recognized as “existing facilities” by the VT Agency of Transportation and should be maintained, improved, and expanded upon in State highway projects. Transit connections within and between Centers is also highly desired. Center Areas should receive priority for new transit service and other multimodal transportation improvements. Park-and-ride facilities are strongly encouraged at the periphery of Center Areas.

Agricultural Soils Mitigation: In recognition of the Regional Plan’s primary objective “to guide growth into compact settlements,” mitigation of agricultural soils shall not be required in Center Areas, regardless of the physical properties of the soil, unless specifically warranted based on policies found in local plans. In Center Areas, LCPC shall advise the District Commission that on-site mitigation is not consistent with the land use objectives of this Plan. If the District Commission determines that mitigation is needed, off-site mitigation should be allowed at the minimum ratio required by statute. LCPC may participate in any Act 250 proceedings related to this issue, provided off-site mitigation is also compatible with the policies of the municipal plan of the host community and/or the findings and conditions of any municipal land use permit.
Enterprise Areas

**General Description:** The Enterprise Area contains areas designated for special uses that generate significant amounts of activity, such as industrial parks, airport facilities, ski resorts, etc. in municipal plans. While not directly connected to a Center or “existing settlement,” these areas provide much of the Region’s current and potential employment opportunities and are vital to the economic development of the County.

**Transportation:** Given that these areas are likely to rely on heavy freight and/or generate a significant amount of customer/employee traffic, use of shared access and internal circulation roads is highly encouraged. Locally appropriate internal pedestrian connections are also encouraged. Connection to transit and other multimodal service is encouraged to ensure that Lamoille County residents without access to an automobile are able to benefit from the services and employment opportunities found in these areas.

**Agricultural Soils Mitigation:** In recognition of the need for “shovel ready” industrial land in Lamoille County, off-site mitigation should be allowed for any development that is primarily industrial in nature or will provide infrastructure needed to support industrial development (such as warehouse, distribution, and port facilities). Such mitigation should follow the minimum ratio required by statute.

Rural and Working Lands Area

**General Description:** The Rural and Working Lands Area is made up of those areas designated in local plans primarily for lower density development, agriculture, and forestry. This area covers a large portion of Lamoille County’s land area and includes agricultural land and forest land interspersed with clusters and nodes of development. Use of development tools such as conservation subdivision, Planned Unit Developments (PUDs), and Transfers of Development Rights (TDRs) is strongly encouraged in this area.

New development should be located to minimize disruptions to productive use of land currently in agricultural production. Development should be located along existing features such as farm and woods-roads, along field’s edges, or on the least productive fields. New residential subdivisions may be required to include covenants and deed language acknowledging that the development is located in an area with active agriculture and forestry operations and prohibiting future homeowners from bringing nuisance suits against existing operations and future agriculture and forestry operations that follow applicable state regulations.

**Transportation:** This area contains several of the major transportation corridors through Lamoille County. Some communities allow diverse, non-residential uses along these corridors. State Planning Statute discourages “strip development,” and the Act 250 District Commission is enabled to deny projects deemed to be “strip development” under the newly reformed criteria 9(L). State Statute defines “strip development” as “linear commercial development along a public highway that includes three or more of the following characteristics: broad road frontage, predominance of single-story buildings, limited reliance on shared highway access, lack of connection to any existing settlement except by highway, limited accessibility for pedestrians, and lack of coordination with surrounding land uses in terms of design, signs, lighting, and parking.”

To avoid a project being designated as “strip development” by the District Commission, municipalities may pursue several options, including access management policies that encourage or require use of shared access and parking, development of access management plans under 24 VSA § 4432(1), capital planning for bicycle/pedestrian improvements and local park-and-rides, site plan review that includes specific standards for
signs, lighting, parking etc., context sensitive design, design review or form based codes, and/or limiting non-residential uses along corridors in rural areas.

The Rural and Working Lands Area also contains several important wildlife roadway crossings. These include the Willow Crossing Area on Route 15 near the Cambridge/Johnson town line, Route 118 in Eden and Belvidere, Route 12 in Elmore, the area of Route 100 north of North Hyde Park Village at the Eden Town Line, and the Shutesville Hill area on Route 100 near the Stowe/Waterbury town line. Transportation improvements in these areas should be designed to allow for wildlife permeability. This can be accomplished by providing oversized culverts, reducing speed limits, providing occasional breaks in guardrails, and other similar methods. Development in and adjacent to these areas should include site design techniques to maintain connectivity between wildlife habitats.

In agricultural areas, new roads should be constructed along fields’ edges or use linear features such as hedgerows to avoid fragmenting agricultural fields. Development should also be configured to allow for continued access to working lands by agricultural and forestry equipment.

**Agricultural Soils Mitigation:** This area should be targeted for investments in programs aimed at assisting agriculture and forestry. Actively farmed agricultural land should be targeted for protection associated with off-site mitigation from other sites within Lamoille County. Given the large portion of Lamoille County in this area, off-site mitigation may be appropriate in some circumstances. Off-site mitigation may be allowed when one or more of the following criteria are met:

- The development is located within one-and-a-half (1.5) road miles of a Center Area associated with a State Designated Downtown; or within one road mile of another Center or Enterprise Area; and/or connected to a Center Area or Enterprise Area by pedestrian or bicycle infrastructure, including but not limited to, an on-road bike lane or shoulders that are officially for biking (4’ wide) or marked as a bike lane meeting VTrans standards, sidewalk, greenway or trail system, or formal bike/multiuse path; or
- The development is a “conservation subdivision” in which at least 50% of the total area is reserved as open space; or
- Off-site mitigation is necessary to facilitate development of farmworker housing, value-added enterprises, agricultural/forestry education facilities, or other uses that support the working lands economy; or
- Off-site mitigation elsewhere in Lamoille County better contributes to the creation of usable, unfragmented blocks of working lands; or
- The Vermont Agency of Agriculture has determined that off-site mitigation is appropriate or that mitigation is not needed.

In addition, regardless of the criteria outlined above, in recognition of the need for workforce housing in Lamoille County, off-site mitigation at the minimum ratios required by statute should also be allowed for any residential or mixed use development in which the majority of dwelling units will be affordable to households with annual incomes up to 120% of the host community’s median income.

**Working Lands – Forest Area**

**General Description:** This area contains Lamoille County’s largest blocks of unfragmented forests. As noted in the Working Lands Chapter of this Plan, there are numerous, diverse uses of Lamoille County’s forests, including
but not limited to active forest management, conservation, wildlife management, recreation, and/or aesthetic preservation. The specific use of any forest should be left to the property owner and/or land manager. However, what unites almost all these uses is that they all rely on large, unfragmented blocks of forest land. Therefore, maintaining unfragmented blocks of forest land is an important objective of this area.

When new development occurs in this area, it should be located to minimize forest fragmentation and/or disruption of productive use for timber management. Development should be located along existing features such as woods-roads or in the least productive forest stands. Development should also be configured to allow for continued access to working lands by forestry equipment. New residential subdivisions may be required to include covenants and deed language acknowledging that the development is located in an area with active forestry operations and prohibiting future homeowners from bringing nuisance suits against existing operations and future forestry operations that follow applicable state regulations.

Transportation: Transportation infrastructure can fragment working lands just as much as development. New roads should be very limited in forest areas and should be constructed with consideration of impacts on productive forest stands, wildlife connectivity, erosion and runoff, and aesthetic resources.

Agricultural Soils Mitigation: This area should be targeted for protection associated with off-site mitigation from other sites within Lamoille County. If agricultural soils mitigation is required, it should be on-site, unless off-site mitigation is supported by the Vermont Agency of Agriculture. Off-site mitigation should also be allowed when necessary to facilitate value-added enterprises, agricultural/forestry education facilities, or other uses that support the working lands economy. This area should also be targeted for investments in programs aimed at assisting agriculture and forestry.

Floodplain/Working Land Area

General Description: This area includes land located outside of Center Areas and within the FEMA mapped 100-year floodplain. Much of this area is used for agriculture due to favorable, alluvial soils and large flat fields which are absent in the more mountainous terrain in other areas of Lamoille County. Provided State Accepted Agricultural Practices (AAPs) are followed, agriculture is an appropriate use of these floodplain areas. Best Management Practices, such as establishing vegetated buffers along stream banks, are strongly encouraged. Some areas have reverted to wetlands or floodplain forests. This vegetation can greatly improve floodwater attenuation and may capture sediment and debris during large flood events, helping to mitigate downstream flood damage and debris jams.

Development in this area must be carefully designed to minimize risks to life and property, and to ensure that floodwaters are not displaced onto upstream or downstream properties. When new structures are constructed, they should be elevated at least two feet above base flood elevation. Use of compensatory storage or structural piers is highly encouraged to accomplish this elevation.

Transportation: Construction of new roads should be extremely limited in this area. When new roads are constructed, they must be designed to ensure that floodwaters are not displaced onto abutting or downstream properties.

Some elements of the existing transportation network may contribute to upstream and downstream flood damage. Undersized bridges and culverts may cause downstream erosion that destabilizes stream beds and
banks and may even change the path of the stream. Berms used to elevate roads may disconnect a river from its floodplain and push floodwaters onto other properties. Redesign and retrofitting existing elements of the county transportation network to reduce flood hazards is highly encouraged. This may include increasing bridge and culvert spans, installing bypass culverts or low water crossings in berms, and development of flood benches to reconnect rivers to their floodplain.

