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# TRANSPORTATION PLAN

## Synopsis and Policies

## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>GOALS &amp; OBJECTIVES</td>
<td>1</td>
</tr>
<tr>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Regional Context</td>
<td>2</td>
</tr>
<tr>
<td>A Transportation Plan for the Windham Region</td>
<td>3</td>
</tr>
<tr>
<td>POLICIES</td>
<td>7</td>
</tr>
<tr>
<td>TRANSPORTATION TOPIC SUMMARIES, CONCLUSIONS &amp; POLICIES</td>
<td>7</td>
</tr>
<tr>
<td>Land Use and Development Summary &amp; Policies</td>
<td>7</td>
</tr>
<tr>
<td>Energy and Air Quality Summary &amp; Policies</td>
<td>10</td>
</tr>
<tr>
<td>Freight Summary &amp; Policies</td>
<td>13</td>
</tr>
<tr>
<td>Highway Summary &amp; Policies</td>
<td>15</td>
</tr>
<tr>
<td>Public Transportation Summary &amp; Policies</td>
<td>17</td>
</tr>
<tr>
<td>Bicycle &amp; Pedestrian Networks Summary &amp; Policies</td>
<td>21</td>
</tr>
<tr>
<td>Resources</td>
<td>24</td>
</tr>
<tr>
<td>TRANSPORTATION MAPS</td>
<td>25</td>
</tr>
<tr>
<td>Existing Transportation Network</td>
<td>Map Page 1</td>
</tr>
<tr>
<td>Future Transportation Network</td>
<td>Map Page 2</td>
</tr>
<tr>
<td>Highway Network</td>
<td>Map Page 3</td>
</tr>
<tr>
<td>Functional Class of Highways</td>
<td>Map Page 4</td>
</tr>
<tr>
<td>Bicycle Suitability Map: Brattleboro Area</td>
<td>Map Page 5</td>
</tr>
<tr>
<td>Bicycle Suitability Map: Putney/Bellows Falls Area</td>
<td>Map Page 7</td>
</tr>
</tbody>
</table>
GOALS & OBJECTIVES

INTRODUCTION

Efficient travel is essential to individual and family economic and social well-being, as well as the economic, social and environmental health of the region. Most traditional transportation plans attempt to project traffic volumes and predict their impacts for a 20 year period. This plan does likewise, but it attempts to find strategies that will allow people's travel needs to be met efficiently while strengthening our communities and reducing transportation-related environmental impacts.

There are many transportation planning challenges in the Windham Region. They include the financial difficulty of developing public transportation systems to serve small, rural populations; the poor fit between the long term schedules required to implement many transportation decisions – especially for major items like bridges and key intersections – and the often short duration of public support for a given decision; and the challenge facing government agencies that are called upon to reduce overall transportation demand in a culture that tends to view transportation as an unlimited and free resource. This plan attempts to alleviate some of the difficulty posed by those challenges by providing a clear direction for the Region’s transportation decisions.

Demographic and economic trends are important contributors to the analytical basis for this plan and the policies contained herein. In the last fifteen years we have changed our travel patterns significantly. More two-worker households, more licensed drivers per household and more residential development in outlying areas all contribute to significantly increased travel per person. Gains made in vehicle gas mileage over the last fifteen years have been more than offset by increased per capita travel. We need to accommodate this increased mobility more effectively now and in anticipation of additional demographic changes in the future.

The Windham Regional Transportation Plan calls for transportation systems and programs that serve people's needs, while minimizing negative impacts on communities and the environment. It also calls for a coordinated approach from town, regional, State, and Federal stakeholders. This approach to transportation planning broadens the scope to include not only traditional traffic issues, but also to include other modes of transportation and to deal with far reaching land use and economic development issues that affect the Region in the long term. This plan is intended to be a living document that is flexible and is changed as appropriate to deal with changing needs and concerns.
 REGIONAL CONTEXT

The way in which the American public views transportation planning has changed dramatically, and those changes are reflected in legislation and policies at both the State and Federal levels. That is not to say that the public is of one opinion, for regional differences will continue both in terms of what are the major issues and how to implement preferred solutions. However, the basic approach to solving those problems has changed in two important ways.

COMMUNITY COMMITMENT

First, it has become widely acknowledged that transportation systems have a marked effect on the quality and pace of life, and therefore the people affected must take more responsibility for the decisions regarding those systems. Transportation plans and reports at all levels of government have come to include many terms like "bottom-up planning," "sustained public participation," "local control," etc. These are important principles, and the aim of Windham Regional Transportation Plan is to accurately reflect the will of the communities that it serves.

In making this commitment, the Windham Regional Commission (WRC) and its member Towns are addressing another question that has long been at the center of transportation planning: Should transportation planning follow land use and development, serving the travel and traffic demands that accompany it, or should planning lead development, simultaneously enabling community growth and protecting community character? Others have noted that broad regional development is driven by three forces: employment opportunity, transportation infrastructure and lifestyle choice. The strong interrelationship between these three factors is apparent, as is the difficulty of trying to identify any one as the true "leader" that drives development.

Nationwide, state and local governments are transitioning away from making transportation system decisions based on reactions to prior development and resultant traffic demands. Instead, they are trying to use those transportation system decisions to influence development and thereby exert more control over demand. However, in the course of making this transition, the importance of maintaining the existing system and implementing needed highway and bridge repairs should not go overlooked.

MULTIMODAL SYSTEM

The second way in which the approach to transportation planning has changed is what might be called the maturing of America's relationship to the automobile. In July 2012, Moving Ahead for Progress in the 21st Century (MAP-21) was passed by Congress. MAP-21 is the first long-term highway authorization enacted since 2005 and the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) era. MAP-21 creates a streamlined, performance-based, and multimodal program to address the many challenges facing the U.S. transportation system. These challenges include improving safety, maintaining infrastructure condition, reducing traffic congestion, improving efficiency of the system and freight movement, protecting the environment, and reducing delays in project delivery.
Preceding MAP-21, SAFETEA-LU represented the largest surface transportation investment in our Nation's history. SAFETEA-LU addressed many of the challenges facing our transportation system – challenges such as improving safety, reducing traffic congestion, improving efficiency in freight movement, increasing intermodal connectivity, and protecting the environment – as well as laying the groundwork for addressing future challenges. SAFETEA-LU built upon the goals of two previous acts, the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the Transportation Equity Act for the 21st Century (TEA-21). SAFETEA-LU promoted more efficient and effective Federal surface transportation programs by focusing on transportation issues of national significance, while giving State and local transportation decision makers more flexibility for solving transportation problems in their communities.

LESSONS LEARNED FROM TROPICAL STORM IRENE

Hurricane Irene impacted all of the Towns in the Windham Region, some more than others. With bridges washed out, roads gone, homes taken down stream, and culverts squashed, the region’s transportation infrastructure was turned upside down. Post-Irene efforts to repair the infrastructure directly relate to mitigating damages when the next disaster hits. Some hazard mitigation techniques have included upsizing culverts and lengthening bridges based on stream hydraulic studies; as well as improved bank stabilization. Planning for not only the next federally declared disaster but for any upcoming extreme weather event, will include continued coordination between the Towns, Windham Regional, State and Federal Agencies.

A TRANSPORTATION PLAN FOR THE WINDHAM REGION

This regional transportation plan takes direction from the trends outlined above, and directly builds on the policies and prescribed actions in the Windham Regional Plan that was adopted in October 2006. It is consistent with the requirements of Vermont’s Municipal Regional Planning and Development Act and with State initiatives regarding the establishment of regional transportation planning capacity. Furthermore, it is compatible with policies and programs of the approved plans of member towns.

As has been the case traditionally, State and regional transportation planning is heavily influenced by Federal programs, both in terms of the activities that are pursued and the problems that must be addressed. For example, the development of the interstate highway system (initially envisioned before World War II and in progress since the mid 1950s), brought needed commerce to rural areas like the Windham Region. It was accompanied by the building and improvement of many collectors and arterial highways, the development of faster and safer vehicles, and the creation of many supporting facilities (service stations, restaurants, motels, tourist attractions, etc.). Unfortunately in many cases, the development that followed the construction of major highway systems, and their impact on secondary traffic congestion, were not adequately anticipated. Those secondary impacts reflect the fact that transportation and land use intrinsically linked in a cyclical loop in which:
1. Traffic volumes increase, due to outside influences and/or local growth; after which

2. Subsequent traffic conflicts increase and levels of service decrease; requiring that

3. Transportation system improvements are made to address those problems; with the result that

4. Increased traffic capacity and greater accessibility lead to increased development and additional land use changes; and

5. Those changes bring a new cycle of traffic increases and conflicts, producing a call for yet more system improvements.

In the past, responses have been largely limited to increasing highway capacity, with perhaps inadequate attention paid at the State or regional levels to more efficient use of available transportation resources. More recent Federal and State legislation has shifted the focus away from a primarily highway improvement focus to address the larger picture of an integrated transportation network. MAP-21 and the recently enacted Vermont “Complete Streets” legislation include imperatives for inclusion of all modes of transportation and all transportation system users. In this way, the interstate highway system becomes just one piece in the many overlapping networks that comprise the entire transportation system.

The following regional goals outline changes that are perceived as necessary for the Region’s future transportation system, and they propose some specific steps toward realizing those changes. In general, they move the Windham Region in the direction of a transportation system that is both economically efficient and environmentally sound. These goals place transportation decision-making at the most local level appropriate, respect community character and approved Town Plans, promote needed transportation system improvements, and recognize the significant environmental impacts of many transportation decisions.

**REGIONAL GOALS:**

- Direct the development of transportation infrastructure that is compatible with regional settlement patterns, community character, approved Town Plans and other elements of the Windham Regional Plan.

- Promote transportation infrastructure decisions that foster economic growth and diversity, consistent with local and regional economic development policies.

- Support transportation decisions that avoid negative environmental impacts, understanding that health and prosperity decline in a deteriorating environment.
Promote the development and maintenance of an intermodal transportation system that is economically efficient and environmentally sound, and that enables the movement of people and goods in an energy efficient manner.

Encourage the development of an effective mix of travel modes, not limited to highways and motor vehicles.

Encourage the placement of transportation decision-making at the most local level appropriate and with optimal local public involvement, while recognizing that by their nature many transportation decisions are regional and statewide in scope.

TRANSPORTATION PLAN ORGANIZATION

This Regional Transportation Plan is laid out such that the major themes and policies are presented first and foremost in this document. This section presented the overarching themes and goals that influence all other elements of the Plan. Section Two puts forth the specific transportation policies that direct the work of the Windham Regional Commission in their efforts to support and improve transportation networks throughout the Region. Each group of policies corresponds with a particular transportation topic, for which a summary and conclusions statement is provided. These topics include Land Use and Development, Energy and Air Quality, Freight, Highway Systems, Public Transportation, and Bicycle and Pedestrian Networks. Following Section Two several regional maps are provided that show existing and proposed transportation systems, existing highway networks, existing functional classifications of highways, and bike route suitability of existing transportation systems. Section Three of this plan provides more detailed data and information on each of the transportation topics presented in Section Two. Additionally, embedded hyperlinks are found throughout the plan to direct readers to the proper authoritative websites and documents for further reference.

The Regional Transportation Plan, following a review period and incorporation of changes that result from that review, was accepted by the Windham Regional Transportation Committee at the June 10th, 2013 meeting. The Regional Transportation Plan will guide the Windham Regional Commission's transportation work program over the life of this Plan.
LAND USE AND DEVELOPMENT SUMMARY & POLICIES

Each of the identified land use designations functions differently and has its own specific transportation needs and constraints. Transportation systems and land use patterns are intrinsically linked elements, affecting each other in a cyclical loop where developing land use requires increased access, which in turn attracts more development. This cyclical loop must be understood and respected such that both development and transportation systems are focused in areas where increased access is desirable from both an economic and environmental standpoint. This means maintaining a reliable and safe transportation infrastructure that provides the needed connections, is attractive for economic development, is convenient for commuters, and can handle the burdens created by dense development.

The downtown areas of Brattleboro and Bellows Falls already serve as transportation hubs for the Region. This distinction should be encouraged and fostered. The downtowns are ideal places in the Windham Region to develop strong intermodal transportation systems. To relieve traffic congestion and give commuters, residents, and visitor’s convenient access to the downtown areas, alternative means of travel should be incorporated into the transportation system. This should include paved bicycle lanes or shoulders on certain roadways, separated bike/pedestrian paths where appropriate, busses and paratransit systems, rail and intercity bus service. Park and ride lots should be conveniently located to allow drivers to park their cars and car pool, walk, bike, or take the bus or rail. These areas would receive the greatest benefit from the incorporation of all aspects of Complete Streets guidelines.

Villages are secondary hubs along the transportation corridors. These areas should serve as minor hubs for elements
such as public transportation connections and park and ride transfers. Functional conflicts in villages between motor vehicles and pedestrians should be reduced through the use of appropriate traffic calming techniques and road standards. The scale and design of these areas should enhance the human and economic functions of the village, and not simply increase the efficiency with which a vehicle may pass through the village.

Resort centers are a unique entity in the Region, creating their own microcosms of commerce and connections. The Region has an interest in making the resort centers and their recreational facilities attractive and accessible to as many visitors as possible, while balancing the concerns of safety issues and functional conflicts that often arise as a result of the seasonal influxes of people. Resort centers should continue to develop better modal links and connection points to enable effective use of alternative transportation modes for accessing the areas. Efficient, reliable transportation systems for accessing the resort areas will reduce congestion and improve the seasonal experience of visiting these areas.

The transportation corridors of the rural lands in the Windham Region allow users to travel within the Region between downtowns, villages, and resort centers, while also accessing the broader New England Region. Care must be taken when reconstructing or redesigning roads and bridges to prevent the loss of rural character and the inducement of unnecessarily increased traffic volumes and speed. Because of the dispersed nature of development in these regions, alternative mode options must be located purposefully and with an understanding of the entire transportation system. Park and ride lots should be placed in convenient locations in rural lands, both to serve local uses and to enable more ride-sharing by residents. These locations will be used for people to meet and car pool as well as to park for recreational purposes, such as bicycling, swimming, walking, cross country skiing, etc. Bicycling facilities should be enhanced and consider not only roadway shoulders, but also connections to regional trail networks that combine separated paths, road shoulders, Class 4 Town Highways and Legal Town Trails.

Finally, the transportation system should also take into consideration the problems of the transit dependent populations of rural areas, who do not have access to a car, are elderly or disabled, are low income, are youth, or for some other reason, cannot drive. Lower population densities in the Region make full scale public transportation difficult, but some creative public transportation options have been developed and have potential for expansion in the future.
LAND USE POLICIES

1. Weigh the secondary growth effects that often result from transportation infrastructure improvements and determine if the benefits of the improvements outweigh the costs to existing historical, cultural, and environmental assets.

2. Minimize functional conflicts and require that developers be responsible for relieving new traffic impacts generated by their developments.

3. Avoid strip development and minimize the negative effects of existing strip development.

4. Preserve village character through appropriate design and scale of commercial, industrial, residential, transportation infrastructure and community structures and uses.

5. Preserve and create Right-of-Ways for future transportation linkages between communities, neighborhood services, and other destinations.

6. Avoid extension of roads into and through Resource Lands.
ENERGY AND AIR QUALITY SUMMARY & POLICIES

Nationwide both the total number of miles traveled and the total number of trips taken are overwhelmingly accomplished by private vehicle. This is no different for the State of Vermont, which in 2009 was sixth in the nation for per capita vehicle miles traveled, and in 2008, devoted 34% of its total energy use to the transportation sector. This intensive use of transportation is mainly due to the rural nature of the State, which is mirrored within the Windham Region. Dispersed populations require significant travel time to access services that are regularly needed, and as such, devote much more time and energy to transportation.

There are many factors contributing to the high energy consumption of the transportation sector in Vermont, but of these, fuel efficiency is a major contributing factor. The majority of the vehicle fleet in Vermont falls within the range of 21-30 miles per gallon. Within the Windham Region, the highest average fuel efficiencies are found around Bellows Falls and Brattleboro, and drop off substantially in the western and northern regions. It should be noted that in a study conducted by the University of Vermont Transportation Research Center, Windham County was second only to Windsor county in the for the highest estimated gasoline usage by county in 2009. Vehicle preference has much to do with the fuel efficiency of the fleet, and in recent years Vermonter have shown a preference for larger, less fuel efficient vehicles. In 2009, 40% of the new vehicles purchased in Vermont were SUVs, pick-up trucks, and vans. The combination of high numbers of low fuel-efficiency vehicles coupled with the quickening pace of residential sprawl has had a major impact on the amount of energy consumed by the transportation sector.

Recently, trends have been developing that may help mitigate the rate of energy consumption in the transportation sector. First, with the passing of new Federal fuel efficiency standards of 35.5 mpg by 2016, the fuel efficiency of the overall fleet will increase in the coming decades. As the majority of the Vermont fleet of cars falls below this level, these new standards will have a positive impact on the transportation sector’s energy use. Additionally, trends throughout the nation are showing an increase in passenger miles in both bus and rail transit, and an increase from 7.2% to 10.4% in the number of person trips completed on foot. While these statistics are nationwide figures, it may depict a shift in attitudes towards alternative...
forms of transportation and an opportunity to make a significant push in their direction. Finally, the sharp increase in oil prices in the past years has also seen a corresponding drop in oil sales. Higher fuel efficiency standards coupled with both shifting attitudes and higher costs for traditional fuels may help the State and the Region reduce their energy use in the transportation sector.

In addition to energy concerns, air quality is also heavily affected by the transportation sector. Automobiles are categorized as mobile sources of air pollutants, and the four pollutants monitored by the EPA for meeting National Ambient Air Quality Standards (NAAQS) are carbon monoxide, hydrocarbons, nitrogen oxides, and particulate matter. If the State does not meet one or all of the criteria pollutant standards set by NAAQS, they are considered in “non-attainment.” Vermont, and correspondingly the Windham Region, is in attainment currently. However, it should be noted that both Massachusetts and New Hampshire have counties that are in non-attainment, and given the close proximity to the Windham Region, could have a negative effect on the Region’s air quality.

The transportation sector’s contribution to green house gas (GHG) emissions must also be considered when evaluating air quality because of climate change concerns. The transportation sector accounts for 74% of Vermont’s GHG emissions, and since 1990, the carbon dioxide emissions from the transportation sector have increased by 21.4% in Vermont, as compared to 16.8% nationwide. Suggested measures for reducing mobile source emissions have been recommended by the Federal Highway Administration (FHWA) and are included in Chapter 2 Energy and Air Quality. These same recommendations would also help reduce the GHG emissions released by the transportation sector, and should be considered in development of strategies for improving air quality in the Region. Among the suggested improvements, the most relevant to this Region are the following:

- Improved public transit
- Park and ride/fringe parking
- Ride-sharing programs
- Pedestrian and bicycle facilities
- Programs to promote non-automobile travel to major activity centers such as shopping centers, special events and other centers of vehicle activity; and
- Programs for new construction and major reconstruction of paths or areas solely for use of pedestrian or other non-motorized means of transportation

Local and regional strategies include providing more public transportation, managing regional transportation demand, locating industrial parks where future links to the rail network would be feasible and encouraging land use patterns that reduce the need for individual private transportation. Additionally, with the passing of high fuel efficiency standards and increased pressure to develop alternative fuels for vehicles, the Region needs to be mindful of the developments taking place in vehicle
design, and prepare for the energy source infrastructure these alternative fuel vehicles will require. Electric and natural gas vehicles in particular have different range and refueling requirements than typical gasoline vehicles, and these needs must be met in order to support their inclusion into the fleet of Vermont vehicles. Finally, given the new requirements of Complete Streets, transportation design should more adequately address the needs of transit dependent populations, pedestrians and cyclists as well as other traditional forms of transport.

POLICIES

1. Support emissions standards that reduce regionally generated air pollutants from transportation related activities.

2. Promote alternative fuel vehicles and the infrastructure necessary to fuel those vehicles.

3. Require all development projects to incorporate elements that reduce reliance on single occupancy vehicles, such as providing access to public transit, installing pedestrian and bicycle network links, or providing access to ride-sharing programs.

4. Support efforts to minimize energy consumption, especially non-renewable energy resources, and explore expanded use of alternative fuels.

5. Integrate traffic designs in designated downtowns and village centers that limit idling and calm traffic.
FREIGHT SUMMARY & POLICIES

While in the past, the Windham Region has experienced a rapidly increasing volume of freight traffic, this high rate of increase is expected to slow in coming decades. This is mainly due to the slackening of the population growth rate and the shifting demographic to a larger proportion of residents 65 and older. These two factors mean relatively less consumption of housing, food, clothing, and retail merchandise. In addition, there is a growing shift in the industry of Vermont to more service base industries, which do not demand as much freight volume. In 2007, inbound freight accounted for 36% of freight flows while outbound freight accounted for only 15% of freight flows. This split is expected to not only continue, but also increase in coming years with the State’s shift away from manufacturing industries.

Vermont’s statewide mode share by weight for all freight movement consists of 83.4% by truck, 16.53% by rail, and .01% by air, which indicates a 6% shift from truck freight to rail freight from the modes shares reported in the 2005 Transportation Plan. Truck freight still accounts for the majority of freight transportation, both through the State and through the Region. The 2012 Vermont Freight Plan shows projected freight traffic increases of between 40%-60% on VT9 and I-91 by 2035, with these routes also currently handling the highest volumes of truck traffic. The Freight Plan does go on to state that current road capacities are sufficient to accommodate these increases.

The Region should be aware of these projections and the impact these increases will have not only on these routes, but also on the turn-off routes that freight traffic may take as detours or to reach their final destination. Trucks are increasing in both size and weight, and these increases will have a significant impact on road maintenance needs. As indicated in Chapter 3 Freight, several town highways reported some of the highest truck traffic as a percentage of their total volume of traffic. These locations should be monitored and assessed for standard upgrades and maintenance needs. Appropriateness of truck travel should also be assessed along these corridors.

The Region will continue to promote rail freight as a favored alternative to truck freight when possible. Ongoing challenges in Vermont’s rail network center on weight limits, tunnel clearance improvements, and rail bridge rehabilitation and upgrade. The rail lines throughout the Windham Region, and in

FREIGHT TRANSPORTATION METHODS

rail freight

truck freight

dairy freight

lumber freight

TRANSPORTATION PLAN • ADOPTED JUNE 10, 2013
most of Vermont, can accommodate a rail car weighing 263,000 pounds. More and more rail companies have been moving rail freight more efficiently by moving double stack rail cars over an infrastructure that can hold up to 286,000 pounds.

Vermont recently received $51 million in American Reinvestment and Recovery Act (ARRA) funding for high-speed and intercity passenger rail improvements. The grant will fund track and bridge improvements on the New England Central Railroad line between St. Albans and the Massachusetts state line and increase the weight limit to 286,000 pounds. Another improvement that was recently completed along the NERC rail line was the lowering of the Bellows Falls tunnel foundation to allow first-generation double-stack and auto-rack cars to pass through the tunnel. Additional improvements are still necessary to allow full double-stack height cars to pass through the tunnel.

While these improvements are promising, more work still needs to be done in order to allow rail freight to effectively compete with truck freight. High priorities for the Region include continuing to improve the track and bridges along NECR and Green Mountain Railroad Corporation (GMRC) lines to achieve 286,000 pound weight capacity fully along the line, better coordination of economic development activities in proximity to the rail lines, and preservation of rail siding access to existing and future industrial sites.

**POLICIES**

1. Maintain, improve, and expand passenger and freight rail services.

2. Encourage businesses and industries with high freight demands to locate within the rail corridor, improving mobility of goods by rail.
HIGWAY SUMMARY & POLICIES

The 1,703 miles of roadway located within the Windham Region are broken down by town highway classification. Town highways are classified from Class 1 Town Highway to Class 4 Town Highway depending on use and condition. The most common classification of town highway for almost all of the towns within the Region is Class 3 Town Highway. The Town of Brattleboro contains the highest number of Class 1 highway miles, which are mostly absent from the other towns in the Region. Also located within the Region are 42 miles of Legal Town Trail, which are mainly located within the towns of Jamaica, Dover, and Readsboro. A formal definition of each classification can be found in Chapter 4 Highways.

Nearly 60% of the roads within the Windham Region are unpaved. Generally, Class 3 and 4 Town Highways are unpaved. These gravel and dirt roads contribute to the picturesque charm of the Region’s rural character, but can also become challenging to traverse during winter and mud season. It is always a difficult decision for Selectboards whether or not to pave a road in their town. Gravel roads can be significantly less expensive to maintain, but factors such as volume and type of traffic, and existence of steep grades may outweigh the lower maintenance costs. It is an issue that must be carefully weighed and addressed in both the context of the specific needs of the town and the greater character and atmosphere of the Region.

The condition and safety of Windham Region roads and bridges continues to be a concern, and maintaining the existing infrastructure will continue to be a major funding priority. Currently, the distribution of town highway financial assistance is based on miles for each class of road. This system of distribution may not serve the towns that have high daily volumes of traffic, as these roads will tend to deteriorate at a faster rate. Additionally, the availability of aggregate, in the form of gravel, sand, and stone, has drawn attention as rising costs and the future prospect of decreasing availability become apparent. In coming years, a significant issue in land use planning may be standards, regulations, and community acceptance of aggregate facilities for maintenance and upkeep of roads.
Reconstruction of roads and bridges may be a solution to some of the existing problems within the Region. Care should be taken so that reconstruction does not result in new facilities that do not fit into the character of the community. In Vermont, the design for reconstruction of roads and bridges is based on the American Association of State Highway Officials (AASHTO) standards. As implemented, these standards may not always reflect the character of Windham Region and its member towns. Wherever possible the use of AASHTO standards should be flexible.

POLICIES

1. Preserve and promote esthetic values particularly along state and federal highways and within scenic byway corridors.

2. Screen new development from I-91 and other scenic roads using vernacular perimeter plantings of hedges, hedgerows, and street trees.

3. Design and build new roads so that emergency vehicles can readily maneuver and access all proposed structures.

4. Improve existing roads and design culverts and bridges to carry a 50-year flood event without damage.

5. Construct all new public and private roads and driveways to VTrans A-71 and B-76 Driveway Standards, so that they do not contribute to the damage of town roads from runoff.

6. Use existing transportation corridors, as an alternative to building new infrastructure, to accommodate new transportation services, facilities, and utilities.

7. Develop and use innovative transportation design programs, including access management and the High Risk Rural Roads program, to provide safer access and mobility for users.

8. Work with local and regional entities to designate Vermont Byways or to otherwise protect travel corridors that exhibit special scenic, historic, recreational, cultural, archeological and/or natural qualities.

9. Work with local and regional entities and VTrans to implement appropriate traffic calming techniques.

10. Require appropriate scale and re-design of streets, highways and transportation facilities, to serve local traffic, destination traffic and through traffic.

11. Support appropriate efforts to access aggregate supplies for use on Town Highways.

12. Promote high quality design for all transportation projects, including roads, bridges, train stations, bus stops, etc.
Developing and maintaining a robust public transportation system within a sparsely populated rural area can be challenging, and as such, any new construction or improvements to the system must be carefully considered and weighed to provide the most efficient service to the broadest possible population. Those especially dependent on public transportation should be given special consideration. This includes individuals without transportation, individuals over age 65, individuals under age 18, and those below poverty or median income levels. Based on 2010 Census Data, over a third of the regional population falls either within the elderly or youth categories of transit dependent populations. All of the towns in this region displaying the highest dependent population characteristics have some form of public transit bus service provided (Rockingham, Brattleboro, Vernon, Westminster, Putney, Readsboro, Marlboro, Athens, Jamaica, Wardsboro, Stratton).

However, provision of service does not necessarily equate to sufficiency of service. One suggested improvement to service could include extending the Dial-A-Ride service further west in the Region. Expanding more regular public transportation service to Vernon with a connection hub in Brattleboro is another option. The town of Vernon is among the top five towns for percentage of households without a vehicle, total population under 18 years old, and total population 65 years and older. Vernon also has the third highest density of population in the Region.

The Region currently is served by two public transit bus providers, Connecticut River Transit (CRT) and the Deerfield Valley Transit Association (DVTA). The Brattleboro Bee Line, which was previously independently run, is now operated by CRT. CRT operates on both fixed routes and rural demand service areas while DVTA operates fully in a rural demand service area, with fixed destinations. All of the routes operating in the Region are performing above the adequate service markers as defined by the 2010 Public Transit Route Performance Review Report, and the majority of the routes are performing above successful levels. In terms of private bus service providers, Greyhound is the only inter-city bus provider in the region. The Greyhound route operates a single daily round-trip from White River Junction to Springfield, MA. This route has stops in the Region in Bellows Falls and Brattleboro. The only other private bus service is offered by the Stratton Mountain Ski resort, and it
mainly serves as a shuttle for resort visitors.

Presently VTrans and the Federal government, with a local match, are allocating $13 million to the public transit program. Most of this includes operating assistance to each provider, JARC, capital assistance, CMAQ projects, carpooling, and elderly and disabled transportation assistance. In the coming years, funding will need to keep pace with the increase in demand of public transportation. What might help alleviate some lack of funding is coordinating services between transit providers on a more systematic level and continuing to solidify the partnerships between each of the stakeholders. The Public Transit Committee has proven to be successful in getting stakeholders around a table to discuss spending priorities on transit and coming to a consensus.

Passenger rail service in the Region is provided by Amtrak’s Vermonter route along the New England Central Railroad (NECR) line. It operates seven days a week with one northbound and one southbound train. This daytime service is geared more to the needs of tourists rather than business travelers. Southeastern Vermonters can access the Amtrak train in Brattleboro or Bellows Falls and reach their destination of New York City, Washington DC (and points in-between) or Montpelier, St. Albans (and points in-between). While the previous transportation plan had reported decreased ridership on the Amtrak route in the region, the Vermonter has seen a rebound in ridership, reporting a 3.5% increase in ridership in 2009 over the previous year. In 2010, the Vermonter had reached a total of 78,461 boardings/alightings, putting ridership at near year 2000 levels.

Vermont recently received $51 million in American Reinvestment and Recovery Act (ARRA) funding for high-speed and intercity passenger rail improvements. The grant will fund track and bridge improvements on the NECR line between St. Albans and the Massachusetts state line. This corridor was among eleven congressionally designated High Speed Rail Corridors that would be eligible for funding. The primary aim of these improvements is to decrease travel times and improve the reliability of passenger services between Boston and Montreal. The estimated reduction in travel time is thirty minutes.

Residents and visitors to the Windham Region have five major airports to choose from: Albany International, Albany, NY; Bradley International, Hartford, CT; Logan International, Boston, MA; Burlington International, Burlington, VT, and Manchester Airport, Manchester, NH. Windham Region residents and visitors currently have limited public transit options when traveling to and from the major airports. Presently, there are privately run transportation options in a range of cost rates. A possible alternative would be to create a partnership with public and local private providers to schedule regular service from the Brattleboro Transportation Center and the Bellows Falls Intermodal Transportation Center to Bradley International and Manchester Airport.

As an alternative to coordinated public transit service to the airport, taxi service is available in some parts of the Region. A number of private companies currently offer service to the surrounding airports, as well as around town transportation. These companies include Brattleboro Taxi, Bellows Falls Taxi,
Buzzy’s Taxi, and Valley Cab Service. A private company providing airport service is Thompson Transportation, located in Troy, NH.

Carpooling in the Region has seen a steady decline since the 1980 Census. It is expected that the number of commuters carpooling will begin to increase again through the installation of a number of municipal park and ride lots, including a proposed Town of Rockingham/CRT lot, and another State park and ride lot. The Region currently has four park and ride lots located in Brattleboro, Westminster, Dummerston and Jacksonville. Six more park and ride lots are proposed throughout the Region, with two specifically located near Mount Snow and Stratton ski areas.

Intermodal facilities serve as hubs for integrated service between two or more transportation methods. This allows users of a bus service to expand their destination access by linking their bus trip with a coordinated train route, or beginning their trip with a bike ride. The Brattleboro Transportation Center is currently the only intermodal facility in the Region. This facility provides parking spaces for downtown Brattleboro, while also creating an intermodal facility for the two bus transit providers, taxis, and Amtrak service. The facility also provides bike racks and lockers for cyclists to park their bikes for either short or extended stays.

Efficient use and planning of intermodal facilities should be a focus in the coming years. Currently, Greyhound service is not linked with this Brattleboro Transportation Center, and this creates a missed opportunity for coordinated inter-city services. Additionally, while DVTA’s schedule coincides with the northbound Amtrak train arriving in Brattleboro, this is not true of most of the bus schedules servicing Brattleboro and reduces the effectiveness of this facility to serve its function. Finally, another layer of coordination needs to exist during the peak winter sport season, when large numbers of visitors are accessing the resorts around the area. Coordinated public transportation routes should be able to take visitors at least the last portion of their trip, from Brattleboro, Wilmington or Jamaica, if not all the way in from their origin point.

Another key element for focus is coordinated communication of services. The Go Vermont webpage begins to bring together public transit information in one place. However, this information needs to be presented in a more integrated fashion and searchable such that an individual can easily find a dependable public transportation route to their destination. Equally as important, this site needs to be marketed widely such that users of public transportation in Vermont have a widely known, central hub of information. With growing communications technologies, individuals are more and more demanding information in a central, coordinated, user friendly format. Provision of this information will not only meet this demand, but also promote higher use levels on public transportation routes.
POLICIES

1. Implement an integrated, multi-modal transportation system in the urban centers; providing connections between rail, air, bus, car, bike, and pedestrian.

2. Integrate the use of energy efficient and alternative modes of transportation into community plans and development.

3. Establish effective and efficient public transit services to meet the needs of transit dependent populations and to better serve the general public.

4. Establish a safe and convenient regional system of park & ride lots to encourage ride-sharing.

5. Include transit orientated development in any proposed project.

6. Incorporate public transportation into planned transportation improvements for resort centers.

7. Create new and expand existing public transit services to fulfill intercity and intra-regional demand.
BICYCLE & PEDESTRIAN NETWORKS SUMMARY & POLICIES

While in past decades the land use and development within Vermont and the Region has been heavily influenced by the automobile, a shift in attitude towards other forms of transportation is taking hold. There is an increasing amount of discussion, both nationally and locally, of how to restore the social aspects to communities and develop healthy, livable communities. A key component of the transportation portion of “livable” communities is having “compact, transit-oriented, walkable, bicycle-friendly land use.” A 2009 study conducted by the Bureau of Transportation Statistics found that 85% of respondents ranked “pedestrian friendly streets in downtowns” and “safe sidewalks or paths” of high importance for a livable community. This high percentage of important votes placed these categories just under categories for major roads and adequate parking in terms of importance to respondents.

Fortunately for the Windham Region, many of our historic downtowns and villages developed around a pedestrian lifestyle, with compactly settled centers for easy access to needs. The essential pieces of mixed uses and concentrated municipal services are already found in many of the village areas. Now it is simply a matter of refocusing the public infrastructure in such a way to give pedestrians and bicyclists a priority equal to the automobile. Part of this will be supported by the recent passing of the Complete Streets Legislature. The other part of this will be a continuing shift in attitude of residents towards the acceptance of these other forms as respected and encouraged forms of travel.

Several recent projects are either completed or under construction in the Region that focus on the bicycle and pedestrian networks. These projects include the Putney Road bike lane, the Newfane sidewalk reconstruction on West and Court Streets, improvements to the pedestrian signals in Brattleboro, Safe Routes to School Program improvements for Readsboro, and the completion of the bicycle suitability map for the eastern portion of the Region. These developments and improvements should continue to be built upon, and network connections should be recognized and encouraged throughout the Region. The Windham Regional Commission can be especially helpful in this process by identifying parallel projects in adjacent towns that have future potential for connection.
Future improvements should also consider more than just connecting networks. Part of developing a robust bicycle and pedestrian network for a region or town is providing other benefits and amenities. Developing inter-modal links is an important part of this idea. All public transit or private vehicle trips begin and end with a pedestrian trip and many could include a bicycle trip as well. Including bike racks on buses, at train stations, and at intermodal facilities will encourage users to bike to these locations rather than drive. Providing safe, direct pedestrian links is also a crucial component of their success. Other amenities should also be considered, such as shelters and bike racks at bus stops, bike lockers at commuter destinations like parking garages and park and ride lots, and comfort elements along networks such as landscape elements, benches, painted crosswalks, and street lighting.

Finally, the Region has a vast array of trail networks made up of multi-use trails, Legal Town Trails, and conservation rights of way. These networks should be promoted as the excellent resource they are, and connections should be strengthened between these networks and the traditional roadway networks associated with bicycle and pedestrian systems. These opportunities would allow a seamless cross-over between recreational and utilitarian use for these systems, and allow the Region to take advantage of opportunities that already exist.

The Region has an excellent framework for developing safe and comfortable pedestrian and bicycle networks through and between each of its town centers. One of the biggest challenges faced pertains to the high speed roads which simultaneously connect and cut through these town centers. Solutions to this issue were somewhat addressed in the Land Use and Development section of this chapter. Traffic calming measures are valuable tools for reducing the speed of cars once they reach a village center. The surface material, roadway layout, and road width also all have an effect on the perceived speed a driver will deem safe for passing through a stretch of roadway. All of these tools can be used to help negotiate the interaction between bicycle and pedestrian traffic and vehicle traffic, providing safer and more pleasant downtown and village centers.

Rural lands present a slightly more difficult challenge for integrating bicycle and pedestrian traffic with vehicle traffic. As settlement of rural lands has outpaced growth in town centers, vehicle traffic has increased. There is also the perception that vehicle speed has increased. A first step for towns is promoting the routes depicted as suitable on the bike suitability map. Increased awareness will help cyclists feel more comfortable choosing their routes. A next step may be “Share the Road” signage on some of the more popular routes within towns. Also, towns can develop their own bike suitability maps, and perhaps include recommended pedestrian routes as well, highlighting known trails and pleasant rights of way that may be underutilized because of lack of publicity. All of these steps can help better integrate bicycle and pedestrian traffic with vehicle traffic in these areas.
POLICIES

1. Incorporate ADA regulations and guidelines into all pedestrian projects.

2. Require provision of appropriate pedestrian and bicycle facilities in new development projects.

3. Review and accommodate for non-motorized transportation, such as bicycle lanes, wider shoulders and sidewalks in roadway and bridge projects.

4. Preserve and encourage creation of Rights of Way for future linkages between communities, neighborhoods services and other destinations.
RESOURCES

WINDHAM REGION LAND USE DESIGNATIONS IMAGE
Downtown Image taken by C.Meves
Village Image taken by C. Meves
Resort Image
Rural Image

TRANSPORTATION SECTOR ENERGY OPTIONS IMAGE
Compressed Natural Gas Image
Fuel Efficiency Image
Electric Charging Stations
Hybrid Vehicle Image

FREIGHT TRANSPORTATION METHODS IMAGE
Rail Freight Image
Truck Freight Image
Dairy Freight Image
Lumber Freight Image taken by C. Meves

HIGHWAY SYSTEM COMPONENTS
Priority Intersection Image
Highway Bridges Image taken by C. Campany
Dirt Roads Image
Flickr: Kidder Covered Bridge

REGIONAL PUBLIC TRANSPORTATION ELEMENTS
CRT Bus Transit
Amtrak Passenger Rail
DVTA Bus Transit
Brattleboro Transportation Center WRC Stock Photo

REGIONAL BIKE/PED IMPROVEMENTS
Brattleboro Signal Improvements taken by C.Meves
Putney Road Bike Lane taken by C. Meves
Putney Sidewalk Improvements taken by C. Meves
Bike Suitability Map
TRANSPORTATION MAPS

- EXISTING TRANSPORTATION NETWORK
- FUTURE TRANSPORTATION NETWORK
- HIGHWAY NETWORK
- FUNCTIONAL CLASS OF HIGHWAYS
- BICYCLE SUITABILITY MAP 1
- BICYCLE SUITABILITY MAP 2
Existing Transportation Network

This map displays the major features of the transportation network of the Windham Region. The proximity and connection between these features is represented, but the true locations are approximate. Features and locations outside the Region are not exactly located and simply shown to illustrate their connection to features within the region.
Future Transportation Network

This map displays the major features of the transportation network of the Windham Region. The proximity and connection between these features is represented, but the true locations are approximate. Features and locations outside the Region are not exactly located and simply shown to illustrate their connection to features within the region.
Southeastern Vermont Bicycle Suitability Map
produced by the Windham Regional Commission

This four section map provides information of interest to cyclists about roads in Southeastern Vermont. This information should help cyclists understand the types of conditions they may encounter on these roads and choose appropriate cycling routes through the region.

Map Series Legend

Information about roads on the bicycle network:

Traffic volumes: Traffic volumes are based on Average Annual Daily Traffic (AADT) data from the Vermont Agency of Transportation. In general, low traffic volumes coincide with AADTs of less than 2000 vehicles per day; high traffic volumes coincide with AADTs of over 5500 vehicles per day.

Traffic speed: State and federal highways (indicated on the map with a highway route shield) usually have higher traffic speeds. Town highways often have lower posted speeds and slower traffic.

Shoulder suitability: Shoulder suitability measures how well suited a shoulder is for accommodating cyclists. In general, shoulders with a width of greater than three feet in good condition are considered suitable. Shoulders with a width of between one and three feet in good condition and with adequate sight distance are considered moderately suitable.

Unpaved road on system: For much of the summer months, most of these roads can be negotiated with a standard road ("skinnny bike") with a moderate amount of care. These roads offer great riding for those with a hybrid or mountain bike (though they’re often hilly).

Significant grade (arrow points uphill): Information on significant grades is highly subjective. You will encounter hills on nearly every road in Southeastern Vermont. These cyclists with marginal fitness levels, or those looking for a more relaxing ride may want to avoid roads marked with a significant grade.

Urban riding conditions: In these areas, cyclists may encounter vehicles moving at slower speeds, but also cyclists may have to contend with higher traffic volumes, frequently turning vehicles, parked cars, pedestrians, storm drains, rough pavement, and other hazards.

Cycling hazards and opportunities:
- Hazard, caution needed.
- Angled railroad crossing; use caution.
- Cycling opportunity.

Road information for Map 1

<table>
<thead>
<tr>
<th>Town</th>
<th>Best</th>
<th>Location</th>
<th>Notes (provenance, designation, etc.)</th>
<th>M-W-M (TREX)</th>
<th>M-S-M (MOMENTUM)</th>
<th>M-W-M</th>
<th>M-S-M</th>
<th>Notes (provenance, designation, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Putney</td>
<td>Village or hamlet with a store</td>
<td>Village or hamlet without a store</td>
<td>Store outside village</td>
<td>School outside village</td>
<td>Bike shop</td>
<td>Parking area outside village</td>
<td>Paved road, not on bicycle network</td>
<td>Unpaved road, not on bicycle network</td>
</tr>
</tbody>
</table>

The bicycle network: These roads form the backbone of the bicycling system in Southeastern Vermont. They provide routes for cyclists traveling through the region, though some roads on the network might not be the preferred choice for the recreational rider. The network includes all federal and state roads, many primary town highways (Class 2 town highways), and other roads that either allow for enjoyable cycling, map produced July 2011

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Southeastern Vermont Bicycle Suitability Map

This four section map provides information of interest to cyclists about roads in Southeastern Vermont. This information should help cyclists understand the types of conditions they may encounter on these roads and choose appropriate cycling routes through the region.

Information about roads on the bicycle network:

Traffic volumes:
- Low
- Moderate
- High
Traffic volumes are based on Average Annual Daily Traffic (AADT) data from the Vermont Agency of Transportation. In general, low traffic volumes coincide with AADTs of less than 2000 vehicles per day, high traffic volumes coincide with AADTs of over 5500 vehicles per day.

Shoulder suitability:
- Unsuitable
- Moderately suitable
- Suitable
Shoulder suitability measures how well suited a shoulder is for accommodating cyclists. In general, shoulders with a width of greater than three feet are considered suitable. Shoulders with a width of between one and three feet, in good condition and with adequate sight distance are considered moderately suitable.

Unpaved road on system:
Riding on unpaved roads requires caution. For much of the summer months, most of these roads can be negotiated with a standard road (“skinny tire”) bike with a moderate amount of care.

Significant grade (arrow points uphill):
Information on significant grades is highly subjective. You will encounter hills on nearly every road in Southwestern Vermont. These grades can be confusing since there may be multiple humps on a single road. The riding route may want to avoid roads marked with a significant grade.

Urban riding conditions:
In these areas, cyclists may encounter vehicles moving at slower speeds, but also cyclists may have to contend with higher traffic volumes, frequently turning vehicles, parked cars, pedestrians, storm drains, rough pavement, and other hazards.