**Agricultural Soils Mitigation:** This area should be targeted for conservation associated with off-site mitigation from other sites within Lamoille County. When land in this area is conserved through off-site mitigation, the mitigation agreement should contain provisions for maintaining or establishing a vegetated buffer along the stream bank.

Off-site mitigation should be allowed when necessary for hazard mitigation and/or floodplain restoration. This area should also be targeted for investments in programs aimed at assisting agriculture and forestry.

**Conserved Lands Overlay**

**General Description:** There are two overlay areas on the Future Land Use Map. Overlays create special use areas placed over existing land use areas that identify unique provisions in addition to those of the underlying area. The overlay protects a specific resource or guides development within special areas. The objectives of each underlying Planning Area should be followed for both conserved lands overlay areas.

The overlays on the Future Land Use Map are for State Forest Land and Other Conserved Land. Conserved lands often have limited uses because of the characteristics being conserved. Development is usually limited or restricted. Much of the Conserved State Forest Land in Mt. Mansfield State Forest is leased by ski resorts and subject to Act 250 review. Since these areas have already been conserved, they are not targeted for future agricultural soils mitigation. However, future conservation easements are encouraged to connect to existing conserved lands to: reduce forest and agricultural fragmentation; provide large blocks of land that better support wildlife connectivity; protect rare, important, and irreplaceable natural and fragile areas; and protect scenic and historic features and resources. Use of recreation on some conserved lands is appropriate and should be encouraged when possible.

**Transportation:** Transportation infrastructure can fragment working lands just as much as development. New roads should be extremely limited. Roads and trails should be constructed with consideration of impacts on productive forest stands, agricultural operations, wildlife connectivity, erosion and runoff, and aesthetic resources.

**Shoreland Area Overlay**

**General Description:** Overlays create special use areas placed over existing land use areas that identify unique provisions in addition to those of the underlying area. The overlay protects a specific resource or guides development within special areas. The objectives of each underlying Planning Area should be followed for both conserved lands overlay areas.

The overlay on the Future Land Use Map for the Shoreland Area follows the jurisdiction of the Vermont Shoreland Protection Act (Chapter 49A of Title 10 §1441 et seq.) administered by the Agency of Natural Resources Department of Environmental Conservation. The Act establishes a state regulation for guiding development within the protected shoreland area 250 feet from the mean water level of all lakes greater than 10
acres in size. The intent of the Act is to prevent degradation of water quality in lakes, preserve habitat and natural stability of shorelines, and maintain the economic benefits of lakes and their shorelands. Municipalities may be delegated to administer this Act locally.

**Future Land Use Goals**

In order to measure the effectiveness of local and regional planning efforts in establishing the development patterns outlined in the Future Land Use Map, LCPC establishes the goals listed for the next regional planning cycle. NOTE that the purpose of these goals is to measure the progress toward attaining the objectives of this Plan. The goals listed below are not intended to be mandates for any municipality, and they shall not be used as the basis for denial, or recommendation of a denial, of any development proposal, including projects with a substantial regional impact.

- Locate at least fifty percent (50%) of new residential dwelling units in Center Areas defined on the Future Land Use Map.
- Locate at least fifty percent (50%) of new or renovated commercial floor area in Center or Enterprise Areas.
- Increase the county-wide supply of workforce housing.
- Reduce the rate of fragmentation of agricultural and forest lands in the Rural and Working Lands Areas.
- Increase the number of public road miles in Center Areas served by appropriate pedestrian infrastructure. In rural settings, this may include expanded/wide shoulders, trail networks, and off-road paths.
- Maintain and improve wildlife connectivity, as measured through the following:
  - Increase the percentage of conserved or protected land within identified wildlife corridors
  - Increase the percentage of culverts within identified wildlife corridors utilizing aquatic organism passage (AOP) design features.

As noted above, these goals are intended solely for the purpose of measuring progress toward the objectives of this Plan, and shall have no regulatory effect. If, upon evaluation, a goal is not met, it could signify:

- **A need to reevaluate State, regional, or local policies that may inhibit achieving the goal.** For example, if less than 50% of new residential dwelling units are located in Center Areas, this could signify a need to revise State wastewater rules to allow more extensive alternative wastewater treatment technology and/or management structures, as outlined in the “Land Use and Infrastructure Limitations” discussion below.

- **A need to reprioritize funding to meet the Goal.** For example, if less than 50% of new and renovated commercial floor area is located in Center or Enterprise Areas, this could signify a need to prioritize funding for wastewater, water supply, transportation, and telecommunications infrastructure serving these areas.

- **A need to reexamine the goals.** For example, if Centers are inhibited by flood hazards or already developed to build-out capacity, such that new development cannot occur, this could signify a need to identify safer areas for new Center or Enterprise Areas.
POLICIES & ACTION ITEMS

Policy: Infrastructure investments, transportation improvements, and location of public buildings should reinforce the objectives of the Regional Plan. Future development should be directed to areas served by water and wastewater and other public infrastructure.

Action Items:
- Coordinate and educate municipalities to plan for controlled and guided growth, through use of locally appropriate tools such as municipal plans, infrastructure inventories and assessments, capital budgeting, public grants and loans, and innovative financing structures.
- Development and maintenance of modern infrastructure systems, including multi-modal roads, water supplies, wastewater systems, and diverse energy sources, with priority given to infrastructure that supports development and redevelopment of Center and Enterprise Areas.
- Support expansion of telecommunication and broadband networks to serve all areas of Lamoille County.
- Infrastructure upgrades and extensions serving Center Areas should receive the highest priority for public funding. Efforts to extend water and sewer lines beyond Center Areas and/or outside established sewer service areas should be reviewed with consideration for the long-term growth and developmental impacts associated with expanded service areas as well as planning tools and bylaws in place to prevent strip development or undue adverse impacts on natural resources. Appropriate planning tools, such as zoning or subdivision bylaws containing provisions to prevent strip development, should be in place prior to undertaking sewer or water line expansion beyond Center Areas or immediately adjacent Enterprise Areas.
- LCPC may support inter-municipal sewer line extensions that connect Center Areas in one municipality to wastewater treatment facilities with excess capacity in another, provided such extensions are supported by the legislative bodies of all impacted municipalities, and measures are in place to minimize strip development between the Centers.
- LCPC will not support the relocation of community “anchors” which may include, but not be limited to, the following: municipal offices, schools, post offices, churches, general stores, etc., outside of Center Areas.
- New and expanded State, County, and Federal offices and other facilities (excluding maintenance facilities, garages and similar uses) shall be located in Center Areas.
- LCPC supports exploration and development of innovative wastewater treatment options, including, but not limited to, development of decentralized wastewater systems.
- As an alternative to wastewater infrastructure, LCPC supports municipal efforts to develop community wastewater management districts serving Center Areas and/or to develop low-interest loan programs for septic repair and upgrades.
- LCPC supports revisions to the State Environmental Protection Rules to encourage greater use of “Innovative/Alternative Systems and Products” and waterless waste treatment options.
- LCPC will work with the VT Agency of Natural Resources for allocation reform to ensure that the reserved capacities of its member municipalities’ sewer plants are more closely aligned with the actual operating capacity.
- LCPC will work with the VT Agency of Natural Resources, interested municipalities, and other Regional Planning Commissions to make State Wastewater Revolving Loan Funds available to capital projects within locally defined wastewater management districts.
The VT Agency of Transportation must consider land use impacts of transportation projects, as outlined in the discussion of the Future Land Use Map.

**Policy:** Land use and development should reflect site specific environmental limitations. The density and intensity of development should conform to the limitations of the land and available public services. Higher densities and more intensive uses should be located in Center and Enterprise Areas, while lower densities and less intensive uses should be located in Rural and Working Land Areas.

**Action Items:**
- Land development planning should take into account the capability of the land as it relates to topography and soil limitations, areas of steep slopes, and poorly drained or unstable soils. These areas should remain in resource or recreational use or at most accommodate low densities.
- In areas where fragile characteristics have been identified, development should be discouraged unless it can be shown that these assets will not be unduly altered or harmed. These areas may include, but are not limited to, high elevations, steep slopes, wetlands, floodplains, threatened and endangered species, or wildlife habitat, such as deeryards, bear masts, and core forest habitat.
- New development outside of Center Areas should be discouraged from areas prone to significant flooding unless adequate measures to reduce flood damage have been made, as outlined in the Watersheds and Flood Resiliency Chapters. Flood prone areas that also contain agricultural soils should receive high priority for protection associated with off-site mitigation from other sites within Lamoille County.
- New on-site and municipal sewage treatment facilities should be sited outside of the FEMA-delineated 100-year floodplains, to the greatest extent feasible, to mitigate the environmental impacts of flooding. If wastewater sewage treatment facilities must be located in the 100-year floodplain, they should be elevated or floodproofed to at least two feet above the base flood elevation.
- Encourage municipalities to adopt Wellhead Protection Areas (WHPAs) and Source Protection Plans (SPPs) to preserve the quality of local water supplies.

**Policy:** Encourage future growth within Center and Enterprise Areas while discouraging strip development along transportation corridors.

**Action Items:**
- Development related to the recreation and travel industry should be encouraged in both Center and Enterprise Areas. Recreational development must give consideration to off-site impacts to host and neighboring communities such as transportation and the availability of affordable housing for employees.
- Especially in Center Areas, encourage a mixture of housing opportunities to meet the needs of diverse County residents.
- To discourage strip development and maximize efficient use of the existing capacity of the regional transportation network, LCPC will work with municipalities to explore and implement measures such as access management policies that encourage or require use of shared access and parking, development of access management plans under 24 VSA 4432(1), capital planning for bicycle/pedestrian improvements and local park-and-rides, site plan review that includes specific standards for signs, lighting, parking etc., context sensitive design, design review of form based codes, and/or limiting non-residential uses along corridors in rural areas.
- In determining whether or not a development constitutes “strip development,” the District Commission must consider the following:
The unique topography of Lamoille County which is characterized by narrow valleys bounded by rivers and steep mountain slopes and which has resulted in a traditional development pattern of town and village centers that are linear in nature; and

The need to foster development that supports the working landscape, such as sawmills, stock yards, feed stores, agricultural processing plants, and equipment repair/supply that are more appropriate to locate in Rural and Working Lands Areas; and

The diverse, alternative means of providing pedestrian access and non-motorized connectivity in rural settings, including trail systems, expanded shoulders, and multimodal paths, such as the Lamoille Valley Rail Trail and the Stowe Recreation Path.

• Connect Enterprise and Center Areas to the regional public transportation network.

• Support redevelopment and reuse of existing vacant or underutilized structures and industrial and brownfield sites whenever possible.

• Work with municipalities to develop bylaws that reduce the appearance of “strip development” along state highways, facilitate infill and redevelopment in areas of existing strip development rather than extension of strip development, and minimize pressures for additional strip development in adjacent municipalities.

• LCPC should encourage minor revisions to Vermont Neighborhood Development Area (NDA) program rules to make the designation more effective in rural areas. Such revisions include:
  o Allowing NDAs to be created in areas served by either public water OR public wastewater (as opposed to both, which is current practice).
  o Allowing NDAs in areas where the municipality or private developer is implementing creation of a community wastewater system or a wastewater management district.
  o Allowing NDAs in communities without zoning provided the community has adopted subdivision bylaws that require developers to meet all of the density and design standards of the program.

**Policy:** In addition to impacts and benefits to the host municipality, development must consider impacts on other municipalities and regional resources and infrastructure.

**Action Items:**

• In the development of local plans and bylaws, municipalities are encouraged to incorporate issues and concerns common to neighboring communities in the region.

• Work with municipalities and adjacent regions to better coordinate land use planning efforts.

• Future growth should not significantly impair the public recreational opportunities of waters, open lands, or woodlands or destroy or threaten areas of significant historical, educational, cultural, endangered, scientific, agricultural, silvicultural, architectural, or archaeological value.

• Future development must not place an undue burden on the ability to provide public and community services, such as schools, roads, water, sewer, emergency access, etc. Where such services are impacted, including services that are provided by entities other than the host municipality, the developer should be required to provide financial or other mitigation.

• LCPC will provide information and assistance to proposed projects and developers on issues that are of local, regional, interregional, and statewide concern.
**Policy:** A diverse array of tools should be utilized to maintain the County’s working landscape.

**Action Items:**
- Encourage and promote the implementation of a range of conservation concepts in planning; i.e., the transfer and/or purchase of development rights, land trusts, conservation easements, covenants, land use tax incentives, and clustering to allow for the retention of open space whether it is scenic vistas, agricultural lands, wildlife management areas, public lands, etc.
- Encourage the use of transfer of development rights, purchase of development rights, and similar planning tools to:
  - Encourage higher density development in Growth Areas
  - Protect agricultural and forest resources in Rural and Working Land Areas
- To reduce development pressures on Rural and Working Lands, encourage development in Center and Enterprise Areas. In Center and Enterprise Areas, LCPC may provide comments through the Act 250 process regarding appropriate circumstances for off-site mitigation, as outlined in the Future Land Use Map, regardless of whether the project meets the definition of a substantial regional impact.
- Target the Working Lands Area for protection associated with off-site mitigation from other sites within Lamoille County. In order to ensure that off-site mitigation best meets the needs of local communities, off-site mitigation payments may be made to local Land Trusts with proven records of land conservation and ongoing stewardship.
- In Rural and Working Lands Areas, protect the viability of agriculture and forest lands by supporting development designed to mitigate the impacts from parcel fragmentation and to provide continued accessibility to resource lands. When development of agricultural and forest lands occurs, development should be clustered in such a way so as not to negatively impact the continued viability of any remaining or adjacent agricultural operations. Consideration should also be given to the loss of open space and recreational resources when developing agricultural and forest lands.

**Policy:** Increase the amount of “shovel ready” land for industrial development served by sufficient infrastructure. Such land should primarily be located in Enterprise Areas or within Center Areas as appropriate based on local planning goals.

**Action Items:**
- Inventory and map existing industrial areas to assess regional capacity for expansion.
- Identify infrastructure limitations to support industrial development in Enterprise Areas and Center Areas. Assist municipalities in pursuing funding and financing to address these limitations, provided such investments support the three primary land use objectives described in this section.
- Work with owners and operators of existing intensive uses, such as gravel pits and other earth extraction industries, to determine if future industrial uses may be incorporated in long term remediation of the site.
- Within zoning districts designated primarily for industrial development, municipalities are encouraged to consider allowing some industrial uses as permitted uses rather than conditional uses. In such areas, municipalities should also consider measuring performance standards such as noise from the boundary of the industrial district rather than property lines within the district.
Future land use map
Land Use: Background and Inventory

Lamoille County’s existing land use patterns are heavily shaped by the region’s underlying topography and geography, as well as its transportation network and historic decisions related to infrastructure investments. The County is bounded to the west by the Green Mountains, including Mount Mansfield, Vermont’s highest peak, and to the east by the Worcester Range. The County is then bisected by the Lamoille River and its tributaries. This topography of narrow river valleys bounded by steep mountain slopes has resulted in a settlement pattern that differs greatly from those found in the gentler landscapes of the Champlain and Connecticut River Valleys.

The transportation network has also had a profound impact on land use in Lamoille County. Route 15 (east - west) and Route 100 (north - south) are the primary transportation corridors through the region. Lamoille County is the only region in northern Vermont that does not contain an interstate highway (I-89 in Chittenden County and Northwest Vermont Regions and I-91 in the NVDA region). The region was also once served by the now defunct Lamoille Valley Railroad.

By necessity, most existing settlements in Lamoille County developed along transportation networks such as roads and railways. While linear in nature, most of the settlements constructed in the 1800s and early 1900s were compact in nature. Most regional and local anchors, such as schools, municipal offices, general stores, places of worship, and Courthouses, are still found in these settlements. Lands surrounding these settlements were, and continue to be, utilized for agriculture, forestry, and earth resource based enterprises.

Many of these settlements were created before modern plumbing technology. In some areas, Village governments appeared to foster development of local wastewater and water infrastructure – which are essential to tightly knit, mixed use development patterns. In the mid 1900’s, better understanding of clean water needs resulted in development of public wastewater systems in Jeffersonville, Johnson Village, Morrisville, Hyde Park Village, and Stowe. Many of these systems have excess capacity, creating opportunities for infill within Center Areas, but also present potential cost challenges to existing customers who must carry the cost of this unused capacity.

With the advent of the automobile, new auto oriented development has occurred on the periphery of many existing settlements. In addition, the allure of a rural lifestyle and the draw of housing that is0 markedly more affordable than many surrounding regions have led to low density housing development scattered through rural areas of the County. Growth in rural areas places additional demands on local transportation networks and emergency response services and can also result in fragmentation of working lands and natural resources. These trends are discussed in greater depth in the Housing and Working Lands Chapters.

While Lamoille County’s challenging topography and isolation from major transportation networks have created challenges for development, they have also provided opportunities for the travel and tourism industry. Two of Vermont’s largest ski resorts, Stowe Mountain Resort and Smugglers’ Notch Resort, are located on the western end of the County. Both resorts have major base lodge areas and have contributed to development of ancillary travel and tourism development along Route 108. Smaller recreation destinations are also found scattered throughout the region’s rural landscape.
Land Use and Infrastructure Limitations

For economic growth and development to reach its full potential in Lamoille County, infrastructure needs must be met. This includes adequate water systems, sewage capacity and sewer systems, the availability of three-phase power, the availability of affordable energy, access to roads and bridges, and broadband internet capabilities. This infrastructure not only sparks development but also enhances Lamoille County’s attractiveness to current and future residents by allowing residents to expand their employment opportunities through telecommuting or home-based businesses. Further discussion of road infrastructure improvements can be found in the Transportation Chapter, energy and electricity can be found in the Energy Chapter, and broadband capability can be found in the Telecommunications Chapter.

Development can only occur where there is adequate infrastructure to support it. Infrastructure considerations include the location of parking, power, wastewater treatment systems, and water supply. The Future Land Use Map categorizes Center Areas based on the availability of wastewater and water infrastructure. For this section, Working Lands means agricultural and forest land.

Parking
While sometimes thought of as a private responsibility, parking is an important component of infrastructure. Parking can be a highly land consumptive land use, but is one that is essential for economic development. Land beneath a parking lot cannot be used for new structures, cannot host an on-site wastewater system, and does not pay fees for water or wastewater. Concentrating parking in central areas such as shared lots (public or private) and on-street parking can provide for the parking needs of businesses in Center Areas while freeing up land for other forms of development. In more urban areas, this may allow new or expanded buildings. In Centers without wastewater, offsite parking arrangements may provide more room for onsite septic systems on land that would otherwise be needed for parking lots.