Cycling hazards:
- 1. Putney Road (US Route 5), Brattleboro - Between the West River and the Erie 3 roundabout, Putney Road has very high traffic volumes; many vehicles turning, and, just north of the West River, unsuitable shoulders.
- 2. Railroad crossings on Route 42, Brattleboro and Verner - These are crossings having hazards. Cyclists should cross the tracks perpendicularly (that is, at right angles) to the rail.
- 3. Route 9, Brattleboro, Marlboro, and Wilmington - Route 9 has high amounts of truck traffic, narrow shoulders, and many curvy and hilly roads with limited sight distance.
- 4. Route 30, Newfane - North of Newfane village to the Townsend line, Route 30 has narrow shoulders, sharp curves, and limited sight distance.
- 5. Route 121, Rockingham - Between Saxtons River and Cambridgeport, Route 121 is undergoing major reconstruction in 2003 and 2004. Some sections may be difficult to negotiate on a bicycle.

map produced July 2004
For more information about this map, contact:

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www.wrc.windhamvt.us/bikemap

A project of the Windham Regional Commission's Bicycle and Pedestrian Committee

The bicycle network:
These roads form the backbone of the bicycling system in Southeastern Vermont. They provide routes for cyclists traveling through the region, though some roads on the network might not be the preferred choice for the recreational rider.

The network includes all federal and state roads, many primary town highways (Class 2 town highways), and other roads that either allow for enjoyable cycling, complete a loop, or provide an alternative to another road on the network.
TRANSPORTATION PLAN

Topics and Background

TABLE OF CONTENTS

LAND USE AND DEVELOPMENT .................................................................................................................. 1
  Background .............................................................................................................................................. 1
    Historic Settlement Patterns ................................................................................................................. 1
  Transportation and Regional Land Use ................................................................................................. 4
  Current Regional trends .......................................................................................................................... 5
    Complete Streets ................................................................................................................................. 8
  Land Use Designations & Transportation Needs .................................................................................. 9
    Village/downtown ............................................................................................................................... 9
    Downtowns ........................................................................................................................................... 14
    Resort Centers .................................................................................................................................... 15
    Rural Residential, Productive Rural & Resource Lands ...................................................................... 17
  Resources .............................................................................................................................................. 18

ENERGY AND AIR QUALITY .................................................................................................................... 19
  Background ........................................................................................................................................... 19
  Energy .................................................................................................................................................... 21
    Factors Contributing to Increased Energy Consumption ................................................................. 21
    Factors Mitigating Increased Energy Consumption ........................................................................... 23
  Air Quality ............................................................................................................................................ 25
    Vermont Air Quality .......................................................................................................................... 25
National Highway System ................................................................. 60
Primary Regional Travel Corridors ..................................................... 60
Interstate/Principal Arterials .............................................................. 60
Minor Arterials ................................................................................ 62
Major Collectors ............................................................................. 64
Bridges ............................................................................................ 67
Bridge Classification ........................................................................ 67
Sufficiency Determinations for Bridges ............................................. 67
Condition of the REgion’s Bridges ..................................................... 68
Resources ........................................................................................ 71

PUBLIC TRANSPORTATION ................................................................ 73
Public Transit Need .......................................................................... 73
Transit Dependent Population ......................................................... 73
Public/Private Bus Transit .................................................................. 77
Public Transit Bus Systems ................................................................. 77
Private Resort Shuttles ...................................................................... 78
Private Sector Inter-City Bus Transportation ...................................... 79
Public Transit Analysis ...................................................................... 79
Passenger Rail Transportation ............................................................ 81
Additional Public Transportation & Services ...................................... 83
Airport Public Transit ........................................................................ 83
Taxi Service ..................................................................................... 83
Park-and-Ride .................................................................................. 84
Ride/Car Sharing .............................................................................. 88
Intermodal facilities .......................................................................... 90
Brattleboro Transportation Center ....................................................... 90
CHAPTER 1
LAND USE AND DEVELOPMENT

BACKGROUND

In rural areas such as the Windham Region it is easy to see how the railroads and river influenced the development of our downtowns, how the horse and buggy helped to shape our villages, and how the automobile has affected our rural lands. The function of these distinct land use categories—downtowns, villages, and rural lands—pose their own unique set of transportation needs and constraints. Land use and transportation systems are cyclically linked, and therefore must be addressed with the implications to both in mind. Each of the land uses designated in the Windham Regional Plan brings with it specific transportation needs and demands, while simultaneously affecting adjacent transportation networks and land uses. As such, any plan addressing a transportation system should first look at both historic and developing settlement trends within its region.

HISTORIC SETTLEMENT PATTERNS

Physical limitations have played a dominant role in the Region's pattern of settlement. European settlement first occurred in the Connecticut River Valley where water, good soil and access to natural transportation routes were available. Villages evolved at the confluence of streams, as exemplified by Brattleboro and Bellows Falls in the Connecticut River Valley, and Wilmington and Jamaica in the Region's interior.

Historically, both Brattleboro and Bellows Falls were centers of commerce by virtue of their location on the Connecticut River. From the outset, the river provided hydropower for manufacturing and a transportation corridor for logging and shipping by flatboat. In the nineteenth century, the river's commercial importance declined due to the railroad industry's rise as a major means of shipping. Then, beginning in the 1950's, the construction of the interstate highway system resulted in yet another shift in freight transport to the trucking industry. This era also saw a transition from private rail systems to publicly funded highways as the major means of transporting people from place to place.
FIGURE 1-1: WINDHAM REGION MAJOR VILLAGES AND ROADWAYS RELIEF MAP

Map of the Windham Region
Southeastern Vermont

Produced by the Windham Regional Commission, Brattleboro, Vt.
The linear pattern of development seen throughout Vermont was the natural response to the river and stream valley topography, and it was followed by the establishment of a regional road system that linked village nodes in each major valley (Figure 1-1). In the latter half of the twentieth century, with private automobiles and trucks dominating transportation, these roads enabled a land use pattern of mixed residential and commercial uses to radiate out from villages. The resulting pattern of the Region is one of small villages located in stream valleys with expansion along connecting roads. This spread out pattern of development, frequently termed “sprawl,” has become pervasive in the region, and the rural open landscape and its valuable resources have been increasingly compromised by this form of development.

Public investment in lands, facilities, services and utilities is an important factor in shaping patterns of development and land use. In most cases, public investments are at least as influential as private development in determining the growth of the Region’s communities. The most significant public investments have been the construction of Interstate 91 and other highway improvements, flood control dams, waste water treatment and water supply facilities, and acquisition of Green Mountain National Forest lands. State highway improvements and electric generation stations and distribution lines also represent substantial infrastructure investments that have not only responded to, but also continue to influence development growth.

Since the 1950’s, the ski industry has also been an important contributor to the Region’s settlement pattern. Alpine ski facilities and accommodations have brought large numbers of skiers to the Region. The 1980’s saw new expansion at the resorts with facilities and services for four-season recreation being provided. Tourism related industries and vacation home construction have accompanied this land use trend and in many respects are more significant growth factors than the ski facilities themselves, becoming major travel generators.

Tourism and related development are an important part of the land use/transportation connection, and perhaps the most visible one in this region. Other considerations also come into play: the relationships of where we live to where we work, the ability to develop businesses in rural Vermont that deliver perishable products to distant markets, and the ability for some to work from their home office or shared work space. With the e-Vermont push to expand broadband internet access throughout the Region, the option for some individuals to telecommute to work will be more readily available. The effects of telecommuting on transportation systems are still unfolding. On one hand, it has the potential to significantly reduce travel time and energy use for commuters with this option. On the other hand, it also removes distance as factors for some workers in choosing where to live, and could also reduce the role of traditional economic factors in controlling rural sprawl. All of these factors are items to consider in the future development of the Region’s transportation system.
The current land use and transportation pattern is characterized by extensive forested areas, agricultural lands (primarily in the Connecticut River Valley), small dispersed villages, two urban centers, a regional highway and rail network, and ski resort and second home developments on the eastern slopes of the Green Mountains.

Transportation systems and land use patterns are intrinsically linked elements, affecting each other in a cyclical loop (see Figure 1-2). Current land-use, combined with an increase in traffic volumes along town highways, factors heavily into the level of service of highway; as well as the drivers overall experience and connection between land-use and transportation. This connection can also be conveyed through a build-out analysis that examines land development capacity. Using current zoning, tax parcels and house locations, a town can determine the existing development capacity and project the maximum build-out potential under current regulations.

Accommodating the vehicle trips from the proposed development includes referencing the access management regulations, and the codes and standards for roads and culverts. Access management plays a key role in the safe, efficient movement of vehicles, including sight distance, shared access, and limiting conflict points. Once the transportation need is determined, maintaining the infrastructure includes asset management and potentially developing a Transportation Capital Plan. These items can provide a framework for making cost effective decisions about allocating funding resources and managing the infrastructure. The existing land-use, with a build-out analysis, access management and road standards, and a Transportation Capital Plan can all be incorporated into a Corridor Management Plan (CMP). This Plan can be utilized over a period of time, with phasing in new infrastructure and land-use projects.
The following regional land use categories recognize existing settlement patterns, availability of existing and planned public infrastructure (water, sewer and roads) and land use policies established in existing Town Plans. A basic goal of the Windham Regional Plan is maintaining a settlement pattern of compact villages, downtowns and resort centers, separated by rural countryside. Concentrating development in order to maintain the Region’s characteristic pattern of settlement is regarded as a top concern of citizens.

The Windham Regional Plan Proposed Land Use Map designates six broad land use categories throughout the Region. The categories are as follows:

- Village/Downtown
- High Intensity Mixed Use
- Resort Center
- Rural Residential
- Productive Rural
- Resource

These land use categories set the framework for development in the Region. Each designation’s general character and their respective transportation needs will be discussed in more detail in the following sections.

**CURRENT REGIONAL TRENDS**

The use of the land and its resultant transportation needs directly affects the transportation modes chosen by individuals living and working in the Region. While the following chapters will address in detail the aspects of transportation relating to freight, public transportation, bike/pedestrian, etc., several statistics are addressed here to illustrate transportation trends occurring within the Windham Region. As shown in Figure 1-3, centralized villages and downtowns have a lower average vehicle ownership per household when compared to overall ownership for the towns in the Region. Six of the eleven villages/downtowns/census designated places in the Region have an average vehicle ownership of 1.5 vehicles or less per household. This provides an obvious distinction from the towns in the Region as a whole, of which only one, Brattleboro, has an average vehicle ownership below 1.5 vehicles per household. Densely populated areas provide more opportunity for transportation options, including walking, biking, or taking public transportation. As such, the need for personal vehicle ownership is reduced. However, because development in recent decades has continued to move away from historic village and downtown centers, personal vehicle ownership has increased. Figure 1-4 shows the increasing trend of vehicle ownership that has been developing in this Region from 1980 to 2010. Ownership of two vehicles per household jumped from 32% to 40%, which demonstrated the largest increase, while households with zero vehicles fell from 21% to 7%.
Not only has vehicle ownership increased throughout the region, but travel distance to work for residents of the area has been increasing as well. In 1980, the average commute to work for residents of the Region was sixteen minutes. Based on the 2010 American Community Survey data, the average commute for the Region has increased to twenty-one minutes overall, with the town of Athens having the longest average commute time of 38.50 minutes. Part of the reason for the increase in commute time is that residents are living farther and farther from their place of work. As seen in Figure 1-5, not only has the number of residents who worked outside their county of residence seen an increase from 1980 to 2010, but the number of residents working outside the state of Vermont has nearly doubled since 1980,
increasing from 7.73% to 13.55% of the working population over 16 years of age. One factor that may help to offset this trend in increasing commuter travel time and distance is the coinciding increase in residents working from home in the Region. While it is not possible to quantify how much this factor offsets the increase in transportation need from other factors described here, it does present an opportunity for the Region to promote this employment option for residents living in the area.

One final trend to review with respect to the travel habits of residents within the Region is the mode of transportation used for commuting. Since 1980, driving to work alone has the overwhelming majority as the method of choice for regional commuters, having remained above 70% since 1990. According to the 2010 American Community Survey data, 10% of respondents carpooled to work, followed by 8% walking to work. Carpooling as a method of commuting has been declining since 1980, while walking has seen a slight uptick after declining through 2000. Again, it should be noted here that the percentage of respondents working from home has noticeably increased since from 1980. These trends in resident behavior should be considered when addressing the transportation needs within each land use designation.
COMPLETE STREETS

The “Complete Streets” legislation (No. 34), that became effective July 1, 2011, “requires that the needs of all transportation users, regardless of their age, ability, or preferred mode of transportation be considered, regardless of the project’s funding source in state and municipal transportation projects and project phases including but not limited to: planning, design, construction, and maintenance” (Complete Streets, a guide for Vermont communities, 2012). This legislation will begin being implemented in the 2013/2014 construction season.

The concept of Complete Streets has been gaining ground nationally over the last decade. According to National Complete Streets Coalition the definition of a “Complete Street” is as follows:

“Complete Streets are streets for everyone. They are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists, and public transportation users of all ages and abilities are able to safely move along and across a complete street. Complete Streets make it easy to cross the street, walk to shops, and bicycle to work. They allow buses to run on time and make it safe for people to walk to and from train stations.”

In Vermont, new Complete Streets legislation builds upon the Vermont State Standards that were established in 1997. The current legislation requires all transportation projects to consider all users at all points throughout the design and construction process. Over the past 10 years, more attention has been given to including all modes of transportation into the design and construction of a project. The Complete Streets methodology formalizes the need to consider all modes in upcoming infrastructure projects. It is believed that with the passing of this new legislation, the early consideration of all modes of transportation will lead to more complete transportation systems in Vermont’s towns and villages. “Complete Streets principals require designers to consider how a project will incorporate the needs of all facility users, throughout a project’s planning design, construction, and maintenance phases. This methodology may result in additional benefits including: improving safety for all users, improving connectivity, improving human health, enhancing quality of life and livability, providing an aesthetically pleasing surrounding, supporting current and future economic vitality, and the reduction of pollutants into the environment” (Complete Streets, a guide for Vermont communities, 2012). Given the inherent transportation needs of particular land uses throughout the Region, the requirements of this legislation can only be helped by a clear vision and transportation goal for each land use designation. Expected levels of service for each mode and user should be incorporated into the overall transportation goals for each designation.
Most of the Region's towns have villages that provide for a concentration of residential, commercial service, small industry and government uses. The Plan recognizes 23 villages and 2 downtowns, as described in the Existing Land Use/Land Cover section of the Windham Regional Plan, as growth areas for the future. These same villages and downtowns are places to promote redevelopment and encourage additional residential and commercial development. The downtown and village land use category includes the core civic/business district as well as the surrounding mixed use neighborhoods. Development in downtowns and villages should be carefully planned to minimize undesirable impacts on the character of these places.
VILLAGES

Typically, villages are densely developed with mixed land uses such as residences, schools, commercial developments, municipal services, cultural facilities, and other services. Typical cultural facilities found in the villages include a church or a community center. Services, such as gas stations and/or general stores tend to be small in scale. The village serves as the meeting place for the town, where people come for business, social activities, education, etc. Infrastructure improvements vary from village to village based on the size of the community. Some villages have invested in wastewater treatment facilities, water systems, sidewalks, lighting and recreational lands. It is important to note that the size and density of development exist along a continuum, so the transportation needs of one village may not exactly match that of another.

When these villages were settled the predominant forms of transportation were horseback and walking, and the scale of the village accommodated them. However, as motor vehicles became the predominant form of transportation, villages were changed to accommodate automobiles. As traffic volumes and speeds increased, roads often were widened and the village character changed.

In 2002, the Vermont legislature created the Village Center designation. Much like the Designated Downtown, Village Center designation is a tool that can be used to support economic vitality in the village center. Currently, the Region has 13 designated village centers (Putney, Saxtons River, Townshend, West Brattleboro, North Westminster, Westminster Station, Westminster, Westminster West, Whitingham, Wilmington, Algiers, Jamaica and Weston). Communities that receive the...
designation become eligible for a number of benefits for their village center that include tax credits for building rehabilitation and improvements as well as priority consideration for State programs.

One way to protect village center character while supporting economic vitality based on transportation is through a Corridor Management Plan. The VT 103 Corridor Management Plan was a joint effort of the Town of Rockingham, the Town of Chester, the Southern Windsor County Regional Planning Commission, the Windham Regional Commission, the Vermont Agency of Transportation (VTrans), and local residents and business owners to develop a comprehensive corridor management plan for the VT 103 corridor between VT Route 10 and the I-91 Exit 6 Interchange (Figure 1-9). The Corridor Management Plan (CMP) accomplished the following:

- Informed State, Regional, and Town planning efforts
- Town and regional plans may incorporate the entire CMP or certain sections into town plans
- Provided suggestions for possible future local regulatory changes that benefit the VT 103 corridor
- CMP goals & policies informed Regional Planning Commission project prioritization processes and served as a basis for future regional work programs
- Guided state permitting & project development

Below is a brief summary of the corridor recommendations, for Rockingham.

- Improve Access Management Along the Corridor
- Revise Land Use Regulations to Enhance Development Pattern
- Expand Public Transit Service on the Corridor
- Enforce Speeds on VT 103
- Revise Land Use Regulations in Rockingham Meetinghouse District
- Identify Locations for Park and Rides
- Establish an Access Management Memorandum of Agreement
- Revise Land Use Regulations in Upper Bartonsville C/I(2) District
- Sign Alternative Bicycle Route Parallel to VT 103
- Enhance Cell Phone Coverage Along Corridor
- Identify Location for Intermodal Transfer Facility
- Improve Access into VT Country Store
- Upgrade Rail for Freight & Passenger Service
TRANSPORTATION FUNCTIONS IN VILLAGES

The Region’s villages should be destinations to arrive at and not merely to drive through. This can be achieved by utilizing the highway approaches to the village as gateways. These gateways can serve a secondary purpose of alerting travelers that they have arrived in a village and reduce their speed.

The village will serve as a connection point: people to people, people to services and customer to merchandise. This can be accomplished by providing safe and convenient ways for various modes of transportation to link up, either in the village or at its edges. Automobiles and trucks are essential and must be effectively accommodated, but they must also not dominate the human and economic functions for which the village exists. Roads entering the village should have adequate shoulders to accommodate bicycles safely. In some cases, a separate path might be appropriate. Pedestrian access often can be enhanced by sidewalks or paths within the village. Road standards within the village must accommodate traffic safely, but should not encourage undesired traffic volumes or speed through the village. Rather, the road standards should accommodate the human scale of the village and thereby support the village's economic functions.

Traffic calming, is one technique that may improve quality of life of the people living in villages by controlling vehicular movement to improve safety along village roads. Traffic calming is intended to provide convenience, safety and enjoyment of travel by all who may use the highway. The major advantage of traffic calming devices over more traditional speed reduction measures such as police enforcement is that traffic calming measures are “self-enforcing”. Because traffic calming devices physically force drivers to slow down, they can be much more effective than measures that rely on consistent enforcement. Traffic calming may involve strategic physical modification of roads, which must be compatible with existing land uses. Examples include: speed bumps, chicanes, roundabouts at intersections, street closures or restricted access, narrower streets, brick paving instead of asphalt, etc. Additional traffic calming tools include landscaping, signage, pedestrian paths, gateways, etc. Figure 1-11 shows examples of these devices in use.

As traffic volumes continue to increase throughout the region, it is anticipated speeding and traffic congestion will continue to be an issue in many of the towns. The VT 30 Traffic Calming Report demonstrated that regional towns, VTrans, and WRC recognize speeding as a transportation problem.
and are committed to slowing traffic down through various traffic calming measures. Additional guidelines are found in the 2003 VTrans Traffic Calming Study and Approval Process for State Highways.

**DOWNTOWNS**

The two downtowns in the Region are Brattleboro and Bellows Falls. These locations offer concentrated commercial and industrial activity, accompanied by relatively high population densities of residents and workers. A full range of services support the downtowns, including municipal waste water treatment facilities, public water systems, communication centers, and other utilities. The downtowns also are locations for the Region's government, cultural, and service institutions.

The downtowns give the Region opportunities to attract and sustain certain types of economic development. They also provide denser settlement and provide residents and businesses with numerous services that are less available in more rural areas. In these centers, transportation issues are more complex due to combined commuter, commercial, residential and tourist traffic and associated congestion, as well as freight traffic related to commercial and industrial activities.

Both downtowns are located on two major highway corridors, Interstate 91 and U.S. 5. They are also each on the Central New England Railroad (formerly Central Vermont). Though currently used only for recreational travel, the Connecticut River is another historically important transportation corridor on which both downtowns are located. In addition to these north-south corridors, each of the regional centers has significant corridors that traverse it east to west. VT 9, an east - west principal arterial, passes through Brattleboro and is currently a part of the National Highway System (NHS). This road runs the width of the state from New Hampshire to New York. In Bellows Falls, VT 103 also is currently a part of the NHS and connects to Rutland and points west and north. For further discussion on NHS, see Chapter 4: Highway Systems.

Brattleboro and Bellows Falls each have a Designated Downtown, under the Vermont Agency of Commerce and Community Development's Vermont Downtown Program, making them two of eighteen designated downtowns in the state. Participation in this program requires documentation of a viable downtown center, a commitment to enhancing and maintaining the downtown district, and sound financial and administrative plans. Designated downtowns are eligible for priority funding in a number of state programs, and projects can be eligible for downtown transportation and capital improvement funds, reallocation of sales tax receipts for building materials related to expansion or rehabilitation of downtown properties, an income tax credit for rehabilitation of certified historic buildings, and other benefits.

Brattleboro and Bellows Falls also provide important intermodal connections. The Transportation Center in Brattleboro provides parking, as well as public transit and taxi services to many of the towns in the region. CRT, the Brattleboro Bee Line, and DVTA all serve the intermodal center daily; including DVTA coordinating with Amtrak’s evening schedule to provide intermodal service from Washington, D.C.
and New York City to the Wilmington/Dover area. The transportation hub will provide access to and connections between the train, regional bus, taxi, bicycle rentals and a park and ride lot.

**TRANSPORTATION FUNCTIONS OF DOWNTOWNS**

The downtowns should continue to serve as centers of employment and for the distribution of goods in the Region. This means maintaining a reliable and safe transportation infrastructure that provides needed connections, is attractive for economic development, is convenient for commuters, and can handle the burdens created by dense development. However, it is important that this occur without unduly impacting the quality of life that made the area an attractive place for people to live and for development to occur in the first place.

Truck traffic and general congestion are increasing in the downtowns. It is important that future road standards and reconstruction projects accommodate increasing needs while providing desired safety levels and retaining the integrity of existing communities.

To relieve traffic congestion and give commuters, residents, and visitor’s convenient access to the regional centers, alternative means of travel should be incorporated into the transportation system. This should include paved bicycle lanes or shoulders on certain roadways, separated bike/pedestrian paths where appropriate, busses and paratransit systems, rail and intercity bus service. Park and ride lots should be conveniently located to allow drivers to park their cars and car pool, walk, bike, or take the bus or rail.

The downtowns are ideal places in the Windham Region to develop strong intermodal transportation systems. In an otherwise largely rural region, these are areas of relatively dense population and development, and can generate sufficient demand to allow for public transit systems, carpooling and paratransit. Both downtowns also have railroad corridors, which could allow Brattleboro and Bellows Falls to increase their role as multi-modal collection and distribution points for goods and for commuter services.

**RESORT CENTERS**

Large-scale ski resorts are located in the western tier of the Region in the Green Mountains. The resorts provide recreational facilities and services and contribute to the Region's seasonal housing stock. Route 100, the state's interior recreational travel corridor, together with Routes 9, 11, 30 and 103 provides access to the resorts.

Resort development is generally concentrated around the ski area base facilities, and these built-up areas are recognized as resort centers. The Regional Plan recognizes four resort centers: Mount Snow, Haystack, Stratton Mountain, and Magic Mountain. In addition, to the Resort Centers in the Windham Region, many tourists travel through the Windham Region to reach destinations outside the Region such as Bromley, Manchester, Okemo, Killington etc.
Growth in the vicinity of these resort centers, which has been stimulated by resort development and expansion, is sometimes referred to as secondary development. Seasonal homes are perhaps the most discussed form of secondary development, but lodging and restaurants are also prevalent near the Region's resort centers. Much of this secondary development has occurred in places having sewer systems, along major routes, and in and around historic village areas.

**TRANSPORTATION FUNCTIONS OF RESORT CENTERS**

Resort centers bring valued tourism and economic growth to the Windham Region. But along with those benefits, the negative impacts of high levels of traffic that are common to resort centers raise many issues. Towns are concerned about the cost of adequate road and bridge maintenance. Safety issues and functional conflicts often arise near resort centers due to seasonal influxes of residents and tourists. At the same time, the Region has an interest in making the resort centers and their recreational facilities attractive and accessible to as many visitors as can be accommodated. Implicit in all of this is a need for balance.

Resort center development has responded to, and remains driven by, the automobile as the single dominant mode of transportation. As a result of this almost singular mode of transportation, traffic congestion around these resorts peaks on weekends during the winter season. Roads that can handle typical volumes of traffic for the region are inadequate to convey the influx of traffic during these times. The Town of Wilmington is especially affected by this increase in traffic. The main intersection in its downtown falls to a Level of Service rating of “F” during peak season traffic. The WRC recently completed a Summary Report on the impacts of traffic at this particular intersection and is working with the town and the resorts to implement solutions to help ease traffic congestion in this area and to increase Level of Service and safety in the village. Solutions like these should be sought for other resorts in the Region as well.

In the future, resort centers should continue to develop better modal links and connection points to enable effective use of alternative transportation modes and provide convenient transportation between them. A growing trend is for skiers to arrive at the centers in groups instead of individually. This pattern is attributed to a changing population, including changing family patterns and generally more skiers per car, more buses, etc. It is therefore important to consider flexible and far reaching public transit programs in these resort centers. DVTA is currently the only transit provider in the Region that provides service to a resort center. DVTA offers year around transit services to Mount Snow Resort from many places in the Deerfield Valley, including condo units in Dover and shops in Wilmington, as well as serving the Brattleboro Transportation Center.
To help these transportation functions work more efficiently, the Region will need intermodal facilities and centers serving "four season" tourism. To help relieve peak season and peak hour traffic congestion, shuttle bus services and bicycle and pedestrian paths should be designed for existing transportation routes, as well as becoming part of any newly proposed roads and reconstruction projects. Facilities that complement these intermodal functions such as bus stops, waiting shelters, park and ride lots, and bicycle racks will also improve traveling convenience in the resort centers. While needed road improvements will continue to be made, alternative modes (like buses instead of cars) and alternative routes (pathways for bicyclists and pedestrians), combined with a reliable and convenient system of "intermodal links," can help accommodate increases in travel without requiring undue expansion of the highway system.

**RURAL RESIDENTIAL, PRODUCTIVE RURAL & RESOURCE LANDS**

Rural and resource lands comprise most of the Windham Region, which are the balance of lands in the Region where growth is not concentrated. These are characterized by open lands and small hamlets where a mixed pattern of residential, commercial, outdoor recreational and small industrial uses occur. Specific definitions of each of these designations are found in the Land Use Chapter of the Windham Regional Plan.

Approximately two thirds of Windham Region land has the potential for resource-based production including agriculture, commercial forestry and mineral extraction. This working landscape is a valuable, integral part of the Region's economy, environment and culture.

In spite of sometimes difficult access, steep topography, lack of waste water treatment facilities and lack of public water supply systems, many acres of rural lands have attracted residential development. Such development is an appropriate use at low densities in many areas, but it has encouraged rural sprawl and will continue to do so.

Historically, the roads and bridges in the Region's rural lands have served mainly to connect villages and towns for local travel and commerce. More recently, these networks have been improved to accommodate increased commuter traffic and through-traffic related to interstate travel, commerce and tourism.

**TRANSPORTATION FUNCTIONS OF RURAL & RESOURCE LANDS**

The transportation system in rural and resource lands must serve a wide variety of users, sometimes with conflicting functions. The transportation corridors of the rural lands in the Windham Region allow users to travel within the Region between towns, villages, resort centers, and regional centers. Many corridors also access the broader New England region. Continuation of these functions at an adequate level may require maintaining the transportation infrastructure more effectively than in the past. However, care must be taken when reconstructing or redesigning roads and bridges to prevent the loss of rural character and the inducement of unnecessarily increased traffic volumes and speed. The basic design characteristics of a roadway can play an important role in travel behavior, with drivers naturally
tending to higher speeds if roads are straighter and wider than the intended traffic load requires. To accommodate a narrower road the speed limit might need to be lower. Additionally, if a lower speed limit is acceptable, then a different highway standard may also be possible, avoiding an "overbuilt" facility.

Park and ride lots should be placed in convenient locations in rural lands, both to serve local uses and to enable more ride-sharing by residents. These locations will be used for people to meet and car pool as well as to park for recreational purposes, such as bicycling, swimming, walking, cross country skiing, etc.

Bicycling continues to increase, both as transportation and as a recreational activity, and needs to be better accommodated in the future by provision of facilities where feasible and appropriate when resurfacing and reconstructing rural roads. Regional trail networks that combine separated paths, road shoulders, class 4 town roads and legal trails should be developed in a coordinated and forward looking manner.

The transportation system also should take into consideration the problems of the transit dependent populations of rural areas, who do not have access to a car, are elderly or disabled, are low income, are youth and/or cannot drive. Being away from a concentrated growth area can make it difficult to get to work, medical appointments, shopping, etc. Lower population densities in the Region make full scale public transportation difficult in this Region, but as will be discussed Chapter 5: Public Transportation, some public transportation options are available now and have potential for expansion in the future.

RESOURCES

Figure 1-1: Windham Regional Commission GIS Department

Figure 1-2: Windham Regional Commission Diagram, modified by C. Meves

Figure 1-3: 2010 Census, U.S. Census Bureau, http://www.census.gov/

Figure 1-4: 2010 Census, U.S. Census Bureau, http://www.census.gov/

Figure 1-5: 2010 Census, U.S. Census Bureau, http://www.census.gov/

Figure 1-6: 2010 Census, U.S. Census Bureau, http://www.census.gov/

Figure 1-7: Windham Regional Commission

Figure 1-8: Windham Regional Commission GIS Department

Figure 1-9: Windham Regional Commission VT 103 Corridor Management Plan

Figure 1-10: Windham Regional Commission VT 103 Corridor Management Plan

Figure 1-11: Windham Regional Commission Stock Photos

Figure 1-12: http://jpschroeder.blogspot.com/2010/08/day-48-latham-ny-to-brattleboro-vt.html
CHAPTER 2
ENERGY AND AIR QUALITY

BACKGROUND

The form and frequency of transportation use within the Region has serious implications for energy use and the air quality of the environment. As evident from both the data for total passenger miles traveled and total passenger trips (Figure 2-1), personal vehicle trips account for the largest proportion of transportation in this country. Within Vermont, total vehicle miles traveled per person, per year continues to increase, which contributes to traffic congestion, increased fuel consumption, and degradation of air quality. In 2009, per capita vehicle miles traveled in Vermont was 12,297, a full 27.9% above the national average, putting Vermont at sixth in the nation for per capita vehicle miles traveled (Department of Public Service, Comprehensive Energy Plan, 2011). AVMT surpassed 10,000 miles per capita in Vermont in 1990, and has continued to steadily increase. This trend shows no sign of slowing, with average annual population increases of 1% per year since 1930, and 22% average annual increases in total annual vehicle miles traveled (AVMT) since that time. Figure 2-2 displays these trends side by side from 1930 through 2010. The figure helps illustrates Vermonters’ automobile dependency.

Being one of the least efficient forms of travel, the high use of private vehicles for transportation in this country, and in this State, has a significant impact on energy use. As displayed in Figure 2-3, transportation accounted for over 25% of the energy used within the U.S. in 2008, and 34% of the energy used in the state of Vermont. The transportation sector is the highest sector for energy use in the State, eclipsing the energy use of even the industrial sector. According to the Vermont Comprehensive Energy Plan “[t]his difference can be attributed to Vermont’s higher dependence on automobile transportation due to the State’s rural character, as well as a proportionally smaller industrial base.” The transportation sector is also Vermont’s fastest growing end-use energy sector at 1.3% per annum since 1990. Having such a significant impact on energy use requires an
increased level of scrutiny in the developing of policies that will promote this Region’s success in the future.

Transportation not only accounts for a large percentage of the energy use in this state, but also affects the quality of the air we breathe. Air pollution from motor vehicles is known as "mobile source" pollution. Mobile source pollution comes from entities that are not stationary and includes both on road vehicles (such as cars, trucks and buses) and off road equipment (such as ships, airplanes, agricultural and construction equipment). Because this source of pollution is not fixed in its location, not all of the air pollutants from motor vehicles in the Region are from sources within the Windham Region. The topography, prevailing wind, and weather patterns result in air pollution traveling from other States and other Regions. However, because of federal attainment regulations, the State of Vermont is still responsible for meeting air quality standards for the air
space within its boundaries.

The transportation sector has a significant impact on both energy use and air quality within the Windham Region. The following sections will delve into these two topics more thoroughly, and outline some of the issues as they pertain to the State and to the Region.

**ENERGY**

In 2009, 79% of Vermont’s source energy for the transportation sector was motor gasoline, followed by distillate fuel, 16%, and jet fuel, 5% (Department of Public Service, *Comprehensive Energy Plan, 2011*). In 2010, 98.5% of the registered vehicles in Vermont used gasoline or diesel as their fuel source. With the transportation sector energy use being mainly determined by the individual vehicle miles traveled by residents and visitors to Vermont, energy use as it pertains to personal vehicles is of utmost priority. Recently, the improvement of fuel efficiency of vehicles has again gained traction as a policy issue, but when total vehicle miles traveled increases faster than the population grows, gains in fleet efficiency are more than offset, and total petroleum used for transportation increases. As such, other factors contributing to increased energy use in the transportation sector must also be addressed.

**FACTORS CONTRIBUTING TO INCREASED ENERGY CONSUMPTION**

Fuel efficiency has increased over time, but the overall average miles per gallon (mpg) rate in the U.S. peaked in the late 1980’s and then began declining. This downward trend should see an upswing in the near future with the passing of new Federal fuel efficiency standards in 2011. The new standard requires a 35.5 mpg average for the U.S. auto industry by 2016. The majority of the vehicle fleet in Vermont fell within the 21-30 mpg efficiency range based on the vehicles registered in 2010. Currently, less than 10% of the fleet falls within the 31-40 mpg range, which would be the new standard by 2016. Although this new standard would only affect new cars, the potential exists for it to have an impact on the overall efficiency of the State’s current vehicle fleet.
As seen from the graphic, the Windham Region has a wide array of fuel efficiency ranges within its border. The highest fuel efficiencies for registered vehicles are located around Brattleboro and Bellows Falls, following along the Connecticut River. Lower average fuel efficiencies are found throughout the western portion of the Region, with the towns of Stratton and Somerset containing some of the vehicles with the lowest average fuel efficiency.

The total number of registered vehicles in Vermont saw a decline from 2007 to 2010 (Figure 2-5). The only vehicle fuel type category to see an increase in registered vehicles over this time period was the small number of hybrid vehicles registered in the State, seeing an increase of 73.5% since 2007. However, the overall small percentage of this vehicle type does little to offset the substantial percentage of vehicles fueled by gas and diesel. Additionally, new purchases in 2009 highlighted a preference for larger, less fuel-efficient vehicles by Vermonters. Of the new vehicles purchased, 40% were SUVs, pickup trucks, and vans, 35% were in the economy class, and 24% were midsize & large sedans (Department of Public Service, Comprehensive Energy Plan, 2011). Fuel efficiency of these classifications of vehicles has a direct impact on the amount of fuel used by the residents of this Region. Figure 2-6 displays an estimated gasoline usage by county as calculated by the University of Vermont’s Transportation Research Center. Windham and Windsor counties have the highest per capita estimated gasoline usage.

Settlement patterns and vehicle choice play major roles in high per capita fuel consumption, and the rural landscape of the Windham Region has led to homes being built far from downtown and village centers, where services are accessed. The result of separated residential areas is that trips to market, schools and work tend to be only possible with the use of an automobile. In the Windham Region, rural residential sprawl has occurred where homes located along rural roads have been separated from all other aspects of daily life.

**FIGURE 2-5: ALL VEHICLES REGISTERED IN VERMONT BY FUEL TYPE**

<table>
<thead>
<tr>
<th>Fuel/Vehicle Type</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>% Change 2007-2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hybrids</td>
<td>3,651</td>
<td>4,565</td>
<td>5,473</td>
<td>6,335</td>
<td>73.51%</td>
</tr>
<tr>
<td>Electric</td>
<td>106</td>
<td>101</td>
<td>94</td>
<td>77</td>
<td>-27.36%</td>
</tr>
<tr>
<td>Propane</td>
<td>93</td>
<td>75</td>
<td>69</td>
<td>40</td>
<td>-56.99%</td>
</tr>
<tr>
<td>Diesel</td>
<td>31,648</td>
<td>32,140</td>
<td>30,724</td>
<td>25,025</td>
<td>-20.93%</td>
</tr>
<tr>
<td>Gasoline</td>
<td>583,568</td>
<td>578,881</td>
<td>528,930</td>
<td>514,894</td>
<td>-11.77%</td>
</tr>
<tr>
<td>Total</td>
<td>621,073</td>
<td>617,770</td>
<td>567,299</td>
<td>548,381</td>
<td>-11.70%</td>
</tr>
<tr>
<td>Gas/Diesel Cars as a % of Total Fleet</td>
<td>99.06%</td>
<td>98.91%</td>
<td>98.65%</td>
<td>98.46%</td>
<td></td>
</tr>
</tbody>
</table>
Another factor affecting fuel consumption is the location of major employers far from residential areas and the development of strip commercial areas designed and built at scales that encourage automobile access and discourage pedestrian and bicycle traffic.

Increased road capacities that encourage more driving at faster speeds may also have helped contribute to the increased per capita transportation energy use. The Vermont Department of Public Service estimates that lowering the speed limit to 55 miles per hour on the Interstate highways would lead to a 3% reduction in State-wide fuel consumption. While such a reduction in speed limits may not be politically feasible, education of drivers regarding driving habits and the costs of faster speeds may encourage individuals to reduce their driving speeds voluntarily.

**FACTORS MITIGATING INCREASED ENERGY CONSUMPTION**

At the beginning of this chapter, Figure 2-1 illustrated the high percentage of passenger miles that were accrued by light duty passenger vehicles. While passenger miles are dominated by light duty passenger vehicles, the growth in passenger miles across the U.S. in both bus and rail transit has been significant. Aside from “Other transit,” passenger miles by bus saw the largest percentage increase in total miles from 1990 to 2009. Rail also saw significant increases in transit and commuter passenger miles. Light duty vehicles saw some increase, but nothing compared to these two other forms of transportation. When it comes to percent of person trips being taken, walking has seen an increase from 7.2% to 10.4% of nationwide person trips from 1990 to 2009. While these are nationwide statistics, the trends begin to show support for these other forms of more energy efficient transportation.
The recent shift towards these other modes of transportation may in part be helped by the steady increase in the price of gas that has occurred over the last decade. As shown in Figures 2-8 and 2-9, the increasing cost of oil has seemingly begun to have an effect on the increasing consumption of oil. The year 2008 saw a significant rise in cost per barrel of oil. This rise in cost saw a corresponding drop in oil sales in the state of Vermont (similarly nationwide) during that same timeframe. The high cost of oil in recent years has forced some market shifting, and as prices are forecasted to continue increasing, may encourage other modes of transport to move forward. It is an important time for the Region to continue its policies of supporting other forms of transportation besides passenger vehicles.

Also, as the high cost of fuel begins to influence driving habits, and as the new fuel efficiency standards go into effect, Vermont will need to consider alternative methods of raising revenue to cover the cost of transportation improvements. Across the country, the coupling of these two factors is putting a strain on transportation budgets, as the current taxing structure for transportation budgets no longer is able to cover the costs for necessary improvements. Vermont needs to be mindful of this trend and work to implement a new tax structure for continuing its transportation improvements.
AIR QUALITY

Air pollution is another issue resulting from the current transportation system. The Clean Air Act (CAA) requires EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The Clean Air Act identifies two types of national ambient air quality standards. **Primary standards** provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. **Secondary standards** provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

EPA has set NAAQS for six principal pollutants, which are called "criteria" pollutants. Of these six, four are monitored by the EPA Office of Transportation and Air Quality, which “protects public health and the environment by regulating air pollution from motor vehicles, engines, and the fuels used to operate them, and by encouraging travel choices that minimize emissions. These ‘mobile sources’ include cars and light trucks, heavy trucks and buses, non-road engines, equipment, and vehicles.” Figure 2-10 lists these four pollutants and gives a brief description of each.

VERMONT AIR QUALITY

If a state does not meet one or all of the criteria pollutant standards as set by NAAQS, they are considered in Non-Attainment. Vermont is in attainment for all criteria pollutants, with 1988 being the most recent non-attainment event, when short term ozone standards were exceeded once during the summer season.
Transportation conformity is required by the Clean Air Act section 176(c) (42 U.S.C. 7506(c)) to ensure that federal funding and approval are given to highway and transit projects that are consistent with ("conform to") the air quality goals established by a state air quality implementation plan. Vermont must prepare a State Implementation Plan (SIP) to be submitted to EPA for approval, which identifies actions and programs to be undertaken by the State to implement their goals and responsibilities under the CAA. Vermont's SIP does not include any goals for decreasing mobile source pollutants; it only discusses stationary source emitters. The only mobile source pollutant that Vermont regulates is for air quality permits. For these permits the applicant must demonstrate through air quality modeling that the NAAQS for Carbon Monoxide will not be violated.

As part of the CAA, Vermont is a member of the Ozone Transport Commission (OTC). OTC includes twelve Northeast and Mid-Atlantic States, the District of Columbia and the EPA. OTC was formed to address region wide transport of ground level ozone and its precursor gases of VOCs and NOx. Vermont is also a member of North East States Coordinated Air Use Management (NESCAUM). NESCAUM includes all of the New England States, New Jersey and New York and is working towards more stringent emission standards for new motor vehicles, clean fuel strategies, enhanced inspection and maintenance of vehicles and programs to reduce vehicle miles traveled.

WINDHAM REGION

Within the Windham Region the only Vermont air pollution monitoring site is for particulates in Brattleboro, which is below the NAAQS. Windham Region is in attainment for all of the criteria.
pollutants. However, Windham borders Massachusetts to its south and New Hampshire to its east, and both States contain counties considered in non-attainment under the CAA, which could have an effect on the Region’s air quality.

TRENDS TO REDUCE MOBILE SOURCE POLLUTANTS

In non-attainment States the CAA and ISTEA require transportation improvement programs (TIP) to conform to the State’s SIP. This is not an issue yet in Vermont, but may be in the future.

The following Transportation Control Measures have been suggested by the FHWA to reduce mobile source emissions:

- Improved public transit
- Limitations and restriction of certain roads or lanes to transit and HOVs
- Trip reduction ordinances
- Employer-based transportation management
- Traffic flow improvements to achieve emissions reductions
- Park and ride/fringe parking
- Programs to limit auto travel during peak periods (including congestion pricing)
- Ride-sharing programs
- Pedestrian and bicycle facilities
- Bicycle storage facilities
- Programs to reduce extended vehicle idling
- Programs to reduce extreme cold starts
- Flexible work schedules
- Programs to promote non-automobile travel to major activity centers such as shopping centers, special events and other centers of vehicle activity.
- Programs for new construction and major reconstruction of paths or areas solely for use of pedestrian or other non-motorized means of transportation
Some data supports that a majority of emissions from a typical vehicle occur in the first few minutes of operation. With this in mind strategies that require commuters to drive even very short distances (i.e. central meeting place for car pools) would have minimal benefit in reducing emissions. Therefore, there has been some push for reduction of "cold starts" as more important. More recently, strategies have been working towards "zero emission," such as electric vehicles.

Because of climate change concerns, in addition to traditional air quality standards pollutants, greenhouse gas emissions are also an issue to be considered. Greenhouse gases are the gases that trap heat in the atmosphere, and the principal greenhouse gases that enter the atmosphere because of human activities are carbon dioxide, methane, nitrous oxide, and fluorinated gases. The transportation sector accounts for 47% of Vermont’s greenhouse gas emissions (Figure 2-11). Since the Industrial Revolution in the 1700’s, human activities, such as the burning of oil, coal and gas, and deforestation activities, have increased CO2 concentrations in the atmosphere. In 2005, global atmospheric concentrations of CO2 were 35% higher than they were before the Industrial Revolution. Since 1990, the carbon dioxide emissions from the transportation sector have increased by 21.4% in Vermont, as compared with only 16.8% nationwide (Figure 2-12). Similar strategies as proposed above will help reduce greenhouse gas emissions from the transportation sector while also reducing air quality pollutants.