Wastewater Treatment Systems
During the 1960s, Vermont began an aggressive campaign to clean up the state’s lakes, rivers and streams. At the time, a major source of pollution was untreated sewage, which was commonly discharged directly into many bodies of water. Throughout the 1970s and 80s, Lamoille County municipalities invested heavily in wastewater treatment systems. These primary treatment facilities removed much of the toxic nature of the effluent and significantly improved water quality in local rivers.

As communities in Lamoille County plan for the future, wastewater treatment facilities will continue to play a key role in encouraging compact development and attracting many types of industrial uses. As technology has evolved, municipalities now have an array of options when installing new systems, or upgrading and maintaining existing systems. This flexibility allows communities to tailor systems to meet their budgetary and land use needs. Today, water quality standards are stricter and include provisions for quantity of nutrient loading—specifically nitrogen, phosphorous, and ammonia. Improved wastewater plants in Stowe and Johnson are examples of some of the more advanced systems available to communities. In addition, it is possible that the US Environmental Protection Agency will mandate additional phosphorous removal as part of the Lake Champlain Total Maximum Daily Load (TMDL) cleanup plan. Such a mandate would likely require many systems, including those meeting and exceeding existing Federal water quality standards, to undertake expensive upgrades. Many wastewater treatment facility operators have indicated that more cost effective alternatives for reducing phosphorous loading in Lake Champlain exist, such as better managing stormwater and non-point source pollution.
Presently, there are five municipally-owned treatment plants and one large, private sewage system in Lamoille County:

- **Hyde Park Wastewater Treatment System**: A Village system constructed in 1970, equipped with two septic tanks (combined capacity of 55,000 gpd) and a pair of leach fields. Based on recently revised sewage allocations, the system has additional capacity to accommodate commercial customers.

- **Jeffersonville Wastewater Treatment Plant**: An aerated lagoon system constructed in 1989, with a 77,000 gallon per day (gpd) capacity. The plant is operated by the Jeffersonville Village Trustees and any property within the Village may apply to connect. About 50-60% of the system’s capacity is currently unused; meaning, if making a conservative estimate, about 35,000 gpd is available for future development. This represents a significant opportunity for new development within the Village and Service Area. The Village Trustees have identified the need for a new aeration system, and are also investigating ways to reduce the facility’s energy consumption.

- **Johnson Wastewater Treatment Plant**: A sequential batch reactor facility installed in 1996, serving Village and Town residents within a designated service boundary. Connecting to the system is required of all new development within 100 feet of an existing sewer line. System capacity is estimated at 270,000 gpd and is sufficient to accommodate projected growth within, and adjacent to, the service boundary. The Village has been able to replace older sewer mains as part of other projects at relatively low cost. The Town and Village entered into an inter-municipal agreement to extend sewer service onto specific mapped areas of the Town.

- **Morrisville Wastewater Treatment Plant**: Constructed in 2009, the new Morrisville Wastewater Treatment Plant increased operating capacity by nearly 30% over the previous system, to an estimated 425,000 gpd. The Village has room to accommodate any reasonable 20-year growth projection and is actively looking to expand its line capacity and number of connections.

- **Stowe Wastewater Treatment Plant**: A sequential batch reactor system installed in 1980 and later upgraded in 2003, the plant is equipped to process up to 1 million gpd. The plant is operating at approximately 30% capacity; however, a vast majority of the remaining system capacity is committed to Stowe Mountain Resort for future expansion. As a result, the plant has only 5% reserve capacity remaining.

- **Smugglers’ Notch Resort Wastewater Treatment Plant**: A privately-owned aerated lagoon system installed in 1985, with a capacity of 160,000 gpd. The plant consists of four lagoons and additional bio-enhanced treatment (a “living machine technology”), with the effluent disposed of by spray irrigation.

Note that in some Centers, wastewater and water capacity is available, but has not been extended to serve the full Center. Land use patterns can play a role in maximizing use of existing capacity and reduce costs. Allowing higher densities and mixed uses allows more customers to connect to the distribution system and may reduce the per customer costs of water and sewer line extensions within these Centers. Infill, including redevelopment of existing structures and construction of new structures, is highly encouraged in Centers served by water and wastewater.

Households and businesses in Lamoille County not serviced by a municipal sewer treatment facility must have an on-site septic system or connect to another private system, with design and performance regulated by the Vermont Department of Health.

As demonstrated by the Future Land Use Map, many Centers in rural communities are not served by municipal wastewater systems. With no municipal sewer service, the potential for denser, mixed use development is greatly limited. Despite the limitations created by lack of wastewater, there is still potential for some small-scale businesses in these Center Areas. Certain commercial uses, such as offices and retail stores, require significantly
less wastewater capacity than residential uses, making commercial use of existing structures on small village lots a viable option (see Table 3-23 below).

Table 3-23. Wastewater Capacity for Residential and Non-Residential Use

<table>
<thead>
<tr>
<th>Business Type</th>
<th>Use equivalent 1-bedroom</th>
<th>Use equivalent 3-bedroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Office</td>
<td>9 employees</td>
<td>28 employees</td>
</tr>
<tr>
<td>Day Care Facility</td>
<td>2 care providers, 7 children</td>
<td>4 care providers, 24 children</td>
</tr>
<tr>
<td>Day Care Facility</td>
<td>1 care provider, 6 children</td>
<td>3 care providers, 18 children</td>
</tr>
<tr>
<td>Doctor’s Office</td>
<td>2 staff, 7 patients</td>
<td>4 staff, 28 patients</td>
</tr>
<tr>
<td>Retail store</td>
<td>9 employees</td>
<td>28 employees</td>
</tr>
<tr>
<td>Restaurant, Tavern, or café</td>
<td>4 seats</td>
<td>12 seats</td>
</tr>
</tbody>
</table>

Source: Vermont Environmental Protection Rules

As a result, property owners could conceivably develop new, small businesses in existing buildings and lots within wastewater constrained Center Areas. Nonetheless, the table also demonstrates the limits of this option. For example, it would be difficult to develop even a moderately sized café without additional wastewater capacity.

There are a variety of tools available to municipalities to overcome these limitations, including:

- **Developing “decentralized” wastewater treatment systems.** A decentralized system refers to a wastewater treatment system that relies on a mixture of community septic (similar to the system utilized by Hyde Park Village) and on-site wastewater systems. The Town of Wolcott has been actively investigating creating a “decentralized” wastewater treatment system to serve the Village Area. The Town has conducted several studies which has identified potential sites that could support a system serving the existing Village and providing some capacity for future development. Similar systems may also be feasible in other rural Villages. Due to the small population and limited grand list of many rural communities, it is likely that outside funding would be necessary to construct any such system.

- **Structure land use bylaws to maximize use of existing capacity:** As demonstrated in the table above, a small office, store, or even a mixed use building with commercial space and a single bedroom apartment requires less wastewater capacity than a three bedroom single family home. Allowing and encouraging certain types of mixed use development, especially if it involves renovation of existing structures, may reduce demands on existing on-site wastewater treatment systems.

- **Develop Wastewater Management Districts:** Wastewater management districts are an alternative to developing a municipal sewage system. While not widely utilized in New England, municipalities in other areas of the country have organized Wastewater Management Districts in which the municipality ensures proper maintenance of existing on-site wastewater systems. These districts may be funded through special tax assessments or user fees (similar to fees paid by sewer system customers). Since lack of regular maintenance is a major contributor to failing septic systems, such districts can extend the life of existing systems, help to preserve wastewater treatment capacity, and prevent groundwater contamination caused by failing systems. Some wastewater management districts offer low interest loans for replacing wastewater systems.

- **Facilitate agreements between private property owners:** State on-site sewage regulations require setbacks from property lines for leach fields and other system components unless an easement is granted by the adjacent property owner. Given the small size of many Village lots, this represents a major barrier to
enlarging existing on-site systems or creating new ones. In some cases, soils may be available to create a small system serving 2-3 structures. Municipalities may be able to facilitate agreements between willing property owners to either grant easements or construct shared wastewater systems. The municipality’s oversight may provide some assurance that the responsibilities and rights of both parties are maintained. A similar alternative could include constructing septic systems serving municipal buildings with additional capacity to allow for future shared use agreements with other properties in the district.

- **Explore alternative treatment options:** State EPRs allow for “innovative” and “alternative” wastewater treatment options. Such systems range from “pre-treatment” such as recirculating sand filters to composting toilets and greywater recycling. These systems may function on less favorable soils and/or less space than traditional leach fields and mound systems. Given that these systems are not necessarily used with great frequency, residents may not be aware that they are available. Municipalities may consider having information such as the list of approved innovative systems and relevant contact information available at municipal offices.

**Water Supply**

Access to a potable water source is needed for residential living, agriculture, commerce, and industry. At the municipal level, water supplies are critical to fighting fires and protecting public health. Presently, there are six municipal water systems and four co-operative systems that service Lamoille County residents. Households that do not connect to a municipal system maintain a private well or are connected to a private distribution system, such as that of a mobile home park or residential subdivision. Any system with at least 15 connections, or which services 25 or more individuals for at least 60 days per year, is officially classified as a “public water system” and subject to regulation by the Vermont Department of Health.

Public water systems were first put into place primarily for two reasons. The first is to bring clean water from rural springs to the urbanized areas to protect public health from water borne diseases. By requiring proper sanitation and providing clean water, epidemics from water related sicknesses have been all but eliminated. The second reason to develop public water systems was for firefighting. Many systems in Lamoille County were developed following major fires or in an effort to protect against one.

**Municipal Water Systems**

Municipal water systems are owned and operated by the municipalities they serve. With the exception of Department of Health permitting for water quality, pumping rates and schedules for drilled wells, their operations are directed by the local legislative body or designated board. This includes facility maintenance and replacement, allocation of capacity, and service area expansion. Municipal water systems are:

- **Village of Cambridge Water System** (WISD #5149): Installed in 1974-75, the Village of Cambridge system serves approximately 120 connections and has a storage capacity of 100,000 gallons. It services the incorporated Village of Cambridge, with system management contracted to a private consultant. Water for the Cambridge system is supplied from both a primary and back-up well, sited on Village-owned property. The Village recently purchased a forested property covering the well shield of the back-up well. While this public ownership creates a partial wellhead protection area (WHPA), there are no existing land use regulations to protect the full well shield. The Village also owns legal rights two springs on private land in South Cambridge. The Village has no plans of extending service beyond the Village boundaries and carefully reviews all new connections, due to capacity limitations.

- **Village of Hyde Park Water System** (WISD #5154): Installed circa 1900, the Hyde Park system serves 200 connections, with a storage capacity of nearly 270,000 gallons. Operated by the Hyde Park Water & Light Department, service is provided within the Village limits and to a small number of properties along the supply
line from Fitch Hill Reservoir. New connections are left to the discretion of the Village Trustees. The WHPA is protected by local zoning bylaws, limiting the character and density of development within the entire watershed. The system is adequate to serve current and future residential needs. However, additional reserve capacity and pressure may be needed to support fire suppression systems required in larger commercial development.

- **Village of Jeffersonville Water System** (WISD #5150): Originally installed in 1910 and later upgraded in 1984, the Jeffersonville system serves an estimated 200 connections, with a storage capacity of 700,000 gallons. Service is available to any property within the Village boundaries; water for the system is supplied by two local springs. While both WHPAs are identified in the Jeffersonville Municipal Plan, neither is protected by zoning or land acquisition. The Village is currently working to upgrade the size of the water mains in the Village core to allow additional pressure.

- **Village of Johnson Water System** (WISD #5156): First installed in 1895, with major upgrades completed in 2006, the Johnson Village Water System serves 330 connections, with a storage capacity of approximately 530,000 gallons. Operated by the Johnson Water & Light Department, service is available to residents within the Village limits and new connections are permitted by the Village Trustees on a case-by-case basis. The Village owns two wells—the French Hill Surface supply and Nadeau well. In 2003-04, the Village acquired property where a new water supply well was drilled and tested. The WHPA for the new well is owned by the Village and state, and is therefore protected.

- **Village of Morrisville Water System** (WISD #5160): Installed during the late-1800s, the Village of Morrisville Water System is the largest in Lamoille County, serving 1,200 connections, with a storage capacity of more than 2 million gallons. Operated by the Morrisville Water & Light Department, the system serves residents of the Village and portions of town along Vermont Routes 100, 15, and 12. The water service area can be expanded at the discretion of the Village Trustees. The Village owns three wells, although only Well #3 is used as a primary source. Each well is protected by local zoning and through the purchase of properties within the WHPA. The Water & Light Department has significant capacity for expansion and is open to opportunities to supply new connections. In 2007 a bond vote authorized the construction of a high service water storage facility (i.e. a replacement reservoir) adjacent to the current 500,000 gallon reservoir. According to the Morristown Municipal Plan, the most important considerations for the Village water system are to protect the water sources, identify and correct system losses, ensure proper water pressure, and upgrade the aging distribution system (several areas are 80-95 years old).

- **Stowe Village Water System** (WISD #5163, 5164): Installed during the late-1800s and upgraded in 1997, the system serves more than 500 connections with an estimated storage capacity of 1.7 million gallons. Operated by the Town of Stowe Water Department, the system serves the unincorporated Stowe Village and properties along Mountain Road (Vermont Route 108) up to Stowe Mountain Resort. Stowe does not have a fixed water service area; anyone within proximity of a water main may apply to hook onto the system. Water is supplied by two wells—Edson Hill #2 and the Village Green Well. Each was has an approved Source Protection Plan.

- **Smuggler’s Notch Water System** (WSID5151): The Smugglers’ Notch Management Company owns and operates a public community water system serving Smugglers’ Notch Resort. The village section of Smugglers’ Notch was developed in the 1960’s and has been expanding since that time. Smugglers’ Notch Management Company approximates that two thirds of the domestic water currently used by the Smugglers’ Notch village comes from 8 drilled wells, with the balance coming from a surface source within lands owned by the State of Vermont. This surface water source also provides water for snowmaking purposes and fire protection. The Smuggler’s Notch Water System Well Head Protection Area is located in the Town of Cambridge.

### Fire Districts
Municipal fire districts are created by a municipality’s legislative body, upon the application of 20 or more residents, to provide for a variety of fire protection needs, including the construction and maintenance of water works (20 V.S.A §171). By Vermont Statute, municipal fire districts are operated by a Prudential Committee, elected by vote of the district members. In Lamoille County, there are nine incorporated municipal fire districts with license to operate public water systems, including:

- **Hyde Park Fire District #1** (WISD #5153): Established in 1958, with an estimated 12,000 gallon storage capacity, this system services the unincorporated village of North Hyde Park and the North Hyde Park Industrial Park. Capacity is sufficient to accommodate the build-out of the remaining eight lots within the industrial park.
- **Stowe Fire Districts #2** (WISD #5168): Formed in 1987 as a merger between two privately owned water systems, Fire District #2 serves Gold Brook Circle, Wood Road, and portions of Dewey Hill and Gold Brook Road. The system has limited expansion capacity.
- **Stowe Fire District #4** (WISD #5523): Formed in 1993 to serve the needs of the Glen Brook area of Mansfield View properties. The system was previously unreliable, but underwent major upgrades in 2008, including the installation of new waterlines and the addition of a back-up generator. Like Fire District #2, Fire District #4 also has limited capacity for expansion.

In addition, other smaller fire districts within Lamoille County include Stowe Fire District #1 (inactive), and Stowe Fire District #3 (operated by the Stowe Water Department), Morrisville Fire District #1, and Waterville Fire District #1. In the future, it is possible that one or more private water systems within the county could apply to become municipal fire districts.

**Cooperative Systems**

Water cooperatives are private, non-profit organizations created to administer a public water system. There are three such systems in Lamoille County:

- **Cadys Falls Water Cooperative** (WSID #5159): Serving 19 connections in the Cadys Falls area of Morristown, the system was installed in 1947 and has a storage capacity of 3,500 gallons. The Town of Morristown and Village of Morrisville are jointly planning the construction of a waterline connecting Cadys Falls to the Village of Morrisville Water system. Funding for said waterline was approved on the 2015 Morristown Town Meeting ballot.
- **Elmore Water Cooperative** (WSID #5152): Installed in 1950 and later upgraded in 1985, the system has a 4,300 gallon storage capacity and services approximately 20 connections in the Lake Elmore village area. In 2011, the Town of Elmore passed a bond vote to upgrade Elmore Water Cooperative and incorporate it as a municipal system. In the coming years, the town anticipates developing regulations and establishing a water district, which may extend beyond the current cooperative boundaries.
- **Morristown Corners Water Cooperative** (WSID #5158): Serving more than 50 connections in the Morristown Corners neighborhood, the system was built during the 1940s and has a storage capacity of nearly 35,000 gallons.

**Smart Growth vs. Strip Development**

Many of Vermont’s land use objectives and regulations are intended to discourage “strip development” while encouraging “smart growth”. Strip development is a highly land consumptive development pattern in which single use structures, usually for commercial uses, line a highway. Strip development has the potential to negatively impact natural resources and fragment natural resources. Due to the reliance on single occupancy automobiles and
individual access points, strip development can also burden the regional transportation network by creating unnecessary turning movements that could be avoided if accesses where better managed and consolidated and other modes of transportation were utilized.

To date, Lamoille County has managed to avoid the most negative aspects of strip development. While the North End of Morrisville is an auto-oriented area, the municipality and private developers have created a grid network of streets and installed pedestrian infrastructure which may allow infill to occur over time. Several municipalities have created planning areas along State highways that direct new development into “nodes” rather than strips along the highway or require shared access for new developments and subdivisions.

Smart Growth stands in contrast to “strip development”. While strip development refers to low density, disconnected development scattered along a roadway and accessible only by automobile, Smart Growth envisions centers, nodes, and clusters of development accessible by pedestrians and cyclists as well as cars. These centers may include a mix of uses, allowing someone to easily walk from home to work and then to services. Where strip development is “long,” smart growth is “deep.”

Lamoille County’s topography of narrow river valleys surrounded by steep mountain slopes, coupled with the lack of infrastructure in many centers, creates inherent limitations to the denser, deeper development patterns that typify smart growth. As a result, many of the existing settlements in Lamoille County are linear in nature.