**SUSTAINABLE TRANSPORTATION**

Inefficient use of energy for transportation results in both environmental and economic costs. Environmental costs include the production of greenhouse gases and air pollutants. Economic costs include the fact that, except for a percentage of biodiesel energy, all of the energy used to run the transportation system is purchased from outside the State.
The 2011 Vermont Comprehensive Energy Plan outlined goals and strategies designed to create a more sustainable transportation system. The plan begins the transportation chapter by plainly stating “Vermonters need to move toward alternative sources of transportation energy, and to use what they have more efficiently.” Sustainable transportation is generally defined as a system that meets the needs of Vermonters without sacrificing environmental quality or economic vitality. In keeping with these goals, the Vermont Comprehensive Energy Plan developed the following two overarching policies for the transportation sector:

- **Reduce Petroleum Consumption.** We can reduce consumption by replacing current transportation energy—nearly exclusively petroleum fuel based—with more sustainable, cleaner, and renewable fuel alternatives, such as electricity and natural gas, while increasing vehicle efficiency.

- **Reduce Energy Use in the Transportation Sector.** We can redesign our transportation system to include more efficient transportation options and land use patterns that maintain mobility for all and for the movement of goods, in order to ensure a thriving Vermont economy and quality of life.

The transportation sector in Vermont accounts for 41% of total energy expenditures by end use (Figure 2-13). This high expense and growing emissions trend is exactly why the current transportation systems are considered unsustainable. Gasoline and diesel fuel continue to be the primary source of energy for transportation in the Windham Region. Energy consumption in Windham Region and the nation continues to increase. Supplies are seen as adequate to meet the near term demand, however increased energy consumption results in both environmental and economic costs to the Region. The policies put forth in the Comprehensive Energy Plan should be considered a starting point from which to develop specific energy policies that fit this Region and its land use character.

**RESOURCES**

- **Figure 2-1:** RITA Bureau of Transportation Statistics, Pocket Guide to Transportation, 2012

- **Figure 2-2:** AVMT from VTrans Vermont Annual Vehicle Miles of Travel (Annual VMT), Population Data from VT Housing Data, [www.housingdata.org](http://www.housingdata.org)
Figure 2-3: University of Vermont Transportation Research Center, Vermont Energy Transportation Report, 2010, http://www.uvm.edu/~transctr/research/trc_reports/UVM-TRC-11-007.pdf

Figure 2-4: University of Vermont Transportation Research Center, Vermont Energy Transportation Report, 2010, http://www.uvm.edu/~transctr/research/trc_reports/UVM-TRC-11-007.pdf

Figure 2-5: University of Vermont Transportation Research Center, Vermont Energy Transportation Report, 2010, http://www.uvm.edu/~transctr/research/trc_reports/UVM-TRC-11-007.pdf

Figure 2-6: University of Vermont Transportation Research Center, Vermont Energy Transportation Report, 2010, http://www.uvm.edu/~transctr/research/trc_reports/UVM-TRC-11-007.pdf


Figure 2-8: U.S. Energy Information Administration, http://www.eia.gov/consumption/

Figure 2-9: U.S. Energy Information Administration, http://www.eia.gov/consumption/

Figure 2-10: EPA, Pollutants, http://www.epa.gov/otaq/inventory/overview/pollutants/index.htm

Figure 2-11: Vermont GHG Emissions Inventory Update, 1990-2008, http://www.anr.state.vt.us/anr/climatechange/Pubs/

Figure 2-12: U.S. Energy Information Administration, http://www.eia.gov/consumption/

CHAPTER 3
FREIGHT

BACKGROUND

Freight traffic in the region, in Vermont, and across the United States, has steadily increased over the years. Starting with the Railroad Revitalization and Regulatory Reform Act of 1976 (the 4-R Act) and the Motor Carrier Act of 1980, deregulation of freight transportation opened up opportunities for new players and created competitive conditions across modes. With the Intermodal Surface Transportation Efficiency Act (ISTEA), Transportation Equity Act for the 21st Century (TEA-21), the subsequent Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) and now Moving Ahead for Progress in the 21st Century (MAP-21) emphasizing multimodal planning, the foundation is set to focus on a more comprehensive freight initiative. In the 1990’s, the nature of doing business with freight shifted to the need for more reliable and efficient operations. The deregulation of the trucking industry, multiple transportation acts, the New England economy shifting from manufacturing to services, and the overall growth in national and international trade have all combined to increase the volume of freight traffic throughout the State.

In Vermont, this trend is expected to dampen in coming years. The high rate of increase that has been experienced in recent years is now expected to slow again in upcoming decades. As reported in the 2012 Vermont Freight Plan:

“In 2007, Vermont handled over 52 million tons of freight worth approximately $58 billion across all modes. By 2035, this volume is expected to grow to 70 million tons, a compound annual growth rate of 1.28 percent compared to the anticipated GDP growth of 2.4 percent. This lower growth rate reflects a continued shift in economic activity away from freight-intensive industries such a lumber and agriculture toward services.”
Population growth throughout the state is projected to be half what was over the last 30 years, while the proportion of residents aged 65 and older is expected to increase. The combination of these factors means relatively less consumption of housing, food, clothing, and retail merchandise and a corresponding reduction in the growth rate of freight demand related to these goods relative to business and commercial sector demand. Additionally, whereas manufacturing topped the ranks of Vermont’s five most important industries in 2009, followed by financial activities, government, education and health, and retail trade, by 2039, financial activities and retail trade are projected to top the list.

As depicted in Figure 3-1, inbound and through trade each accounted for about one-third of all freight flows through Vermont. Outbound goods make up less than half of the volume of inbound goods. This highlights the fact that Vermont’s economy is primarily service-oriented, importing food, clothing, building materials, consumer goods and business machines. In this respect, Vermont is similar to most of the other Northeast states. This split is expected to continue and be accentuated in the future.

Because of its location and relatively small area, Vermont has many significant trading partners. The Region’s proximity to the major urban centers of Boston, New York and Montreal increases the through traffic of goods. While outbound goods are distributed relatively evenly between New York, Canada, and the rest of the U.S., as evident from Figure 3-2, New York is a major source of goods coming into the state.
With Route 9 being one of the major gateways to New York State, this fact is especially pertinent to this Region.

While freight encompasses truck, rail, water, and air, Vermont’s statewide mode share by weight for all movements consists of 83.45% by truck, 16.53% by rail, and .01% by air (Vermont Freight Plan, 2012). This mode share breakdown exhibits about a 6% shift from truck freight to rail freight from the mode shares reported in the 2005 Transportation Plan. Reasoning behind this shift will be covered in more depth in the rail section of this chapter. As the Windham Region does not contain a major airport that handles freight traffic, the following sections will focus on the two remaining categories of truck and rail freight transportation.

**FREIGHT TRANSPORTATION BY TRUCK**

With an 83% share of freight transportation in the State, truck transportation has a major impact not only statewide, but also regionally. The Region’s proximity to the major urban centers of Boston, New York City and Montreal increases the through traffic of goods. Interstate 91 is a major north-south transportation corridor for freight traffic, and VT9, which is part of the National Highway System (see Chapter 3), provides the major east-west connection. The following sections will address both truck size and truck volume as it pertains to freight traffic within the Region.

**TRUCK LENGTH & WEIGHT**

Title 23 V.S.A. §1391 to §1393 of the Vermont Statutes define the weight, size and load limitations for vehicles using roads in the State. The following is a brief synopsis and simplification of the regulations; the regulations are complex and the reader is referred to the statute for definitive information. Towns also may post their own weight limits for town roads and bridges, which are subject to the approval of the Secretary of Transportation.

In 2011, Federal lawmakers passed legislation raising the legal gross weight limit on Interstate highways in Vermont from 80,000 pounds to 99,000 pounds for a twenty-year trial period. Prior to this legislation, trucks exceeding 80,000 pounds were prohibited from traveling on Vermont’s Interstate highways unless they were issued a single-use, over-dimensional load permit. For the Windham Region, this legislation specifically pertains to Interstate 91.

Aside from this recent legislation, State law generally limits gross vehicle weights to 80,000 pounds on State highways and Class 1 town highways, though a variety of permits are available to allow for heavier loads. Among these, the laws provide annually permitted categorical exemptions for "unprocessed forest products," "unprocessed milk products" and "unprocessed quarry products." Under these annual permits, a maximum gross weight of 99,000 pounds is allowable on State and town highways. In the past, with more restrictive weight limits on the Interstate system, heavier trucks frequently traveled through towns when the Interstate would seem to be a more sensible route. With the 2011 legislation
increasing the weight limit on Interstate highways, towns may see a reduction in truck traffic on their State and town highways.

State law also sets specific limits to axle loadings. Single axle loads on State highways are limited to 22,400 pounds with an allowed 10% tolerance. Tandem axle loads are limited to 36,000 pounds and also allow a 10% tolerance. The weight limit for bridges with a wood floor is 16,000 lbs, unless otherwise posted, and 24,000 lbs upon a Class 2, 3, and 4 town highway or bridge. Figure 3-3 illustrates the range of classifications existing for trucks with multiple axle configurations.

In 2009, the Vermont legislature enacted Act 50, which modified regulations concerning the operation of trucks and trailers on Vermont highways. Under the revised regulations, trailer or semitrailer configurations up to 75 feet long, a 3 foot increase over previous regulations, are allowed on all Vermont highways unless specifically prohibited on a particular segment. There is no overall length limit on the Interstate highway system for most equipment, though the length of individual trailers and semitrailers is regulated at the Federal level. Vermont statutes also generally limit the width of motor vehicles to 8.5 feet, and height to 13.5 feet.

The Windham Region hosts a wide range of trucking companies, which include common carriers, contract carriers and owner-operators. In addition to these tractor trailers which distribute larger loads, smaller route trucks are also responsible for the distribution of goods in the Region. The larger wholesalers and distributors occasionally use larger tractor trailers to serve this route function as well. The commodity being hauled and the type of service provided generally dictates what equipment will be utilized. The trucks associated with the region’s infrastructure today range in size from a two axle-six tire unit to a seven axel-multi-tire unit and from 28 to 53 feet long. The movement towards reliable and efficient service is pushing the truck industry to use more and more the 53 foot long trailers. With warehouses decreasing their inventory, moving towards efficiency, and tractor-trailers being labeled “the mobile warehouses,” the weight of truck freight has literally fallen on the infrastructure to keep up with movement.
TRUCK VOLUME

As shown in Figure 3-4, VT 9 carries the highest volume of annual truck traffic in the Region (not including cross-border flows) with over 500,000 trucks passing through annually along certain portions of the highway. Interstate 91 is the next most traveled route for trucks in the Region, followed by VT 112, VT 103, VT 100, & VT 11, all of which see between 100,001 to 250,000 trucks per annum. The next figure, Figure 3-4, shows projected truck volume increase for routes within the Region. VT 9 and Interstate 91 both are expected to see 40-61% increases in volume by 2035, as are VT 100 and VT 11. VT 30 is projected to see an increase of 20-40% in truck volume along the segment that starts in Townshend and heads northwest through the Region.

While this growth may appear significant for this Region, the State Freight Plan reports that:

“...present truck volumes on many of these routes are modest, and the impact to the overall volume-to-capacity ratio on most of these routes will generally be minor. Apart from some of the main arteries within the immediate vicinity of Burlington, including I-89 and U.S. 2, the State’s highway network has the capacity to accommodate freight traffic now and in the future.”

Even with this assessment, the
Region must be mindful of the growing volume of truck freight entering its highways, and be especially attuned to the maintenance needs of this volume of traffic. Among the priorities identified by the State Freight Plan with regards to truck freight, a majority of them are focused on increasing truck size and weight:

- Maintain state of good repair
- Increase weight limits and geometric improvements to handle modern trucks
- Impose fewer time-of day and weather related operating restrictions
- Improve oversize/overweight vehicle permitting
- Improve efficiency on major state highways, including US Routes 2, 4 and 7, and Vermont Routes 9, 22A and 103

Figures 3-6 through 3-8 present truck traffic data collected from daily traffic counts taken from 2007 through 2010 by VTrans. Figure 3-6 displays all the locations in the Region that reported 10% or greater truck traffic as a percentage of the total vehicle volume passing the designated checkpoint. Vehicles counted as trucks fall into FHWA Classes 4-13 (See Figure 3-3 for a pictorial representation). From the data collected, Dummerston Town Highway 27 reported the highest percentage of truck traffic passing through the checkpoint. However, as the total daily traffic volume at this location is only 120 vehicles, this percentage does not necessarily translate into a high total volume of trucks. Figures 3-7 and 3-8 give more specific information as to total daily truck counts for the top twenty-five checkpoint locations in the Region. Figure 3-7 displays all daily truck traffic, while Figure 3-8 displays all daily heavy truck traffic (FHWA Classes 8-13). Evident from an analysis of all three of these figures, I-91 at Rockingham, Vernon, and Brattleboro carries both high quantities of truck traffic, and a high percentage of trucks as compared to its total traffic volume. Of all State highways, VT 9 supports the largest percentage of truck traffic.
traffic, particularly near the cities of Brattleboro, Wilmington and Marlboro. On VT 103, the route segment in the Region that contains the largest percentage of truck traffic is located near the city of Rockingham.

Of note, while the highest truck volumes in both all truck classifications and heavy trucks are mostly

FIGURE 3-8: TOTAL DAILY HEAVY TRUCK VOLUME FOR TOP 25 LOCATIONS, 2007-2010
found passing through locations on I-91, VT9, US5, and VT103, the locations with the highest percentage of trucks as a portion of their total volume of traffic are not as consistent. Several town highways reported some of the highest percentages of truck traffic as compared to other locations within the Region. Putney Town Highway 3, Grafton MC0126, Ferry Rd. in Brattleboro, and Shearer Hill Rd. in Wilmington all reported percentages of truck traffic above 12% as a portion of their daily traffic volume. It is important for traffic planners in the Region to be aware of these minor roads that are carrying high percentages of daily truck traffic. Opportunities may exist to improve routes that are more suited to handle truck traffic in the vicinity of these routes, or design standards for these routes may need to be upgraded to handle the volume of truck traffic passing through these locations.

TRUCK FREIGHT COMMODITIES

The top four commodity groups using freight throughout the region are forest materials, dairy products, food and kindred products and warehouse, distribution materials. The following is a description of some of the industries that are responsible for the majority of the movement of these commodities through the Region. This section only addresses the major industries which have a significant portion of freight transportation in the Region.

Lumber production accounts for a significant portion of the freight that is moved on the Region's roads. In Windham County in 2010, 23.0 million board feet of lumber were processed by primary mills (2010 Report, Vermont Department of Forests, Parks and Recreation). This is an increase from 2001 output by approximately 3.2 million board feet, but still lower than 1991 production. Compared with the other counties in Vermont, Windham County produced the greatest volume of lumber for processing, followed closely by Windsor County with 21.0 million board feet processed. Not surprisingly, these two counties also have the greatest number of mills located within their county boundaries with 15 mills each. In 2010, Windham County mills had a total demand of 53.2 million board feet of lumber or more than twice the amount produced within the county. This demand is by far the greatest demand within Vermont. This high level of production and demand translates to a high volume of freight traffic by truck. The presence of a large kiln dry lumber processing facility in Brattleboro also accounts for a significant portion of lumber truck volume.

In addition to traditional products being produced and shipped within the wood product manufacturing industry, a spur in bio-mass electrical generation and heating facilities within and around the Windham Region will likely add to the wood product being shipped through the Region. These facilities will require daily
deliveries of wood mass to fuel their operations. The 2010 Update to the Vermont Wood Fuel Supply Study, published by the Biomass Energy Resource Center, estimated that

“...for the moderate scenario, there is currently slightly less than a million green tons of NALG [Net Available Low-grade Growth] wood from within the fourteen counties of Vermont. However, if the surrounding counties of NH, MA, and NY are included the amount of NALG wood increases dramatically to more than three million green tons annually. Based on the data used, key assumptions applied, and the methodology employed, the results indicate Windham and Rutland Counties contain the highest concentrations of NALG wood.”

The Region should expect to experience an increase of wood product being shipped on its major routes and highways in the coming years.

Due to the perishable nature of milk products, the transportation of these goods occurs almost exclusively by highway. The State of Vermont produced roughly 2.5 million pounds of milk in 2011 (USDA Data Set, Milk cows and production by State and region (Annual), 2011), accounting for approximately 503 million dollars of revenue to Vermont producers. In 2007, about 2.2 percent of Vermont’s dairy produce was sold in Windham County, equaling roughly 10.8 million dollars (USDA Census of Agriculture, 2007 Census1, Chapter 2: County Level Data). The Region has two major processors, the Grafton Cheese Company with two locations in Grafton and Brattleboro, and Commonwealth Dairy in Brattleboro. The Grafton Cheese Company receives three 6,000 gallon milk trucks (one full load, two partial loads) three times a week at its Grafton location and one 6,000 gallon milk truck three times a week at its Brattleboro location. The final cheese products are shipped by truck.

Commonwealth Dairy receives anywhere from 6.5 to 10 million pounds of milk every month, and produces anywhere from 2 to 3 million pounds of product (mostly Greek yogurt) every month. The company is expanding its operations, and expects to increase from averaging 38 milk truck deliveries per week to up to 48 trucks per week. Milk trucks are received Sunday to Thursday and about five to eight trucks are unloaded per day. These deliveries are made by 70,000 gallon tank trucks. Outgoing trucks picking up the product are typically 75' (entire tractor trailer unit), and fully loaded, weigh between 70,000 pounds and 80,000 pounds. Outward bound trucks account for about 45 trips weekly, but are expected to increase to 90 trips weekly.

The presence of several distributors along U.S. 5 in the Westminster/Rockingham and Brattleboro area increases the movement of freight transported through the Region. One reason these firms are located on U.S. 5 is their desire to operate under the allowances of the Federal permit structure for the Interstate Highway System. Trucks may deliver or receive within one mile of an interstate highway without being subject to the State’s permitting and registration requirements. Also, close proximity has the obvious advantage of allowing the trucks quick access to the Interstate. Most of these trips occur on U.S. 5, VT 9
and Interstate 91, but there is an apparent, though as yet undocumented, increase in the use of the Region's other major and minor arterials even for the larger trucks.

While not one of the top four commodities, the shipping of fuel resources throughout the Region should also be of consideration now and moving forward. Currently heating fuels like fuel oil and wood chips are shipped to individual residences and businesses throughout the Region. Several heat and combined heat and power (CHP) biomass projects are being considered or are in development stages in and around the Region. Also under consideration in at least one town within the Region is the possibility of compressed natural gas (CNG) as a fuel source for heat to replace fuel oil. Both of these potential fuel sources, biomass and compressed natural gas, require the fuel to be shipped to the individual users. This is generally done by truck and requires multiple trips per week. In the case of compressed natural gas, the truck traffic generated is substantially more than what is required for fuel oil because of the lower energy capacity of natural gas as compared with fuel oil. The location of the end users and the location of the suppliers should both be considered when planning for this type of dispersed truck traffic.

While the highway network serves the majority of both passenger trips and goods movement through Vermont, air, rail and public transportation facilities are an essential part of the transportation system. As there is presently no designated NHS intermodal connections in the region, this topic will continue to present itself and should be addressed in more detail in the coming years.

**FREIGHT TRANSPORTATION BY RAIL**

The active railroad network in the State of Vermont consists of Class I (3 miles total), Regional (30 miles total) and Short Line/Local (539 miles total) carriers. Track conditions range from FRA Track Class 1 (10 mph speeds restrictions) to FRA Track Class 3 (40 mph speed restrictions for freight & 60 mph speed restrictions for passenger operation). Vermont contains 578 miles of rail network, of which 305 miles are State-owned. Rail is responsible for moving the second largest amount of freight into and out of Vermont. Roughly 16% percent of Vermont’s freight is transported by rail (Vermont Freight Plan, 2012).

The Region’s rail system is a component of the larger New England rail system, including New York, Boston and Eastern Canada. Over the past twenty years, changes to the railroad industry on the national level have affected the current situation of rail in Vermont. When regulatory changes occurred in the 1980’s,
large rail companies sold off some of their rail lines, including the less productive/high cost rail lines. This in-turn allowed new players to come in and focus on innovative and customer-oriented rail. These changes also brought short lines and regional railroad into focus, which now comprises the majority of the railroad system in Vermont. The two active rail short lines in the Region are New England Central Railway (NECR), Inc. and Green Mountain Railroad Corporation (GMRC). NECR operates 325 miles from the Canadian border at East Alburgh, to New London, Connecticut on Long Island Sound. The route through Vermont generally parallels I-91 and I-89 through the communities of Brattleboro, Bellows Falls, Bethel, Montpelier, Essex, and St. Albans. NECR is owned by Genesee & Wyoming, Inc., a publicly traded company that owns and operates 111 railroads in 11 regions located in North America, Australia and Europe. GMRC operates the 50 miles of state-owned track between Rutland and Bellows Falls. It connects with Vermont Railway and CLP in Rutland and with the New England Central in Bellows Falls. The Guilford Rail System operates over the NECR lines in the region. There are no regional railroads in the Windham Region and the only transload facility is at Riverside, in Rockingham.

RAILCAR WEIGHT AND CLEARANCE REQUIREMENTS

Presently, most of the 578 miles of rail line in Vermont have a weight limit of 263,000 pounds, compared to limits on the interline standards on US railroads of a 286,000 pounds. The increase in energy efficiency and decrease in fuel cost which goes along with operating a fleet of 286,000 pound railcars are items the State is considering. VTrans manages an ongoing program to upgrade its rail lines to carry 286,000-pound rail cars. In addition, VTrans’ Rail Policy Plan calls for all new construction to achieve the 286,000-pound standard and, in cases of major structures with a long design life, to achieve the anticipated future carload weight standard of 315,000 pounds. Unfortunately the cost to upgrade the current rail infrastructure to accommodate 286,000 pound cars is very high. Added to this cost, is the need for increasing the railroad bridge weight capacities as well. Currently all bridges south of St. Albans on the NECR line meet 286,000 pound capacity, while only about a quarter of the GMRC bridges meet capacity.
Vermont recently received $51 million in American Reinvestment and Recovery Act (ARRA) funding for high-speed and intercity passenger rail improvements. The grant will fund track and bridge improvements on the New England Central Railroad line between St. Albans and the Massachusetts state line. Separate improvements funded by ARRA grants to Massachusetts and Connecticut will increase the carrying capacity of the tracks on the connecting Connecticut River corridor to the south. While the primary aim of these improvements is to decrease travel times and improve the reliability of passenger services, freight operations on the corridor will benefit because increasing the weight limits to 286,000 pounds ensures the future viability of the line as a local and regional through-freight route.