State policy makers must recognize that the dense, multi-block pattern seen in regions with gentler topography may not be achievable in much of Lamoille County. Even so, there are some steps municipalities can take to implement “smart growth principles” (box at left) even in rural settings with multiple limitations, including:

- Reducing or eliminating frontage requirements and setbacks to allow more densely built development.
• Allowing multiple uses within a single structure without requiring additional land area.
• Using alternatives to minimum lot size to regulate the intensity of development, such as lot coverage and floor to area ratio.
• As locally appropriate, allowing multiple principal uses per lot to replicate the traditional “running ell” and “carriage house” development pattern found in many villages.
• Reducing and eliminating parking requirements, and allow alternative arrangements such as shared peak parking and offsite parking. Where feasible, construct common or municipal lots or on-street parking.

Brownfields Redevelopment
Brownfield contamination sites are scattered throughout Lamoille County. The use of chemical compounds used at, stored onsite, or transferred to sites may lead to contamination. This includes old gas stations, foundries, or dry cleaners and other industrial sites often found in historic villages and downtowns or along the rail bed of the former Lamoille Valley Railroad.

Brownfields contamination can substantially hamper redevelopment of these areas. Developers and businesses avoid these sites due to potential liability. Left unaddressed, brownfields sites are often underutilized and may fall into disrepair. As this occurs, they can devalue an entire Main Street or neighborhood.

LCPC has been an active participant in the Environmental Protection Agency’s (EPA) Brownfields Program since 2005. The program provides Federal funding for assessing and remediating brownfields. Property owners who are not responsible parties to contamination and undertake prescribed remediation receive protection from liability.

Once remediated and redeveloped, brownfields have the potential to become valuable to the surrounding community. Redeveloped properties not only generate tax revenues, jobs, and stimulate economic growth, but they also turn blighted sites into places that are both productive and aesthetically pleasing or attractive. Examples of successful brownfields redevelopments include:

• Arthur’s Department Store – Located on Main Street in Morrisville, Arthur’s served as the anchor of the region’s largest downtown for decades. Past use as a dry cleaner left many private investors leery of the site. Occupying three attached buildings, demolition of Arthur’s would have greatly disrupted the fabric of downtown. After a successful assessment, LCPC was able to assist the property owner in leveraging funds for remediation and redevelopment. In 2014, the buildings were rehabbed to include 19 new units of housing. Local businesses are now opening in the building’s street level storefronts.

• Johnson Community Housing – Located in one of the Region’s most economically depressed communities, a former electric utility site has been successfully remediated and redeveloped as a mix of family and senior housing. The site is located within walking distance of the Village Center and the local Elementary School.

• Former Railroad Engine House/ MSI – This former railroad facility in Morrisville has been remediated and converted into MSI, one of the Region’s fastest growing manufacturing firms. MSI is also incorporating the Engine House into a major expansion of its manufacturing facility.

Assessment, remediation, and redevelopment projects currently underway include a former lumber mill in Jeffersonville, a rail yard in Wolcott, multiple sites that will be utilized as trailheads for the Lamoille Valley Rail Trail, the Gristmill/Creamery in Morrisville, and a former foundry in Morrisville.
Village and Downtown Designations

Vermont’s land use policies, as well as the goals of this Regional Plan, are generally oriented toward directing new growth and development toward compact village and urban centers. In order to revitalize Vermont’s traditional villages and downtowns and to encourage new development close to these areas, the State of Vermont has developed several “designated center” programs, including Village Center Designation, Downtown Designation, Neighborhood Development Area Designation, and Growth Center Designation. These designations are granted by the Vermont Downtown Board at the request of the municipal legislative body. The requirements and benefits vary between the various designation programs. A summary of these programs and associated benefits is provided below.

Village Center Designation
As of the drafting of this Plan, there were seven Designated Village Centers in Lamoille County, including Cambridge Village, Jeffersonville, Johnson Village, Hyde Park Village, Stowe Village, Waterville Village, and Wolcott Village. Municipal plans also identify several potential areas for Village Center Designation. State statute defines a “Village Center” as:

The core of a traditional settlement, typically comprised of a cohesive mix of residential, civic, religious, commercial, and mixed use buildings, arranged along a main street and intersecting streets that are within walking distance for residents who live within and surrounding the core. Industrial uses may be found within or immediately adjacent to these centers. Village centers are typically smaller in scale than downtowns and are characterized by a development pattern that is consistent with smart growth principles.

Benefits of Village Center Designation include:
- state and federal tax credits toward the rehabilitation of historic buildings,
- tax credits for façade improvements,
- tax credits for code improvements, including electric and plumbing, sprinkler system, and access improvements such as lifts and elevators; and
- priority consideration for a variety of grant programs, including Municipal Planning Grants, Community Development Block Grants, Transportation Alternatives Grants, as well as other state and federal funds.

These tax credits have the potential to offset some of the additional costs of working with historic structures as well as overcome some of the challenges posed by infrastructure limitations in many rural village settings.

Downtown Designation
Downtown Designation is similar to Village Center Designation, but requires more robust planning and implementation efforts at the local level. In order to receive Downtown Designation, a municipality must:
- Demonstrate a commitment to protect and enhance the historic character of the downtown through provisions in local bylaws.
- Provide a community reinvestment agreement that has been executed by the authorized representatives of the municipal government, business and property owners within the district, and community groups with an articulated purpose of supporting downtown interests.
- Maintain an up to date capital budget and program that includes funds to improve or preserve public infrastructure within the district, including facilities for public transit, parking, pedestrian amenities, lighting, and public space.
• Identify a source of funding and resources necessary to fulfill the community reinvestment agreement, including commitments from the legislative body of the municipality.
• Organize a downtown organization that will collaborate with municipal departments, local businesses, and local nonprofit organizations for the social and physical benefit of the downtown.
• Provide evidence that any private or municipal sewage system and private or public water supply serving the proposed downtown district is in compliance with State regulations and has sufficient reserve capacity to serve future needs of the designated area.

As a result of these more stringent requirements, Designated Downtowns are eligible for a wider array of benefits than Designated Village Centers. These benefits include:

• All the tax credits and grant incentives available to Village Centers
• Access to the Vermont Downtown Transportation Fund, which provides loans, loan guarantees, or grants up to $100,000 for capital transportation and related capital improvement projects (grants may not exceed 50% of a project’s cost.)
• Traffic calming options, including authority to post speed limits of less than 25 mph to help calm traffic and make the downtown a more pedestrian-friendly environment.
• Expanded signage options, such as the ability to erect and post informational signs to help guide visitors to downtown and to significant historical, educational, recreational or cultural landmarks.
• The ability to create special assessment districts (also known as special benefits district or business improvement districts) to raise funds for both operating costs and capital expenses to support specific projects in downtown.
• Streamlined Act250 review for developments within the Designated Downtown
• Eligibility for “Sales Tax Reallocation,” meaning that sales taxes collected as a result of private development in a Downtown are returned to the municipality to support related infrastructure improvements.
• Eligibility for other, periodic funding opportunities, such as grants to install electric vehicle charging stations.

Downtown Morrisville is currently the only Designated Downtown in Lamoille County. Other areas may be eligible for municipalities willing to commit to the program’s planning and implementation requirements.

**Neighborhood Development Area Designation (NDA)**

The Neighborhood Development Area Designation encourages municipalities and/or developers to plan for new and infill housing in the area within walking distance of a designated downtown or village center. Areas eligible for designation must be within a quarter mile of a Village Center or a half mile of a Designated Downtown. Local land use bylaws must also allow for residential densities of at least four (4) dwelling units per acre.

Benefits of Neighborhood Designation are primarily related to state taxes and permitting processes. These benefits include:

• Higher thresholds of Act250 review for “mixed income” developments. (meaning Act250 review is not needed for some developments that would require it elsewhere)
• Reduced Act250 application fees and ANR wastewater permit fees
• Exemption from the land gains tax.

There are currently no Designated Neighborhood Development Areas within Lamoille County. As noted in the Housing Section, Lamoille County has experienced steady housing growth and increasingly provides workforce
housing for households priced out of the market in adjacent regions. The benefits provided for Neighborhood Development Areas could create an incentive for private developers to redirect new housing from rural areas of the County to areas within, or in closer proximity to, Centers.

Unfortunately, current interpretation of enabling statute inhibits many Lamoille County communities from benefiting from this program. As one of the fastest growing regions in Vermont, in terms of both population and new housing units, LCPC recognizes the potential benefit of Neighborhood Development Areas directing development to more appropriate areas AND encouraging municipalities to strengthen subdivision bylaws and address infrastructure limitations. To achieve these benefits, LCPC encourages minor revisions to program rules to make it more effective in rural areas, which are discussed in greater detail in the Land Use Strategy Section.

**Growth Center Designation**

State statute defines a Growth Center as an area of land that (A) is within or adjoining a downtown, village center, or new town center designated under this chapter; and (B) has clearly defined boundaries that can accommodate a majority of commercial, residential, and industrial growth anticipated by the municipality or municipalities over a 20-year period. A growth center must support and reinforce any existing Designated Downtown or Village Center located in the municipality or adjacent municipality by accommodating concentrated residential neighborhoods and a mix and scale of commercial, civic, and industrial uses that are consistent with the anticipated demand for those uses within the municipality and region.

To be eligible for Growth Center Designation, a municipality must have undertaken extensive planning, including local bylaws with provisions related to density, design, and form of development in the growth center; a capital plan that includes existing and planned wastewater treatment, water, stormwater, and transportation infrastructure, public spaces; existing and planned infrastructure adequate to meet the municipality's 20-year growth needs; policies on the extension of water and wastewater lines that include a defined service area and allocation plan to support the growth center; transportation standards and policies for street connectivity and aiming to create a comprehensive, integrated, connected network for all modes; and bylaws and other programs to minimize impacts on agricultural lands, forests, wildlife habitat, and other important natural resources located outside the proposed growth center.

Benefits of Growth Center Designation include:

- Ability to utilize the state portion of the property tax bill for Tax Increment Financing for infrastructure and improvements
- Vermont Economic Development Authority (VEDA) incentives
- Priority consideration for Agency of Natural Resources funding of new, expanded, upgraded, or refurbished wastewater management facilities, technical and financial assistance for brownfields remediation, Community Development Block Grants, transportation alternative grants, State housing renovation and affordable housing construction assistance programs
- Access to the Vermont Downtown Transportation Fund
- Reduced mitigation requirements for impacts to agricultural soils
- Streamlined Act250 review for developments within the Designated Growth Center

There are currently no Designated Growth Centers within Lamoille County.
Industrial Uses and Enterprise Areas

Lamoille County is fortunate to be home to a vibrant manufacturing section. The region’s industrial base is composed largely of locally held businesses. Industrial firms still form an important employment sector for the region, usually at above average wage levels for the County. Some light manufacturing uses may be located in Center Areas without conflict. However, some industrial uses produce off-site impacts, such as noise and heavy truck traffic that are best mitigated if located in areas specifically designated for industrial growth. Such areas in Lamoille County include:

- The proposed Trombley Hill Industrial Park in Morristown
- The Airport Enterprise Area in Morristown
- Portions of the North End/Uptown in Morristown
- The Jewett parcel in Johnson
- The North Hyde Park Industrial Park
- The Fischer Bridge Industrial Park in Wolcott
- The Cambridge Enterprise Park

Unfortunately, many of these areas lack at least one piece of critical infrastructure, are limited by topography, or are owned by property owners who do not currently wish to sell or develop their property. Lack of direct access to an interstate also creates a barrier for industrial development. As a result, the Lamoille Economic Development Corporation has identified the lack of “shovel ready” land for industrial uses as a major impediment to realizing the region’s full economic development potential.

LCPC can assist in overcoming this obstacle by providing assistance in planning for infrastructure needs, such as upgrades to water, wastewater, transportation, and transmission infrastructure. LCPC can also work with municipalities to develop land use regulations that are supportive of industrial development in appropriate areas. Examples include allowing light industrial activities within Enterprise Areas as permitted rather than conditional uses, reducing the potential for future land use conflicts within Enterprise Areas by new, non-industrial uses such as residential, retail, and office/service type uses, and revising performance standards related to noise and other impacts to reflect an industrial rather than residential context.

Consumer Durables Manufacturing

Consumer Durables Manufacturing manufactures products to be sold to the final consumers or to final consumer dealers. These are “heavy” goods that have a life span of three or more years. Examples include cars, furniture, household goods, or toys. This sector is strong in Lamoille County. Major employers in this sector include:

- For over 30 years, Hearthstone has manufactured stoves (gas, pellet, and wood) in Morrisville.
- Started in North Troy, Vermont, in 1960, House of Troy moved to Hyde Park in the mid-1980s when new owners took over the business. House of Troy continues to make classic lighting as part of the Framburg & Co. line of lighting. The business employs 50-99 people.
- Vermont Precision Woodworks was started in the early 1900’s. Its business has expanded over the years to include wood products for musical instruments and furniture, including beds, bunk beds for dorms and residences, and children’s furniture. Lumber is sourced locally. Vermont Precision Woodworks employs about 50 people.
- Manufacturing Solutions Inc., located in Morristown, is an example of a company that underwent a successful assessment and adaptive use of a former brownfields site. MSI is now a major, growing employer, and is expanding to properties in other Lamoille County communities.
Recreation Equipment
While recreation plays a significant role in Lamoille County’s economy, and indeed the State of Vermont’s economy, few firms specialize in manufacturing recreation equipment. Concept2, based in Morrisville, is a major regional firm in this industry. The company was started by two brothers out of the back of a bread truck and now employs over 50 people. Concept2 is one of the largest manufacturers of oars and rowing machines in the country.

Since 2006, two of the large firms specializing in recreational equipment have moved production out of state. Tubbs Snowshoes was based in Wallingford, Vermont, in 1958 and moved to Stowe in 1987. Production increased and Tubbs was so successful it needed to expand and moved business to China. Production in Stowe ceased in 2005, leaving 30-40 employees without jobs. Diamondback made custom fly fishing rods in Morrisville. The company was sold, production wavered, and in 2007 the plant closed.

Consumer Non-Durables Manufacturing
Non-durable goods are typically goods that are immediately consumed (food and drink) in one use or have a lifespan of less than three years. Examples of the type of manufacturing in this category include food and beverage, textiles and apparel, petroleum products, and chemical products. Textiles are described in more detail below.

Examples of successful companies in this sector include Vermont Peanut Butter Company, whose move to Morrisville in 2012 helped strengthen the industrial cluster in the North End. Alcoholic beverage producers continue to thrive in Lamoille County. Smugglers’ Notch Distillery in Jeffersonville and Green Mountain Distillers in Stowe and Morristown have both made successful forays into the alcoholic beverage market. Trapp Family Lager in Stowe is currently undergoing an expansion of its brewery while Rock Art Brewery in Morristown recently expanded to accommodate increased production capacity and better visitor visibility. Another brewery, Lost Nation Brewing, has been recently established in Morristown. Finally, maple producer Butternut Mountain Farm, with a retail store in Johnson and manufacturing operations in Morristown, has been operating for 35 years. It recently completed an expansion of the Morrisville warehouse and packaging facilities. Many of these companies practice socially responsible business practices, providing living wages for employees, using recycled packaging, and, in the case of Butternut Mountain, using renewable energy such as solar power.

Specialized Textile Products and Services
This category is defined as firms specializing in the manufacture of specialized textile products, either apparel or other products, and providing specialized services to textile producers. Regional firms in this category include Turtle Fur, Inc., Vermont Fleece Company, and Johnson Woolen Mills. Johnson Woolen Mills has been in production since 1908. Their signature “Made in the USA” clothing products are sold nationally and internationally. The company is still family-owned and employs about 50 people. Turtle Fur Group moved into the Morrisville Industrial Park and the Vermont Fleece Company is located in the Hyde Park Industrial Park. The Turtle Fur Group includes four separate brands, with the earliest started in 1966, and now manufactures hats, neck warmers, socks, gloves, and clavas, among its products. In 1971 it expanded to include Vermont Originals, which sells hand-knit wool hats. Together, the Turtle Fur Group and the Vermont Fleece Company employ roughly 100 people.

Natural Resource Based Manufacturing
Natural resource based manufacturing, once the pre-eminent industry in Lamoille County, is used in this context to classify wood product manufacturing. This category includes lumber, plywood, wood flooring, assembling wood products, and transforming and making wood products. Today, fewer than four sawmills remain in Lamoille County. Sawmills are dispersed throughout the County, with sawmills in Hyde Park, Johnson, Morristown, and Wolcott.
Numerous businesses in this category, both large and small, produce wood products such as furniture, sheds, cabinetry, toys, and other woodenware. There are roughly 20 producers of these products in at least eight Lamoille County towns. Many of these producers are secondary job activities or of such small scale that they are not captured in employment data. What can be determined is that large-scale wood manufacturing has decreased in employment 74% from 2000 to 2010. Innovations in the natural resource based manufacturing category include small-scale or “backyard” sawmills that perform similar work on a very different scale.

**Land Use Tools**

Communities have a wide variety of tools available to assist them in achieving their land use goals. Local communities are best positioned to select the tools that will be most effective in achieving their objectives. These tools are divided into “Regulatory” and “Non-Regulatory” Options.

**Regulatory Tools**

There are two primary types of local land use regulations. **Zoning** regulates the uses of land and the dimensions, construction, repair, and removal of structures; establishes dimensions of land, areas, yards, and distances between structures; and sets densities of population and intensity of use. **Subdivision regulations** apply to the creation of new lots and establish standards related to size, shape, location, and density of lots. Subdivision regulations also outline rules related to how roads, utilities, and other infrastructure serving a new development are laid out and constructed. In short, zoning regulates what someone can build or how they can use their property, while subdivision regulations control the division of that property into two or more lots. It becomes important then to determine which tool is correct to accomplish a goal. For some districts, such as the flood hazard district, the regulation of the use of the lot is most critical to achieving the goal. In other districts, such as a rural district, subdivision regulations are more important. As a general rule, zoning is more important to achieving goals in dense or urban areas while subdivision regulations are more important to accomplishing goals in rural or less dense areas. Some communities have combined their zoning and subdivision regulations into a **Unified Bylaw.** Unified bylaws can reduce the potential for contradictory standards or duplicative review.

Simply having regulations does not ensure that a community will achieve its goals or that development will reflect the desires of the community. It is also important that the regulatory tools be properly selected for the local setting and the objectives of the community. Some examples of provisions communities can consider including in their land use regulations include:

**Alternatives to Large Lot Zoning**

Many communities rely on “Large Lot Zoning” to control densities in rural areas. Large lot zoning refers to the practice of requiring multi-acre lots for each residential structure. While large lot zoning can effectively reduce the overall density within a rural area, it may also result in unnecessary fragmentation as each new home site must be accompanied by large amounts of land. Large lot zoning may also require the construction of extensive new road networks to serve new developments, resulting in additional fragmentation of working lands and natural resources.