Along with maintaining the rail lines, the State and towns are analyzing rail tunnel clearances. The one rail tunnel within the region is located in Bellows Falls, along the NERC rail line. Built in 1851 under the square in Bellows Falls, this historic rail tunnel has seen many a rail/passenger car pass through it. In recent years though, the tunnel has been identified as an impediment to double stack rail cars and auto trains. A first phase of improvements to this tunnel was completed in 2007 with the lowering of the tunnel foundation and track structures to allow passage of taller railcars (19 feet 7 inches). This specifically allows first-generation double-stack and auto-rack cars to pass through this tunnel. Further track lowering to accommodate full double-stack height (20 feet 8 inches) is still necessary in the future to maximize the

**RAILROAD CLASSIFICATIONS**

The Association of American Railroads (AAR) and the Surface Transportation Board (STB) classify railroads based on revenue and mileage. The definitions differ somewhat between the two, with the AAR categorizing railroads as follows:

**Class I** – These railroads are the largest railroads and are those with a 2008 operating revenue in excess of $401.4 million, or the equivalent in U.S. dollars if it is a Canadian or Mexican Railroad. Nationally these railroads account for 67% of the industry’s mileage, 90% of its employees and 93% of its freight revenue.

**Regional (Class II)** – Regional railroads are line-haul railroads operating at least 350 miles of track and/or earning revenue of at least $40 million.

**Short Line/Local (Class III)** – These railroads are line-haul railroads that fall below the regional criteria, including those that perform only switching and terminal operations.
efficiency of this route. This final improvement can be accommodated without the need for additional foundation work, according to VTrans.

RAIL FREIGHT COMMODITIES

The three railroad operators in the region, the Guilford Rail System, NECR, and GMRC, all provide much needed freight movement in the region. The Guilford Rail System serves the line segments from Vernon to Brattleboro and then from Brattleboro to Bellows Falls. The Guilford Rail System transports, Omya limestone slurry, forest products, petroleum products, chemicals and other industrial products. In the region, NECR operates line segments from the Massachusetts state line to Brattleboro and then from Brattleboro to Bellows Falls. The NECR line transports farm products, coal, metallic ores, non-metallic minerals, food or kindred products, lumber or wood products, pulp, paper or allied, chemicals or allied, petroleum or coal products, fabricated metal products, electrical machinery, transportation equipment, miscellaneous waste and scrap, mixed shipments, and hazardous material. GMRC originating and terminating rail traffic between Bellows Falls and Rutland includes construction products, petroleum products, rock salt, metals, wallboard, logs and lumber, silicon, slate, and hay. Based on the classification of the NECR and the State owed rail line that GMRC travels, short line railroad (Class 3), the maximum allowable speed for the freight cars is 40 mph.

The future movement of all these commodities through the Region requires a commitment from the State to maintain the rail infrastructure; this includes increasing the gross railcar weight limits of the current infrastructure.

STATE RAIL POLICIES

With regards to future policies and priorities that specifically pertain to the Windham Region, the State Freight Plan has developed the following list of recommendations per its 2012 Vermont Freight Plan:

- Improve service reliability
- Ensure a general state of good repair
- Provide full domestic doublestack railcar clearances on NECR and Western Corridor
- Improve track and bridges along NECR, GMRC, and Western Corridor to provide 286K railcar weight capacity
- Better coordinate regional transportation planning and economic development activities
- Preserve rail siding access to existing industrial sites
- Preserve rail-served industrial sites for new development
Facilitate development of transload and intermodal terminals in or near Vermont where market warrants

The Windham Region will continue to work with VTrans in the future to promote the interests of the Region with regards to freight. This can be done by developing policies that directly support the goals and priorities for both truck and rail freight as highlighted in this chapter.

RESOURCES

**Figure 3-1:** Vermont Freight Plan, 2012, VTrans, http://www.aot.state.vt.us/planning/Freightplan_Documents.htm

**Figure 3-2:** Vermont Freight Plan, 2012, VTrans, http://www.aot.state.vt.us/planning/FreightplanDocuments.htm

**Figure 3-3:** Vermont Freight Plan, 2012, VTrans, modified http://www.aot.state.vt.us/planning/FreightplanDocuments.htm

**Figure 3-4:** Vermont Freight Plan, 2012, VTrans, http://www.aot.state.vt.us/planning/FreightplanDocuments.htm

**Figure 3-5:** Vermont Freight Plan, 2012, VTrans, http://www.aot.state.vt.us/planning/FreightplanDocuments.htm

**Figure 3-6:** 2010 Automatic Vehicle Classification Report, VTrans, http://www.aot.state.vt.us/planning/documents/trafresearch/publications/AVCPrintFinal.pdf

**Figure 3-7:** 2010 Automatic Vehicle Classification Report, VTrans, http://www.aot.state.vt.us/planning/documents/trafresearch/publications/AVCPrintFinal.pdf

**Figure 3-8:** 2010 Automatic Vehicle Classification Report, VTrans, http://www.aot.state.vt.us/planning/documents/trafresearch/publications/AVCPrintFinal.pdf

**Figure 3-9:** Vermont Wood Fuel Supply, 2010 Update, http://www.biomasscenter.org/images/stories/VTWFSSUpdate2010_.pdf

**Figure 3-10:** Draft Vermont Freight Plan, 2012, VTrans, http://www.aot.state.vt.us/planning/FreightplanDocuments.htm

**Figure 3-11:** Vermont Freight Plan, 2012, VTrans, http://www.aot.state.vt.us/planning/FreightplanDocuments.htm
CHAPTER 4
HIGHWAY SYSTEMS

REGIONAL HIGHWAY CLASSIFICATIONS & MAINTENANCE

Like much of northern New England, the Windham Region is characterized by steep mountains and narrow valleys, with about one half of the Region at altitudes above 1,500 feet. Geographic constraints for surface transportation include extensive ridges, deep valleys, five major rivers—the Connecticut, West, Deerfield, Williams and Saxtons Rivers—and a multitude of tributaries crisscrossing the terrain. Consequently, the roadway network is characterized by sharp curves, steep hills and numerous bridges. This roadway network not only serves automobile and commercial truck traffic, but also provides a primary network for bicycle and pedestrian traffic.

Until 1892, all Vermont roads were a local responsibility, and towns had little capacity to adequately construct or maintain them. That year the State imposed a State tax on gasoline and redistributed the funds to towns for roadway improvements. Six years later the legislature established a State Highway Commission. In response to the widespread destruction of highways and bridges by the 1927 flood, the State assumed a major role in construction and maintenance of roads and bridges, including a state highway system. The 1947 State Highway Map shows very few paved roads in the Windham Region. Most of these were in Brattleboro along Route 9 and Route 30 as far north as Townshend. By 1986, the official State Road Map shows paved road conditions essentially the same as they exist today.

TOWN HIGHWAY CLASSIFICATION SYSTEM

There are a total of 1,703.5 miles of roads in the Windham Region. Roadway lengths are typically given in "2-lane equivalent miles" with truck passing lanes not included. Figure 4-1 shows how those 1,703.5 miles of roadway are broken down by Town Highway classification. Roads are classified based on their function, design, ownership and funding priorities. The Vermont Agency of Transportation (VTrans) is responsible for all State and US Highways and the Interstate Highways. As provided in State Statute, some sections of State Highway may be designated for shared State and local responsibilities. These become Class 1 Town Highways. Town Highway miles account for a total of 83.1% of the highway miles in the region.
Town Highways are under the general supervision and control of the Selectboard of the town where the roads are located. Town Highways are classified from Class 1 Town Highway to Class 4 Town Highway depending on use and condition. Each year town Selectboards are required to fill out a mileage certificate which provides the current year’s road miles for Class 1, 2, 3 and 4 Highways and Legal Town Trails. This information is then filed with the State. The total number of Class 1, 2, 3 and 4 Highway miles, legal town trail miles, and State Highway miles in each town is listed in Figure 4-2 and displayed in a graph form in Figure 4-3. Maps of each town showing specific Town Highway designations can be found at http://www.aot.state.vt.us/Planning/mapgis/town_maps1.htm.

As shown in Figure 4-2, the most common classification of Town Highway for almost all of the towns is a Class 3 Highway. The Town of Brattleboro contains the highest number of Class 1 Highway miles, which are mostly absent from the other towns in the Region. Also evident is the large number of Legal Town Trail miles found within the towns of Jamaica, Dover, and Readsboro.

The following summary descriptions are based on 19 V.S.A. §302 & §306, and provide more information about what these designations mean for the towns in which they are located.

**CLASS 1 TOWN HIGHWAY**

These roads comprise 8.4 miles of the Region's roads. These roads are an extension of State Highways and carry a State Highway route number, but routine maintenance is the town’s responsibility. Funding of design and construction for major repaving or reconstruction projects is provided by VTrans. Approximately six percent of the State's Town Highway appropriation is distributed to towns for maintenance of these roads, based on each town's percentage of Class 1 Highways. In addition, there is a proportionate amount of supplemental aid to municipalities with Class 1 Highways having more than two lanes.

**CLASS 2 TOWN HIGHWAY**

Class 2 Town Highways cover 294.6 miles in the Windham Region and are generally considered the most important highways in each town due to their having the highest traffic volumes. These roads are a primary connection between towns or villages and typically have the most commuter traffic of any other roads in the town. Forty-four percent of the State's Town Highway appropriation is distributed to these...
roads based on each town’s percentage of Class 2 Highways. The VTrans Class 2 Roadway Program provides a funding source for towns that want to upgrade a road from Class 3 to Class 2 design standards. The town must document that traffic volume meets the minimum threshold and is capable of maintaining the road at the prescribed standards.

**CLASS 3 TOWN HIGHWAYS**

These roads make up 983.5 miles in the Windham Region. The Class 3 Town Highways comprise the rest of regularly traveled town highways. These roads must be passable “under normal conditions all seasons of the year by a standard manufactured pleasure car” (19 V.S.A. §302 (3b)). Fifty percent of the State’s Town Highway appropriation is distributed to these roads based on each town’s mileage percentage of Class 3 Highways.
Class 4 Town Highways consist of town highways not classified as 1, 2 or 3 and comprise approximately 119.8 miles of town roads in the Windham Region. The indeterminate nature of Class 4 roads results in variations in mileages as reported by towns, WRC and VTrans. No State appropriation is made for maintaining these roads and Vermont law provides only advisory language, stating that “Class 4 highways may be maintained to the extent required by the necessity of the town, the public good and the convenience of the inhabitants” (19 V.S.A. §310). In 2002, the Vermont Supreme Court ruled that a municipality’s obligation to maintain Class 4 roads is discretionary, as opposed to the obligation to maintain Class 1, 2 and 3 roads, which is mandatory (Town of Calais v. County Road Commissioners, February, 2002). The Court emphasized the importance of a town adopting a policy that clearly states the maintenance limitations and permitted uses of its Class 4 roads in order to make it harder for a landowner to claim that the town acted arbitrarily in declining to maintain a Class 4 road.

Reclassifying a Town Highway from a Class 3 to a Class 2 can have significant financial benefit to a town. Towns are eligible for State grants made for resurfacing, rehabilitation or reconstruction of Class 2 highways by a roadway program stipulated in statute 19 V.S.A. § 306(h). The WRC has worked with a number of towns on upgrading roads from Class 2 to Class 1 as part of our effort to help towns maintain roads in the local and regional network. WRC can also assist towns with accomplishing this for Class 3 roads.
LEGAL TOWN TRAILS

Town Trails comprise 42.7 miles of road in Windham Region. A Legal Town Trail is "a public right-of-way which is not a highway and is not a responsibility of the town for construction, maintenance, repair or safety" (19 V.S.A. §301(8)). The towns may however choose to establish rules for usage of these trails, collectively or individually. These regulations could include hours of use, and categories of allowed user (i.e. pedestrians, all terrain vehicles, but no horses and only during daylight hours). In 2006, the passage of the “Ancient Roads” legislation had a significant impact on the formal identification and mapping of Legal Town Trails. Prior to that, neither the Town nor the State had any incentive to keep accurate updates on the mileage of these roads. Act 178, The Ancient Roads statute, was passed with the intent of resolving concerns regarding uncertainty about historic rights of way. All Vermont towns were given until July 2010 to formally identify legal town trails as opposed to a new category of highway called “unidentified corridors.” After 2015 the rights of way for these unidentified corridors expire, and full title reverts to the adjacent property owners. Mileage for the Legal Town Trail designation is now reported along with all other classifications of Town Highways.

Over the past four years, slight changes have been made in the total mileage of each Town Highway classification. While the total miles of highway in the Region has only decreased by 14.87 miles, the most significant change in total linear miles occurred within the Legal Town Trail designation. When last updated in 2006, the Transportation Plan stated that Town Trails comprised 76.72 miles of road in Windham Region. Due to the variability of data quality prior to 2010, it is not appropriate to draw any conclusions from the data trends. The next most significant change occurred within the Class 4 designation, which saw a gain of 17.8 miles.

SURFACE TYPE

As displayed in Figure 4-5 on the next page, nearly 60% of the roads within the Windham Region are unpaved. In summer and fall, these gravel and dirt roads contribute to the picturesque charm of the Region’s rural character, but for a few weeks in early spring, mud season descends and these roads can become impassable. Winter driving may also be more challenging on unpaved roads versus paved roads, although this is more a factor of roadway width, grade, and position on the priority list for
plowing and sanding. A well constructed gravel road, with proper sub-base and drainage can serve communities well and at a significantly lower cost burden on towns. This is particularly true for roads without heavy traffic or significant hills. Over the years, towns have been steadily striving to improve the quality of their “dirt” roads, gradually increasing the number of miles that are constructed to current State standards for maintained Town Highways.

**FIGURE 4-5: 2010 MILES OF ROADWAY SURFACE TYPES IN THE WINDHAM REGION**

Generally, Interstates, U.S. and State Highways, Class 1 and some of the Class 2 Highways are paved. Class 3 and 4 Highways are packed gravel and dirt, respectively, although some sections of Class 3 may also be paved. Figure 4-5 lists the total linear road miles of each surface type for Town Highways in the Region. Presently, 41% of the Region’s Town Highways are paved and 59% are unpaved. While the total miles of paved roads in the region has increased since the 2005 Transportation Plan, the total miles of unpaved roads within the region has remained relatively constant. It is always a difficult decision for Selectboards whether or not to pave a road in their town. Long term cost analysis is a key concern. Gravel roads can be significantly less expensive to maintain, but factors such as volume and type of traffic, and existence of steep grades, may counter balance the maintenance costs. Relative need and convenience for residents can be another factor. The unpaved road amid the traditional rural landscape typifies Vermont for many residents and they are often concerned about
the impact on rural character as more roads are paved.

CONDITION & MAINTENANCE OF REGIONAL ROAD NETWORK

The condition and safety of the Windham Region road network has been and continues to be an area of major concern. Since 1995 the WRC has been working with various regional towns to implement two programs that help to address some of this concern. The Road Safety Audit Review (RSAR) program brings a full range of professional highway transportation experts to specific local “problem sites,” in an effort to find the best solutions. The WRC in conjunction with VTrans has worked with several municipalities to assess intersections. The Road Surface Management System (RSMS) is a program to optimize dollar investments in road maintenance. This program has demonstrated that timely and appropriate maintenance applications can prolong the life of roads and save long term maintenance costs. The WRC has worked with many regional towns to implement RSMS. For more information on accepted standards for roadway design and management, access the VTrans guidance document at:


In recent years, availability of aggregate, in the form of gravel, sand, and stone, has drawn the attention of state as well as town highway officials. Rising costs and the future prospect of decreasing availability impacts maintenance and construction costs of all road improvements, whether paved or unpaved. In 2009, all of Vermont’s Regional Planning Commissions conducted an Aggregate Availability and Cost Survey of their member towns. Around the state, towns reported having to travel farther and pay more to acquire decent grades of aggregate. The most significant factor driving the final cost for aggregate is trucking mileage. One way to reduce this cost is to use larger, heavier trucks, which in turn causes increased wear on the highways. In our region, towns farther from the aggregate sources in the Connecticut River valley were the hardest hit. Survey responders often indicated that local suppliers of aggregate were shutting down due to increasing difficulty of operating their facilities. Some towns either owned or were considering purchasing and developing local gravel banks. This prospect caused some controversy among town citizens. Another trend identified in this study was the increasing use of crushed stone rather than washed and graded bank run gravel. In coming years, a significant issue in land use planning may be standards, regulations, and community acceptance of aggregate facilities.

More Information: An excellent source of more detailed information on highways may be found in the VTrans handbook for Local Officials, the so called “Orange Book” available online at:

FUNDING FOR REGIONAL HIGHWAY SYSTEM

Funding for highway maintenance continues to be a major concern. All of the Region’s highway system is funded from three sources; State funds, Federal funds distributed to the State, and town funds raised through local taxes. Towns shall use these apportioned funds solely for Town Highway construction, improvement, and maintenance purposes, which may include sidewalks, bicycle facilities, the non-federal share of public transit assistance or certain other costs directly related to highways and bridges. By statute 19 V.S.A. §307, in order to be eligible for any of this funding, each town must appropriate an annual highway budget equal to or greater than $300 per mile for each mile of Class 1, 2, or 3 Town Highway.

STATE HIGHWAY CLASSIFICATION & RATING SYSTEMS

HIGHWAY FUNCTIONAL CLASSIFICATION

The Federal Aid Primary System (FAP) was established with the passage of the Federal-aid Act of 1921 and designated certain roads as "an interconnected system of highways, important to interstate and intrastate motor vehicle travel." In the 1940's the Federal Aid Secondary (FAS) category was added to the system, which included “an interconnected system of principal secondary and feeder roads." This system was later repealed in the Federal Intermodal Surface Transportation Efficiency Act of 1991 and incorporated into Vermont’s Statewide Functional Classification of Roadways.

Vermont’s Statewide Functional Classification ranks the roads, streets and highways by their importance to the public’s general welfare, the motorist, and the land use structure. Arterials provide a high level of mobility and a greater degree of access control, while local facilities provide a high level of access to adjacent properties but a lower level of mobility. Collector roadways provide a balance between mobility and land access. When a road segment is forced to serve two opposing functions, such as both inter-regional travel and village travel, a "functional conflict" exists and both safety and convenience usually suffer. There is a basic relationship between functionally classified highway systems in serving traffic mobility and land access, as illustrated in Figure 4-7 and described in Figure 4-8.

VTrans reviews the functional classification of the roadway system annually with assistance from the Towns and the Regional Planning Commissions and recommends additions and
changes to the system. Roads that are classified functionally as Major Collector and above are eligible for Federal aid. As evident from Figure 4-8, the most common classification for this region is the Rural Local road, with 903.6 miles of road in the County (Regional data not available for 2010). A map of the classifications for each highway is displayed in Figure 4-9.

### FIGURE 4-8 DESCRIPTION AND MILES OF WINDHAM COUNTY FUNCTIONAL CLASSIFIED ROADS

<table>
<thead>
<tr>
<th>Code</th>
<th>Classification</th>
<th>Description</th>
<th>2004 Regional Data</th>
<th>2010 Windham County Data Only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Miles of Road</td>
<td>Annual VMT (millions)</td>
</tr>
<tr>
<td>Rural</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Interstate</td>
<td>Primarily serves Statewide and interstate travel. Bicycles not allowed. (miles of two travel lanes)</td>
<td>39</td>
<td>32.93</td>
</tr>
<tr>
<td>2</td>
<td>Principal Arterial</td>
<td>Primarily serves major centers of activity and highest traffic volume, but non-interstate roads. (miles of two travel lanes)</td>
<td>33</td>
<td>26.97</td>
</tr>
<tr>
<td>6</td>
<td>Minor Arterial</td>
<td>Links cities and large towns (or major resorts) and forms an integrated network providing interstate and inter-county service. (miles of two travel lanes)</td>
<td>102</td>
<td>82.53</td>
</tr>
<tr>
<td>7</td>
<td>Major Collector</td>
<td>Primarily serves traffic of intra-county importance (such as to larger towns, parks, regional schools etc.)</td>
<td>167</td>
<td>150.69</td>
</tr>
<tr>
<td>8</td>
<td>Minor Collector</td>
<td>Provides service to smaller communities; network is spaced to collect traffic from local roads to major collector.</td>
<td>121</td>
<td>127.68</td>
</tr>
<tr>
<td>9</td>
<td>Local</td>
<td>Provides service to adjacent land and over relatively short distances.</td>
<td>1236</td>
<td>903.63</td>
</tr>
<tr>
<td>Urban</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Interstate</td>
<td>Primarily serves Statewide and interstate travel. Bicycles not allowed. (miles of two travel lanes)</td>
<td>6.09</td>
<td>44.80</td>
</tr>
<tr>
<td>12</td>
<td>Other Freeways &amp; Expressways</td>
<td></td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>14</td>
<td>Principal Arterial</td>
<td>Primarily serves major centers of activity and highest traffic volume. It should carry the majority of trips entering and leaving the urban area and trips by-passing the urban area.</td>
<td>3</td>
<td>3.32</td>
</tr>
<tr>
<td>16</td>
<td>Minor Arterial</td>
<td>Interconnects the urban principal arterial system and serves moderate length trips.</td>
<td>12</td>
<td>12.24</td>
</tr>
<tr>
<td>17</td>
<td>Urban Collector</td>
<td>Provides service for traffic within residential neighborhoods, commercial and industrial.</td>
<td>8</td>
<td>7.93</td>
</tr>
<tr>
<td>19</td>
<td>Local</td>
<td></td>
<td>36.61</td>
<td>13.60</td>
</tr>
</tbody>
</table>

TRANSPORTATION PLAN • ADOPTED JUNE 10, 2013
FIGURE 4-9: FUNCTIONAL CLASSIFICATION OF HIGHWAYS

Windham Regional Transportation Plan 2012

Functional Class of Highways

For Rural area
- Principal Arterial-Interstate-Rural
- Principal Arterial-Rural
- Minor Arterial-Rural
- Major Collector-Rural
- Minor Collector-Rural
- Local-Rural

For Urban area
- Principal Arterial-Interstate-Urban
- Principal Arterial-Urban
- Minor Arterial-Urban
- Collector-Urban
- Local-Urban

Legend:
- Urban area, as defined by Vermont Agency of Transportation
VTrans has developed a method to identify and prioritize transportation improvements on Vermont's highways, known as Highway Sufficiency Ratings. State Highways that are functionally classified as principal arterials, minor arterials or major collectors are each rated on a scale from 1 to 100. Ratings are based on road standards of the American Association of State Highway and Transportation Officials (AASHTO) and VTrans. This rating system allows VTrans to compare sections of the road network to one another. The State currently considers three major categories in this highway sufficiency rating:

- Structural Condition (50 points)
- Safety (25 points)
- Service (25 points)

The sum of the values from these three categories, minus the adjustments for flooding and lack of an all weather surface, equals the basic rating. The basic rating is then weighed with respect to the volume of traffic it serves.