Fortunately, there are alternatives to large lot zoning which can maintain low overall densities while reducing forest fragmentation. One commonly used technique is the **“Planned Unit Development” or PUD.** PUDs allow a landowner or developer to “cluster” development in one area of a parcel while leaving the remainder of the parcel undeveloped. The undeveloped land is often subject to development restrictions, such as an easement, and may be owned by a homeowners association, an individual, a land trust, or a municipality.

Section 3: Where We Live | Page 161
One potential drawback of PUD’s is that they are often most applicable when a sizeable number of lots are developed at the same time and require some degree of master planning on the part of the applicant. Much of the development in rural areas of Lamoille County occurs in an incremental process in which a landowner may only subdivide a single parcel at a time. In some cases, the benefits of PUD’s may be achieved with a more simplified subdivision process. One option is to allow “density averaging” over an entire parcel.

Also called “fixed area zoning,” density averaging allows a landowner to create new building lots smaller than the district minimum lot size, provided that the total number of new lots does not exceed the number that would usually be allowed within the zoning district. The example below provides an illustration of “density averaging:

A parcel contains 100 acres. The parcel is located in a zoning district with a 10 acre minimum lot size. The owner could create a total of ten lots. Applying fixed area zoning, the owner can create nine one acre building lots over a period of several years, while maintaining ownership of the remaining 91 acres. The remaining 91 acres can continue to be managed as a private forest or sold to another party, but may not be subdivided into additional building lots.

Density Bonuses
Vermont Statute allows municipalities to offer “density bonuses” through their PUD provisions. Density bonuses are usually offered to forward an objective of the municipal plan, such as providing affordable housing, conserving an important natural resource, or providing public access to a trail network. Density bonuses are most effective when the regulations provide clear guidance and standards regarding when a bonus may be awarded.

Transfers of Density
Another regulatory tool authorized by statute is a zoning tool called “Transfer of Development Rights” (TDR). Under a TDR, a municipality could identify a critical resource area as a “sending zone.” The allowable density for a parcel in that zone can be “sent” to a different parcel located in a “receiving” zone where the Town desires more dense development.

Using the hypothetical 100 acre parcel, in a zoning district with a ten acre minimum lot size, the rights to develop ten units of housing on that parcel could be transferred to a parcel in a different area; perhaps in a village center where the availability of infrastructure allows for greater density. A ten acre receiving parcel in a district allowing two units per acre (20 units total) could be developed with 30 units if the development rights were transferred.

TDRs have had limited success in rural communities, largely due to the lack of large enough receiving zones with the infrastructure needed to accommodate higher density development. This would likely be a challenge in Lamoille County’s more rural communities. However, communities with sewer and water infrastructure in their downtowns and Village Centers may find TDRs to be a useful tool for conserving forest land while allowing property owners to realize an economic benefit from the development value of their land.

Recognizing the limited applicability of TDRs, some communities have developed a Hybrid TDR/PUD approach. In this hybrid scheme, the development rights from one parcel can be transferred to another parcel, also in a low-density rural location. The result is one parcel with a “cluster” of development and another, non-contiguous parcel that remains undeveloped, basically containing the open space portion of the two-parcel PUD. This tool allows rural communities to focus development in areas where it is most suited (for example, where soils can support greater onsite septic capacity) while preserving undeveloped tracts of forest land. Wolcott’s Land Use Regulations
allow for density transfers through its PUD provisions, while Stowe’s Zoning Regulations contain a traditional TDR approach.

Both traditional TDRs and hybrid TDR/PUDs require the administrative capacity to document and track transfers of development rights. In order to ensure documentation, it may be wise to record such transfers as notes on the actual Mylar recorded in the Town Land Records.

Overlay Districts
An overlay district refers to a zoning district that is tied to a specific feature. Overlay districts may follow a natural feature such as a stream, deeryard, or wetland; a topographical feature such as all lands above a certain elevation; or infrastructure such as a highway corridor or planned sewer line extension. An overlay adds provisions in addition to the standards of the underlying zoning district. Stowe and Hyde Park have utilized overlay districts to protect viewsheds by requiring developers to take measures such as maintaining forested backdrops on hillsides. Some communities have also established overlays to prevent contamination in the public water supply wellhead protection areas. While not currently used in Lamoille County, some communities in more densely developed areas of the State have developed “access management overlays” that require additional consideration of shared access points on important regional transportation routes.

Alternative Techniques to Manage Density and Intensity of Development in Center Areas
Traditional zoning regulations rely primarily on minimum lot size and setbacks to control density. These are often not the most effective tools in a Village setting and can encourage, or even inadvertently require, new development to take the form of “strip development”. Alternative approaches for managing density include lot coverage – which sets a maximum percentage of the lot that the building footprint and other impervious surfaces may cover. A similar approach is floor to area ratio (FAR) which expresses the relationship between the amount of useable floor area permitted in a building (or buildings) and the area of the lot on which the building stands. Lot coverage is more common in Village settings, in which buildings are generally less than three stories tall, while FAR is more effective in downtowns with multistory buildings.

“Character of the Neighborhood” Standards
Many municipal plans express the importance of maintaining the traditional “character” of Village and downtown areas. However, traditional zoning regulations are usually vague on how to address this and leave much discretion to local review boards. This can create uncertainty and unpredictability in the permitting process. Form Based Code is a relatively new concept in planning that considers development based primarily on “form” (the basic appearance of the building and the way in which it is laid out) and provides more flexibility regarding use. Many form based codes include provisions for administrative review of minor developments. Form based codes may also contain standards related to new public and semi-public infrastructure such as roads, sidewalks, and streetscape amenities.

Design Review is another tool that can be used to maintain the traditional “character of the neighborhood.” Design review is often administered through an overlay district and usually consists of very prescriptive standards related to the architectural design of new buildings. Unlike form based code, design review may also dictate issues such as colors and building materials. Design review usually requires developments to be reviewed by an additional board such as a Design Review Board or a Historic Preservation Commission.
Non-Regulatory Tools

Infrastructure Investments and Capital Planning
In some cases, municipalities may have greater impacts on development patterns through their infrastructure investments than through their land use regulations. Coordinating infrastructure investments with local planning goals is critical to meeting a community’s long term objectives. For example, zoning land within an existing area primarily for low density development may result in widely spaced development that does make efficient use of a system’s capacity.

Many major infrastructure investments require a significant amount of capital – often more than a municipality can fund in a single year. By adopting a Capital Plan and Budget municipalities may make annual contributions to reserve funds for major investments, thus spreading the cost over multiple fiscal years.

Tax Stabilization Agreements
Municipalities have the authority to enter into tax stabilization agreements with landowners for the municipal portion of property taxes. Most municipalities use this authority to stabilize taxes on working lands such as farms to better reflect the “use” rather than the development value of land. The Town of Hyde Park has established a tax stabilization program to encourage businesses to locate in its three locally defined growth areas (Hyde Park Village, North Hyde Park, and Garfield). Under this program, upon approval of the Selectboard, a portion of the taxes on a portion of the increased property value will be reduced for a defined period of time.

Conservation Commissions, Energy Committees, and other Advisory Groups
Communities have the ability to organize local citizens into official town bodies such as Conservation Commissions and Energy Committees. The goals, activities, and agendas of these groups may vary from community to community. Many Conservation Commissions organize educational programs related to natural resources, assist in management of municipal properties such as Town Forests, and maintain local trail networks. Conservation Commissions can also be empowered to provide input on municipal planning decisions. Energy Committees can be established to educate residents about issues such as energy efficiency, assist in development of local energy resources, or conduct energy audits of public buildings and facilities. The roles of these groups is invaluable, as education is often more effective at achieving goals than regulation.

Public Buildings
Municipalities can have a profound impact on development patterns based on where they locate public buildings. When community anchors such as municipal offices, schools, and post offices are located in centers, they contribute to the vitality of the village or downtown. Conversely, when these anchors are located in rural areas or corridors typified by “strip development,” they move activity and customer base outside of the center. For this reason, whenever possible, community anchors should be located in Center Areas.

Public Land and Land Conservation
Purchase of public land or conservation easements is often the most effective means of conserving a specific natural resource. Lamoille County contains several large State Forests. The Vermont Land Trust has been active in conserving land throughout the County. The Stowe Land Trust and Northern Rivers Land Trust (whose service area includes Wolcott) have also conserved land in their respective areas.
Several municipalities have also established “Town Forests”. The size and management objectives of Town Forests vary greatly across communities, ranging from the 300 acre Morristown Municipal Forest which is actively managed for timber, wildlife, and recreation, to Moss Woods, a six acre forested parcel in the heart of Hyde Park Village, owned and managed by the Village Trustees for “its preservation as an irreplaceable natural area.”

**State Designation Programs**
By pursuing State Designations (discussed above), municipalities can harness a variety of incentives to encourage development and redeployment in their traditional centers. Some communities have dedicated staff available to assist property owners in completing the applications required for tax credits. The Union Bank has also been an important partner in purchasing tax credits from individual property owners who do not have the tax liability to qualify for a tax credit.