Sufficiency Ratings are then further categorized to bad, poor, fair and good roads. This breaks down as follows:

- Bad = 0 to 40
- Poor = 40 to 60
- Fair = 60 to 80
- Good = 80 to 100

Since the road sufficiency data is updated on a scheduled basis, the ratings given in the table below do not reflect some road improvements. The most recent ratings available for the Windham Region State Highways functionally classified as principal arterials, minor arterials and major collectors are based on inspection data obtained in 2008. Given this variability, the primary value of a Sufficiency Ratings discussion in a plan such as this is to identify general trends in the road condition. Figure 4-10 shows the distribution of sufficiency ratings for the Region’s State Highways by functional class. Overall, 50% of State Highways in the Region are considered by VTrans to be in either poor or bad condition. This comes to a total of 123.18 miles of highway in the Region that are rated as either poor or bad condition. Highways with a rating of “poor condition” account for the highest percentage of total miles, with 36% of regional highways rated as such. As seen in the comparison chart below, Figure 4-11, all functional classifications of roadways for the region have seen an increase in poor/bad condition ratings in 2008. This increase has relatively negated any improvement gains seen from 1991 to 2008.
Since 2003 the WRC has been available to work with a number of towns to implement a specific Road Surface Management System that will not only aid in maintaining the conditions of roads, but help to hold down the costs.

### FIGURE 4-10: WINDHAM REGION SUFFICIENCY RATINGS SUMMARIZED BY FUNCTIONAL CLASS

<table>
<thead>
<tr>
<th>Functional Class</th>
<th>Route Name</th>
<th>Total Length (mi)</th>
<th>Condition (mi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 - Interstate</td>
<td>I 91</td>
<td>36.12</td>
<td>36.12</td>
</tr>
<tr>
<td>2 - Principal Arterial</td>
<td>VT 9, VT 103</td>
<td>32.04</td>
<td>12.93 5.91 1.85 11.35</td>
</tr>
<tr>
<td>6 - Minor Arterial</td>
<td>VT 11, VT 30, VT 100, VT 112, VT 123, Westminster SH</td>
<td>101.92</td>
<td>8.06 32.31 55.22 6.33</td>
</tr>
<tr>
<td>7 - Major Collector</td>
<td>VT 8, VT 100, VT 103, VT 142, US 5, Putney SH</td>
<td>63.03</td>
<td>1.73 15.22 29.92 16.16</td>
</tr>
<tr>
<td>8 - Minor Collector</td>
<td>Winhall SH</td>
<td>0.40</td>
<td>0.00 0.00 0.40 0.00</td>
</tr>
<tr>
<td>Urban</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 - Interstate</td>
<td>I 91</td>
<td>5.80</td>
<td>5.80 0.00 0.00 0.00</td>
</tr>
<tr>
<td>14 - Principal Arterial</td>
<td>VT 9, Brattleboro SH</td>
<td>0.29</td>
<td>0.14 0.15 0.00 0.00</td>
</tr>
<tr>
<td>16 - Minor Arterial</td>
<td>VT 30, VT 142, US 5</td>
<td>8.12</td>
<td>3.66 2.51 1.95 0.00</td>
</tr>
<tr>
<td>Totals</td>
<td></td>
<td>247.72</td>
<td>68.44 56.1 89.34 33.84</td>
</tr>
<tr>
<td>Percentage of Total</td>
<td></td>
<td>100%</td>
<td>28% 23% 36% 14%</td>
</tr>
</tbody>
</table>

### FIGURE 4-11: SUFFICIENCY RATINGS CHANGES 1991-2008

<table>
<thead>
<tr>
<th></th>
<th>1991 Poor/ Bad</th>
<th>2002 Poor/ Bad</th>
<th>2008 Poor/ Bad</th>
</tr>
</thead>
<tbody>
<tr>
<td>All State Highways</td>
<td>55%</td>
<td>49%</td>
<td>50%</td>
</tr>
<tr>
<td>Principal Arterials</td>
<td>28%</td>
<td>26%</td>
<td>41%</td>
</tr>
<tr>
<td>Minor Arterials</td>
<td>61%</td>
<td>41%</td>
<td>58%</td>
</tr>
<tr>
<td>Major Collectors</td>
<td>83%</td>
<td>66%</td>
<td>73%</td>
</tr>
</tbody>
</table>
SAFETY

Accidents that are reported to police are recorded and reported to VTrans, which develops listings of High Crash Locations (HCLs) for Federal Aid Highways (former FAP and FAS) throughout Vermont. This is available for both roadway sections (.03 mile) and intersections. HCLs are determined statistically through a combination of factors that include average daily traffic, number of accidents, number of fatalities, number of injuries and property damage amount.

The latest VTrans High Crash Location report, 2007 covers 2003-2007 data. This is a statewide listing in two location categories: road intersections and road sections. Each of these lists is prioritized with number one being the worst. In the Windham Region there are 16 sections and 7 intersections that are considered High Crash Locations, Figure 4-12.

Both the number of sections with High Crash Locations and the number of intersections in the Region have increased since the 2002 reporting for this region. While this Region no longer contains the number one priority section for HCLs, it has increased by six total locations since the previous reporting. The number of intersections with HCLs has increased from five to seven, and the overall priority levels for the locations reported are higher than previous locations as well. As compared with the 2002 reporting, the only intersection to be found in both lists is the intersection of VT-11 and VT-30 in Winhall, with all other HCLs being new to the priority list.

In the last few years, the WRC working with the Agency of Transportation has performed a number of Road Safety Audit Reviews (RSAR) at particular locations in the region, that have been identified as problem intersections, whether or not they have had high accident levels.
In 2001, VTrans adopted the State Highway Access Management Guidelines for the purpose of controlling the location and spacing of driveways and commercial entrances along the State Highway system. The guidelines describe the six access categories and the allowable traffic operations in each category, as summarized in Figure 4-13. VTrans, in coordination with the Regional Planning Commissions, analyzed traffic volume, speed limits, density of existing access points, and functional class along the entire length of each state and Class 1 Town Highway. Based on the criteria for each category set forth in the guidelines, all highways were broken into various segments and designated as an Access Category 1-6. All Selectboards in Towns with State Highways were notified of the proposed access category designations, provided with category descriptions and a map of their town’s highways and comments or concerns were requested. The WRC then prepared a GIS database and map of the highway designations for submittal to VTrans.

Access Management promotes the preservation of safe, efficient traffic operations and the character of roads through application of land use control measures and design standards. Towns have expressed concern over a number of issues including: increases in heavy truck traffic, regularity of speeding vehicles, lack of pedestrian safety, and increases in traffic congestion. All of these concerns have a negative impact on the quality of life within the towns, and especially within historic village areas. Towns realize that a number of businesses are dependent on traffic along state and town highways and that as the number of curb cuts or driveways increases, so does the rate of accidents. Some techniques of access management that towns in the Region could implement are:

- Requirements for a minimum separation distance between driveways
- Minimum distances for driveways to be located away from intersections
- Driveways & parking areas that serve more than one lot/business
- Circulation/access between two lots
- Access from secondary streets rather than main arterials
- Development of parallel streets or frontage roads to provide access off the main street
- Raised medians or islands that restrict turn movements
<table>
<thead>
<tr>
<th>Highway Functional Class (AADT)</th>
<th>Degree of Access Control</th>
<th>Direct Property Access</th>
<th>Driveway Controls</th>
<th>Traffic Operations Allowed</th>
<th>Design Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Principal Arterials (Interstate)</td>
<td>Full</td>
<td>No</td>
<td>NA</td>
<td>Access at Interchanges Only w Public Hwys</td>
<td>Grade-Separated Interchanges</td>
</tr>
<tr>
<td>2 [1] Principal Arterials (Non-Interstate - LA) [2] Other Principal Arterials (LA) [3] Limited Access (LA) Major Collectors</td>
<td>Full to Partial</td>
<td>No- Except by Access Rights</td>
<td>NA or Location</td>
<td>Access at Intersections with Public Highways</td>
<td>At-Grade or Grade- Separated at 1/2 to 1 Mile Intervals</td>
</tr>
<tr>
<td>5 Frontage or Service Roads</td>
<td>1 Design Features [2] Land Use Issues</td>
<td>Yes</td>
<td>Number &amp; Location</td>
<td>All Turns In &amp; Out</td>
<td>Signal Spacing (No Less than 300 Feet)</td>
</tr>
</tbody>
</table>
NATIONAL HIGHWAY SYSTEM

The National Highway System’s (NHS) purpose, as stated in the Intermodal Surface Transportation Enhancement Act (ISTEA), is to "provide an interconnected system of principal arterial routes which will serve major population centers, international border crossings, airports, public transportation facilities and other major travel destinations, meet national defense requirements, and serve interstate and interregional travel." Two NHS routes are designated in the Region, VT 9 and VT 103. These routes are illustrated on the Functional Classification of Highways map as Principal Arterials. This designation enables the towns and State to access Federal funds allocated for NHS roads for new construction and reconstruction.

PRIMARY REGIONAL TRAVEL CORRIDORS

INTERSTATE/PRINCIPAL ARTERIALS

The following Windham Region corridors are broken down by their functional classification, which include: interstate/principal arterials, minor arterials and major collectors. In the Windham Region the 74.25 miles of interstate and principal arterials primarily serve interstate travel. The Region's interstate/principal arterials are Interstate 91, VT 9 and VT 103. VT 9 and VT 103 are part of the National Highway System (NHS).

INTERSTATE 91

Interstate 91 is a controlled access, four lane highway with six interchanges in the Windham Region. The interstate traverses the rural countryside along the Connecticut River Valley, and provides access to both Brattleboro and Bellows Falls downtowns and the villages of Putney and Westminster. The Connecticut River Valley is now a Designated National Scenic Byway, with waypoint interpretive sites in Bellows Falls and Downtown Brattleboro.

One hundred percent of Interstate 91 road miles are considered in good condition. However, some of the existing interchanges cannot handle significantly increased traffic on peak tourist weekends. Presently there is not an exit directly serves the West River Valley. This results in a secondary impact to both Brattleboro and Dummerston as drivers look for shortcuts to get to the West River Valley. I-91 also had a HCL listed at number fifty-seven in the 2007 rankings list. This HCL was located in Brattleboro, at mile marker nine.
VT 9

VT 9, or Route 9, is an east-west road that road runs the width of the state from New Hampshire to New York. Within the Windham Region the road runs from the downtown area of Brattleboro and its village of West Brattleboro through the rural countryside to the village of Wilmington. From Wilmington, the route climbs steadily through the densely forested town of Searsburg. This road is the only route for bicycle tourists traveling east-west across the Region and portions of this route near village areas are regularly used by bicycle commuters during peak seasons.

Route 9 has seven high crash locations identified by the State. Three are in Wilmington, three are in Marlboro and one is in Searsburg. This number has increased from four high accident areas that were identified in the 2006 Transportation Plan. The increasing traffic and speed and increased truck traffic is of particular concern on VT 9, especially in the village of Wilmington. Additionally, 13.20 out of the 25.64 miles (51%) within the Region are considered by VTrans to be in bad or poor condition. This total is down from 65%, as reported in the 2006 Transportation Plan, but is still a significant portion given the importance of this east-west route.

With regard to bicycle traffic, rural portions of the road have narrow shoulders sometimes in combination with tight turns and poor sight lines. This is a perceived safety concern for both cyclists and drivers. In the more urban areas, high traffic volumes and parked cars create challenges for cyclists. This has been recently addressed in much of Brattleboro with improvement of the shoulder paving and striping the travel lane to an 11 foot width. Where road width was sufficient, a dedicated bicycle lane has been established.

VT 103

VT 103 runs east-west from Rockingham to Rutland. On VT 103, 100% of the miles are considered by VTrans to be in good condition, which is an overall improvement from fair condition as reported in 2006. VT 103 has seen steady traffic increases, both from commercial traffic and from resort traffic generated by ski resorts north of the Windham Region.
MINOR ARTERIALS

The 110.0 miles of minor arterials in the Windham Region link large towns and/or major resorts and form an integrated network providing interstate and inter-county service. In the Windham Region VT 100, VT 30, VT 11, Westminster Interstate Access Road to the intersection of New Hampshire, VT 123, and VT 112 are all minor arterials. Portions of VT 142 and US 5 are also classified as urban minor arterials.

VT 100

VT 100 is a north - south road that passes through an alternating pattern of rural country side and forested sections, zig-zagging down through towns from Weston to Readsboro, and connecting many of the town villages along the way. This is also a major access route for the Mount Snow and Haystack Resort Centers, and passes near both the Magic Mountain and Stratton Mountain Resort Centers.

There are six section HCLs and one intersection HCL along VT 100, including the Region’s highest ranking section of highway which occurs near the town border of Weston. The five other section locations, and the intersection location, occur in the towns of Dover and Wilmington. The ranking intersection HCL occurs at the crossing of VT-9, VT-100, and Town Road 0033. The number of ranking locations of HCLs along VT 100 has increased significantly since the 2003 data, which only reported two locations. On VT 100, 57% of the roadway miles within the Region are considered by VTRANS to be in bad or poor condition, and none of the miles are in good condition.

Increased traffic and congestion in the village of Wilmington on VT 100 is an ongoing problem, as is generally true in the other villages along the route. Specifically, these villages have a high potential for conflicts with pedestrians and bicyclists. This is a moderately high traffic road with a potential for bicycle/vehicle conflict along essentially all portions of the road. The 1995 Plan noted that bicycling had increased along VT 100 in spite of the traffic. Since then, much of route 100 has been re-striped in order to define a bicycle ride-able shoulder. The pavement condition has been inconsistent, and the shoulder width varies from less than 18 inches to more than 4 feet. Commercial strips have continued to grow in some sections along VT 100. Increased traffic between high volume businesses in resort centers, such as convenience stores and service stations, contributes to safety hazards for pedestrians as well as for turning vehicles. Finally, congestion related to south-bound ski traffic, primarily on Sunday evenings, has been noted as another particular concern for this route. In November 2012, WRC convened a public meeting in Wilmington to specifically discuss traffic issues in the downtown area, including along VT 100. A Summary Report was generated from that meeting and distributed to the towns of Wilmington and Dover, VTrans, and VT DEC District #2.
**VT 30**

VT 30 serves the West River Valley and is the village connector route heading northwest from Brattleboro to the town of Winhall. Along the way, it links the villages of Newfane, Townshend and Jamaica and passes near the Stratton Mountain Resort Center. Major sections of this route are used by a wide variety of bicyclists and pedestrians. The southern end has a wide paved shoulder that serves the Brattleboro community as a de facto recreation path. Many bicycle tourists and other recreational riders travel along the entire length of the road within the Region.

There is a recurring HCL location on VT 30 at the intersection of VT 30 and VT 11 in Winhall, which was also listed in the 2006 Transportation Plan. Of the 39.13 miles, 40% are considered by VTRANS to be in bad or poor condition, which is a significant decrease in condition of the route as compared to the 19% reported in the 2006 Plan.

Increased speed and traffic through the villages along the route VT 30 continue to be significant issues. This has also resulted in functional conflicts between pedestrians, motorists and bicyclists as well as safety problems, especially between Newfane and Townshend villages, where narrow shoulders, curves, and poor sight lines exist. A traffic calming study for these villages has been completed. To date the only recommendation that has been implemented is dynamic striping – and this on an experimental basis. To date, this application has had mixed results.

**VT 11**

A small section of VT 11 passes through a combination of forested and rural countryside in the northwest corner of the Region. The route provides access to Magic Mountain Resort Center, and passes through the village of Londonderry.

On VT 11, 47% of the highway miles are considered by VTRANS to be in poor condition. The route has experienced increased traffic and speed. The increased speed has resulted in safety problems due to curves and intersections along the route. A particular issue is the poor geometry of the intersection at VT 30 and VT 11, which results in confusion for the driver. This is the location of the recurring HCL location at VT 30, as noted above. A driver heading west on VT 11 has a great difficulty in making a left turn onto VT 30. Increased traffic has also resulted in a difficulty for both hikers and snowmobilers crossing at the intersection of the Long Trail and VT 11.
WESTMINSTER INTERSTATE ACCESS ROAD TO THE INTERSECTION OF NEW HAMPSHIRE 123

This section of road is entirely in the town of Westminster. It passes through rural countryside and the village of Westminster Station. The only major issue identified along this route is at the intersection with the railroad underpass. The underpass’ narrow width, low height, abrupt grade change and poor geometry cause unsafe traffic conditions. This results in an intersection with extremely poor sight distances from all approaches and limits the types of trucks that can use this intersection.

VT 112

VT 112 runs from the Massachusetts border and joins with VT 100 in Jacksonville. The route passes through rural countryside and the village of Jacksonville. Due to the moderate traffic volume this road is reasonably free of conflicts for reasonably experienced cyclists.

The highest ranking intersection HCL occurs at the crossing of VT-112 and FAS 0111. All of the 7.45 miles of the highway within the Region are considered by VTrans to be in bad or poor condition. This route has experienced increased traffic due to highway improvements in Massachusetts. These improvements have made VT 112 more attractive for accessing the Windham Region’s resort centers. Congestion related to south-bound ski traffic, primarily on Sunday evenings, has been noted as a concern.

MAJOR COLLECTORS

In the Windham Region, the major collectors primarily serve traffic of intra-county importance (such as to larger towns, parks, regional schools etc.). The Region’s major collectors are: VT 155, Weston and Andover Road, VT 121, VT 35, Pleasant Valley Road, Westminster West Road, US 5, Town Highway 3 Townshend, Town Highway 1 Windham, Stratton Mountain Access Road, Wardsboro/Sunderland Road, Dover Road, Tannery Road, Handle Road, Cold Brook Road, VT 8, VT 100, VT 8A, and VT 142.

VT 155

VT 155 passes through forested, sloped topography in the northern portion of the town of Weston. There are no long State owned bridges on VT 155. The only issue is the need for improved winter maintenance, since this is a commuter route for one major business in that area.

VT 121

VT 121 traverses through rural countryside, the villages of Grafton and Saxtons River and downtown Bellows Falls. It has been a significant bicycle route in spite of its unsuitability. At the time of the 95 Plan, over 80% of this road was identified as in absolute need of reconstruction. Reconstruction of this road from Saxtons River to Cambridgeport was completed in the fall of 2005. The new road has a nominal 3 foot paved shoulder, which is a substantial improvement in bicycle suitability.
VT 35

VT 35 passes through rural countryside, connecting the villages of Grafton and Townshend. An issue of concern is the amount and speed of traffic in the village of Townshend and resulting functional conflicts with pedestrians and bicyclists. Traffic calming measures could be considered in this area. Traffic volume is sufficiently low on the rural portions of this road to allow for reasonably comfortable sharing of the travel lane between bicyclists and motor vehicles.

PLEASANT VALLEY ROAD

Pleasant Valley Road passes through the Village of Saxtons River and through the rural countryside in the town of Rockingham. Poor sight distance where Pleasant Valley Road meets VT 121 has been addressed in the 121 reconstruction.

WESTMINSTER WEST ROAD

Westminster West Road passes through the rural countryside and the villages of Putney and Saxtons River.

STRATTON MOUNTAIN ACCESS ROAD

The Stratton Mountain Access Road provides primary access to the Stratton Mountain Resort Center area. No road sufficiency data is available. An issue is the increasing amount of bicycling on this road and the problem of safety. The town has recently applied for a grant to complete a feasibility study for a mixed-use path to accommodate more pedestrian and bike traffic throughout the Resort.

DOVER ROAD

Dover Road passes through the rural country side and numerous small hamlets in the towns of Newfane and Dover. The traffic and speed on the Dover Road results in functional conflicts between vehicles and pedestrians. Analysis of solutions for Dover Road is ongoing between the town of Newfane and the WRC.

TANNERY ROAD

Tannery Road, Handle Road and Cold Brook Road provide primary access to the Mount Snow/Haystack Resort Center. No road sufficiency data is available since the classification of this road was recently upgraded from minor collector to major collector. No major issues are noted at this time.
**VT 8**

VT 8 passes through the rural countryside in the towns of Readsboro and Searsburg. Segments of VT 8/VT 100 in Readsboro are narrowed and sloped with narrow shoulders. The narrow shoulders do not accommodate the increasing number of cyclists using this road.

**VT 142**

VT 142 passes through the rural countryside, the village of Vernon and downtown Brattleboro. The increasing traffic in Brattleboro has resulted in further congestion and difficulties in making turns at the intersection of VT 142 and Canal Street. Another issue of concern is the potential impact to VT 142 from the proposed reconstruction or relocation of the Hinsdale Bridge. The Hinsdale Bridge is owned by the State of New Hampshire.

**US 5**

US 5 traverses the Connecticut River Valley towns following the river from Guilford to Rockingham, and provides the non-interstate link between Brattleboro, Bellows Falls and the villages of Putney and Westminster. Currently there are 3 high accident locations on US 5; one in Brattleboro and two in Rockingham. It is now part of the Connecticut River Scenic Byway.

The increasing truck traffic all along US 5 corridor is an issue of concern. An offshoot of this issue is an increase in trucks parked or waiting in retail parking lots in the Brattleboro area. Heavy truck traffic has been noted as an issue of concern in Dummerston, Putney and Westminster as it affects villages and local businesses.

Access to zoned industrial area in the town of Westminster is currently a problem. The 0.8 mile section of U.S 5 from the exit 5, I-91/US 5 intersection south to the intersection of Route 123 and U.S. 5 is in need of upgrading to better accommodate the zoned land use.

**FIGURE 4-17 BRATTLEBORO BIKE LANE AND PUTNEY SIDEWALK PROJECTS**
Another issue of concern has been the increasing traffic and the existing functional conflicts between vehicles, pedestrians and bicyclist on Putney Road. The striped bike lane in Brattleboro, and the Putney sidewalk projects have both been installed to help alleviate these conflicts. An additional project is underway to extend the sidewalks in Putney along US 5, towards Landmark College.

**BRIDGES**

There are 892 bridges in Windham Region. Complete data is only available for long bridges. The condition and safety of Windham Region bridges continues to be a subject of great concern and a major funding issue.

**BRIDGE CLASSIFICATION**

Bridges are classified as long or short structures. The Federal Highway Administration defines a long structure (bridge) as "an opening measured along the center of the roadway of more than 20 feet.... (and that) may also include multiple pipes, where the clear distance between openings is less than half of the smaller contiguous opening." Bridges of 6' to 20' are classified as short structures. "Bridges" fewer than six feet long are considered culverts, with the exception of multiple pipes as noted above. Only the bridges classified as long structures are potentially eligible for Federal funding. Although bridge conditions are a major issue throughout Vermont, reliable data on short bridges from which to draw any meaningful conclusions has not been adequately collected in the past. VTrans collects and maintains data on all state bridges and on all long structure bridges. Consequently, this section only covers bridges 20 feet or longer. VTrans lists 356 long bridges in the Windham Region. The data on long structures is separated into those on the State system and those on the Town system. Bridges can also be classified by the functional classification of the route on which they lie.

**SUFFICIENCY DETERMINATIONS FOR BRIDGES**

Citizens and officials in many of the Region’s communities have expressed concern and requested information on the condition and safety of our bridges. VTrans regularly inspects and rates bridges for condition and sufficiency. This data is used to provide Federal Sufficiency Ratings based on the FHWA formula. VTrans performs these ratings for the purpose of determining eligibility for Federal funding. A bridge with a very low rating does not signify a bridge in danger of falling down. Rather, it indicates that the bridge has a significant need for upgrading. Bridges with a sufficiency rating of 50 to 80 are eligible to apply for Federal funds for rehabilitation. Bridges with ratings below 50
are eligible for reconstruction or replacement.

Sufficiency ratings are based on a method of evaluating data to obtain a numeric value. The result is a percentage rating: 0 to 100 percent. These sufficiency evaluations are the basis for determining the Deficiency Status of each bridge. There are three possible Deficiency Status categories for each bridge:

- **No Deficiency** - Bridge is structurally and functionally adequate.
- **Functional Deficiency** - Bridge has a functional deficiency such as insufficient lanes for average daily traffic, inappropriate roadway alignment etc. The detour length that would be required were the bridge to close may be a variable in this determination as well.
- **Structural Deficiency** - Bridge has a deficiency in structural adequacy and safety. This means the bridge is eligible for repair or replacement. A bridge rated “Structurally Deficient” may also be functionally deficient, but a structural deficiency takes precedence in importance. A structurally deficient bridge is not necessarily unsafe, but certain structural components may have been identified that will be replaced or that need closer monitoring.

A bridge is considered to be functionally deficient when it is unable to handle the traffic that it carries in a convenient and efficient manner, which is to say that it does not function the way a new bridge would. It is not an indicator of the bridge's structural condition, which VTrans rates separately. For example, a covered bridge with right-angle approaches or that is only one lane wide might require vehicles to slow down and/or wait their turn, which would not be required with a modern design at the same location. But that same bridge and its place in the community might be very important and people might prefer to retain what a national traffic standard might term "deficient" because its other values far outweigh the inconvenience. Similar situations could be related to older bridges that are narrow, low in a gorge, etc.

**CONDITION OF THE REGION’S BRIDGES**

Overall, of the Windham Region’s 351 bridges rated by VTrans, 35.9% have a Federal sufficiency rating between 50 and 80, and 15.7% have a sufficiency rating below 50. The ratings of all these bridges have a Federal Sufficiency Rating that makes them eligible for reconstruction or replacement.

In 2009, each RPC Transportation Committee was asked by VTrans to help identify and prioritize “pre-candidate” projects for the Town Highway Bridge Program. The Committee used project prioritization criteria that included two quantitative measures and four qualitative measures. The Committee considered including the cost estimates for each project as a criterion, but this information was not available for each project. Given the commitment to town highway long structures, the Committee did not rank bridges that are on the State highway network or that are already in the upcoming fiscal year
Transportation Program, Capital Projects. The Committee has since recommended its choices for the top eight long structures for FY10, FY11, FY12, and FY13 project prioritization process.

The Committee ranked each long structure based on a points system: high priority (5), medium (3) and low (1). The quantitative criteria included:

- **AADT criteria** - low = < 200 vehicles, medium = 200 to 1,000, and high = > 1,000
- **Sufficiency Rating** - low = 40 to 97, medium = 25 to 39 , and high = 17 to 24

The three qualitative measures included the role of each bridge:

- In the regional economy (connecting roads, Town/Village Centers)
- Importance of the bridge to the community
- Length of the detour and congestion associated with a bridge closing

In April of 2013, VTrans provided the list of long structures (20 feet or greater) that they have prioritized shown in Figure 4-19. Of those bridges, the Committee chose the following eight bridges through its prioritization process:

<table>
<thead>
<tr>
<th>Bridge</th>
<th>Bridge #</th>
<th>Facility Carried</th>
<th>Features Intersected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newfane</td>
<td>48</td>
<td>CL 3, TH 15</td>
<td>SMITH BROOK</td>
</tr>
<tr>
<td>Brattleboro</td>
<td>52</td>
<td>VT 9</td>
<td>AMES HILL BROOK</td>
</tr>
<tr>
<td>Westminster</td>
<td>5</td>
<td>TH 01, FAS 126</td>
<td>SAXTONS RIVER</td>
</tr>
<tr>
<td>Grafton</td>
<td>15G</td>
<td>TH 01, FAS 126</td>
<td>SAXTONS RIVER</td>
</tr>
<tr>
<td>Grafton</td>
<td>13G</td>
<td>TH 01, FAS 126</td>
<td>SAXTONS RIVER</td>
</tr>
<tr>
<td>Rockingham</td>
<td>53</td>
<td>CL 3, TH 448</td>
<td>POWER DAM CANAL</td>
</tr>
<tr>
<td>Jamaica</td>
<td>24</td>
<td>CL 3, TH 19</td>
<td>BALL MTN. BROOK</td>
</tr>
<tr>
<td>Guilford</td>
<td>60</td>
<td>CL 3, TH 17</td>
<td>BROAD BROOK</td>
</tr>
</tbody>
</table>

This is an annual process, with this list ever changing. The Transportation Committee will continue to update its evaluation methods as the prioritization process evolves.
**FIGURE 4-19: FY2013 VTRANS CANDIDATE BRIDGE LIST**

<table>
<thead>
<tr>
<th>Bridge</th>
<th>Bridge #</th>
<th>Facility Carried</th>
<th>Features Intersected</th>
<th>Location</th>
<th>Bridge Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newfane</td>
<td>48</td>
<td>CL 3, TH 15</td>
<td>SMITH BROOK</td>
<td>0.03 MI TO JCT W VT30</td>
<td>ROLLED BM W TIMBR DK</td>
</tr>
<tr>
<td>Winhall</td>
<td>17</td>
<td>CL 3, TH 3</td>
<td>WINHALL RIVER</td>
<td>0.05 MI TO JCT W VT30</td>
<td>STEEL BM W TIMBER DK</td>
</tr>
<tr>
<td>Guilford</td>
<td>64</td>
<td>CL 3, TH 10</td>
<td>HINESBURG BROOK</td>
<td>0.55 MI TO JCT W CL2 TH2</td>
<td>QUADRPL WARREN TRUSS</td>
</tr>
<tr>
<td>Dummerston</td>
<td>37</td>
<td>CL 3, TH 62</td>
<td>WEST RIVER</td>
<td>0.01 M EAST OF VT 30</td>
<td>ROLLED BEAM</td>
</tr>
<tr>
<td>Jamaica</td>
<td>29</td>
<td>CL 3, TH 30</td>
<td>BALL MTN. BROOK</td>
<td>0.1 MI JCT TH 30 &amp; TH 27</td>
<td>ROLLED BM W TIMBER DK</td>
</tr>
<tr>
<td>Newfane</td>
<td>41</td>
<td>CL 3, TH 26</td>
<td>BAKER BROOK</td>
<td>@ JCT W CL3 TH19</td>
<td>ROLLED BEAM</td>
</tr>
<tr>
<td>Jamaica</td>
<td>28</td>
<td>CL 3, TH 30</td>
<td>BALL MTN. BROOK</td>
<td>0.1 MI JCT TH 27 &amp; TH 30</td>
<td>ROLLED BM W TIMBER DK</td>
</tr>
<tr>
<td>Wilmington</td>
<td>56</td>
<td>CL 3, TH 6</td>
<td>COLD BROOK</td>
<td>@ JCT OF TH6 &amp; TH77</td>
<td>ROLLED BM W/ FLRBMS</td>
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<tr>
<td>Rockingham</td>
<td>39</td>
<td>CL 3, TH 14</td>
<td>GREEN MOUNTAIN RYW.</td>
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<td>3 SP CONT RIVETED GR</td>
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<td>Townshend</td>
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<td>CL 3, TH 4</td>
<td>BROOK</td>
<td>0.1 MI JCT TH 4 &amp; TH 41</td>
<td>ROLLED BEAM</td>
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<tr>
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<td>61</td>
<td>CL 3, TH 27</td>
<td>BROAD BROOK</td>
<td>0.6 MI TO JCT W US5</td>
<td>ROLLED THRU BEAM</td>
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<tr>
<td>Townshend</td>
<td>43</td>
<td>CL 3, TH 4</td>
<td>FAIR BROOK</td>
<td>0.4 MI JCT TH 4 &amp; TH 41</td>
<td>ROLLED BEAM</td>
</tr>
<tr>
<td>Guilford</td>
<td>14</td>
<td>CL 3, TH 5</td>
<td>GREEN RIVER</td>
<td>0.1 MI JCT W CL2 TH2</td>
<td>ROLLED BEAM</td>
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<tr>
<td>Grafton</td>
<td>15G</td>
<td>TH 01, FAS 126</td>
<td>SAXTONS RIVER</td>
<td>7.4 MI JCT VT 11</td>
<td>ROLLED BEAM</td>
</tr>
<tr>
<td>Grafton</td>
<td>13G</td>
<td>TH 01, FAS 126</td>
<td>SAXTONS RIVER</td>
<td>8.9 MI JCT VT 11</td>
<td>ROLLED BEAM</td>
</tr>
<tr>
<td>Wardsboro</td>
<td>28</td>
<td>CL 3, TH 26</td>
<td>WARDSBORO BROOK</td>
<td>@ JCT W VT100</td>
<td>ROLLED BM W TIMBR DK</td>
</tr>
<tr>
<td>Guilford</td>
<td>63</td>
<td>CL 2, TH 4</td>
<td>BROAD BROOK</td>
<td>@ JCT W CL2 TH1</td>
<td>ROLLED BEAM</td>
</tr>
<tr>
<td>Guilford</td>
<td>55</td>
<td>CL 3, TH 10</td>
<td>HINESBURG BROOK</td>
<td>1.1 MI TO JCT W CL2 TH2</td>
<td>ROLLED BEAM</td>
</tr>
<tr>
<td>Halifax</td>
<td>15</td>
<td>CL 2, TH 1</td>
<td>BRANCH BROOK</td>
<td>0.01 MI JCT W CL1 TH28</td>
<td>ROLLED BEAM</td>
</tr>
<tr>
<td>Weston</td>
<td>29</td>
<td>CL 3, TH 11</td>
<td>WEST RIVER</td>
<td>0.06 MI TO JCT W VT100</td>
<td>ROLLED BEAM</td>
</tr>
<tr>
<td>Grafton</td>
<td>20</td>
<td>CL 2, TH 1</td>
<td>SAXTONS RIVER</td>
<td>3 SPAN ROLLED BEAM</td>
<td>3 SPAN ROLLED BEAM</td>
</tr>
<tr>
<td>Townshend</td>
<td>41</td>
<td>CL 3, TH 4</td>
<td>BROOK</td>
<td>AT JCT TH 4 &amp; TH 39</td>
<td>ROLLED BEAM</td>
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<td>17</td>
<td>TH 02, FAS 106</td>
<td>ROCK RIVER</td>
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<td>TOWN LATTICE COV BR</td>
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<tr>
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<td>49</td>
<td>CL 3, TH 26</td>
<td>ROCK RIVER</td>
<td>@ JCT W CL2 TH2</td>
<td>STEEL THRU TRUSS</td>
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<tr>
<td>Guilford</td>
<td>12</td>
<td>CL 2, TH 1</td>
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<tr>
<td>Brattleboro</td>
<td>52</td>
<td>VT 9</td>
<td>AMES HILL BROOK</td>
<td>1.5 MI W JCT. I91 EX. 2</td>
<td>CONCRETE SLAB</td>
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<tr>
<td>Rockingham</td>
<td>53</td>
<td>CL 3, TH 448</td>
<td>POWER DAM CANAL</td>
<td>@ JCT W CL3 TH450</td>
<td>CONCRETE ARCH</td>
</tr>
<tr>
<td>Rockingham</td>
<td>10</td>
<td>CL 2, TH 4</td>
<td>WILLIAMS RIVER</td>
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<td>ROLLED BEAM</td>
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<td>Jamaica</td>
<td>24</td>
<td>CL 3, TH 19</td>
<td>BALL MTN. BROOK</td>
<td>0.1 MI JCT TH 19 &amp; VT 30</td>
<td>2 SPAN ROLLED BEAM</td>
</tr>
<tr>
<td>Westminster</td>
<td>5</td>
<td>TH 01, FAS 126</td>
<td>SAXTONS RIVER</td>
<td>1.5 MI W JCT. U.S.5</td>
<td>RIVETED TWO GIRDERS</td>
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<tr>
<td>Guilford</td>
<td>60</td>
<td>CL 3, TH 17</td>
<td>BROAD BROOK</td>
<td>0.6 MI TO JCT W CL2 TH1</td>
<td>ROLLED BM W TIMBR DK</td>
</tr>
</tbody>
</table>
RESOURCES

Figure 4-1: State of Vermont - Highway Mileage - For the Year of 2009, Vtrans, http://www.aot.state.vt.us/planning/documents/highresearch/publications/pub.htm

Figure 4-2: State of Vermont - Highway Mileage - For the Year of 2009, Vtrans, http://www.aot.state.vt.us/planning/documents/highresearch/publications/pub.htm

Figure 4-3: State of Vermont - Highway Mileage - For the Year of 2009, VTrans, http://www.aot.state.vt.us/planning/documents/highresearch/publications/pub.htm

Figure 4-4: State of Vermont - Highway Mileage - For the Year of 2009, VTrans, http://www.aot.state.vt.us/planning/documents/highresearch/publications/pub.htm

Figure 4-5: Photos taken by C. Meves

Figure 4-6: State of Vermont – Surface by County and Town, 11/16/2010, VTrans, http://www.aot.state.vt.us/Planning/mappgis/mapping_stats.htm

Figure 4-7: Windham Regional Commission Diagram, modified by C. Meves

Figure 4-8: 2010 Miles and Annual Vehicle Miles Travelled by County and Functional Class, VTrans, http://www.aot.state.vt.us/planning/documents/highresearch/publications/pub.htm

Figure 4-9: Windham Regional Commission GIS Department


Figure 4-12: High Crash Locations, Statewide Rankings by Actual/Critical Ratio, 2003-2007, http://www.aot.state.vt.us/planning/documents/highresearch/publications/pub.htm

Figure 4-13: Access Management Program Guidelines, VTrans, 2005, http://www.aot.state.vt.us/progdev/Sections/PublicationsOverview62011.htm

Figure 4-14: Windham Regional Commission Stock Photo

Figure 4-15: Photo taken by C. Meves

Figure 4-16: Photo taken by C. Meves

Figure 4-17: Photo taken by C. Meves

Figure 4-18: Windham Regional Commission Stock Photo

Figure 4-19: VTrans Supplied FY 2013 Candidate Bridge List
CHAPTER 5
PUBLIC TRANSPORTATION

PUBLIC TRANSIT NEED

As stated in previous chapters, the Windham Region is a predominantly rural region. Developing and maintaining an efficient and effective public transportation system within a sparsely populated rural area can be challenging. As such, providing public transportation to a rural region must be carefully considered and weighed to provide the most efficient service to the broadest possible population. Many of the issues and traditional incentives for public transportation are more applicable to large population centers than to rural areas. The populations to be served within this Region are typically small in number, dispersed over a wide area, and often living far from needed services. The following sections will discuss first, what portion of the Region’s population is considered transit dependent, and then, the several forms of public transit and transportation available to both dependent and by-choice users within the Region.

TRANSIT DEPENDENT POPULATION

As defined in the State legislation, public transportation refers to passenger transportation “by all means available to the general public” while public transit service is a subset of that which means

“...any fixed route, paratransit, transportation brokerage, user-side subsidy, and or rideshare/ride-match program which is available to any person upon payment of the proper fare, and which is promoted to be available to all members of the public, including those with special needs.”(24 V.S.A. § 5088(5))

The Federal Transit Administration defines transit dependent persons as those 1) without private transportation, 2) elderly (over age 65), 3) youths (under age 18), and 4) persons below poverty or median income levels defined by the U.S. Census Bureau (Federal Transit Administration). Currently about 36.2% of the total population of this Region falls within either the elderly or youth categories as defined by the FTA. Given the aging population of the Region, one segment of the transit dependent population of particular concern is the elderly age group. A large percentage of the population will be moving into the 65+ age group within the next ten years.
The set of tables below display the top five towns and downtowns/villages/CDPs for each transit dependent characteristic within the Region.

### FIGURE 5-1: WINDHAM REGION DEPENDENT POPULATION PROFILE

#### Percent of Households without a Vehicle

<table>
<thead>
<tr>
<th>Town</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>STRATTON</td>
<td>6.76%</td>
</tr>
<tr>
<td>ROCKINGHAM</td>
<td>8.01%</td>
</tr>
<tr>
<td>VERNON</td>
<td>10.48%</td>
</tr>
<tr>
<td>READINGSBORO</td>
<td>11.75%</td>
</tr>
<tr>
<td>BRATTLEBORO</td>
<td>15.07%</td>
</tr>
</tbody>
</table>

#### Total Population under 18 Years of Age

<table>
<thead>
<tr>
<th>Town</th>
<th>Total Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUTNEY</td>
<td>437</td>
</tr>
<tr>
<td>VERNON</td>
<td>501</td>
</tr>
<tr>
<td>WESTMINSTER</td>
<td>688</td>
</tr>
<tr>
<td>ROCKINGHAM</td>
<td>1164</td>
</tr>
<tr>
<td>BRATTLEBORO</td>
<td>2368</td>
</tr>
</tbody>
</table>

#### Downtown/Village/CDP

- Bellows Falls village: 10.75%
- Saxtons River village: 11.41%
- Brattleboro CDP: 15.06%
- West Brattleboro CDP: 20.04%
- Readsboro CDP: 24.28%

#### Total Population 65 Years of Age and Over

<table>
<thead>
<tr>
<th>Town</th>
<th>Total Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUTNEY</td>
<td>344</td>
</tr>
<tr>
<td>VERNON</td>
<td>393</td>
</tr>
<tr>
<td>WESTMINSTER</td>
<td>441</td>
</tr>
<tr>
<td>ROCKINGHAM</td>
<td>816</td>
</tr>
<tr>
<td>BRATTLEBORO</td>
<td>1,954</td>
</tr>
</tbody>
</table>

#### Downtown/Village/CDP

- Readsboro CDP: 86
- Putney CDP: 114
- Bellows Falls village: 446
- West Brattleboro CDP: 474
- Brattleboro CDP: 1,176

#### Percent of Families whose Income in 2009 was below the Poverty Level

<table>
<thead>
<tr>
<th>Town</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>WARDSDBORO</td>
<td>9.20%</td>
</tr>
<tr>
<td>JAMAICA</td>
<td>11.90%</td>
</tr>
<tr>
<td>ROCKINGHAM</td>
<td>12.40%</td>
</tr>
<tr>
<td>READINGSBORO</td>
<td>13.60%</td>
</tr>
<tr>
<td>ATHENS</td>
<td>14.60%</td>
</tr>
</tbody>
</table>

#### Downtown/Village/CDP

- North Westminster village: 8.10%
- Saxtons River village: 11.70%
- West Brattleboro CDP: 17.60%
- Bellows Falls village: 17.90%
- Readsboro CDP: 34.10%

#### Percent of Individuals whose Income in 2009 was below the Poverty Level

<table>
<thead>
<tr>
<th>Town</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>JAMAICA</td>
<td>16.00%</td>
</tr>
<tr>
<td>ATHENS</td>
<td>16.30%</td>
</tr>
<tr>
<td>ROCKINGHAM</td>
<td>18.00%</td>
</tr>
<tr>
<td>READINGSBORO</td>
<td>22.70%</td>
</tr>
<tr>
<td>MARLBORO</td>
<td>27.30%</td>
</tr>
</tbody>
</table>

#### Downtown/Village/CDP

- Brattleboro CDP: 12.80%
- Saxtons River village: 16.10%
- Bellows Falls village: 23.50%
- West Brattleboro CDP: 24.00%
- Readsboro CDP: 46.40%

#### Population Density

<table>
<thead>
<tr>
<th>Town</th>
<th>Individuals per sq mi</th>
</tr>
</thead>
<tbody>
<tr>
<td>WESTMINSTER</td>
<td>69</td>
</tr>
<tr>
<td>PUTNEY</td>
<td>101</td>
</tr>
<tr>
<td>VERNON</td>
<td>113</td>
</tr>
<tr>
<td>ROCKINGHAM</td>
<td>127</td>
</tr>
<tr>
<td>BRATTLEBORO</td>
<td>378</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Town</th>
<th>Individuals per sq mi</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Westminster village</td>
<td>742</td>
</tr>
<tr>
<td>Saxtons River village</td>
<td>1,205</td>
</tr>
<tr>
<td>West Brattleboro CDP</td>
<td>1,677</td>
</tr>
<tr>
<td>Brattleboro CDP</td>
<td>1,773</td>
</tr>
<tr>
<td>Bellows Falls village</td>
<td>2,289</td>
</tr>
</tbody>
</table>
As seen in the table above, all of the towns with high transit dependent characteristics have some form of public transportation service. However, provision of service does not necessarily equate to sufficiency of service. The maps on the next page display areas were VTrans has determined there are underserved dependent populations in the Region. As visible from a comparison of these maps, while the Region has a wide range of areas that have a low-moderate percentage of dependent populations, the relative density of these populations is low by comparison to the rest of the state. As such, at this point in time, Dial-A-Ride service may be the best form of service for these areas. It should be noted that this service could be extended further west in the Region from its current service area, given the findings of the VTrans analysis.

Also evident is that while Vernon is serviced by a town bus and CRT Dial-A-Ride public transit, it may be a candidate for expanded services that have hubs in Brattleboro, specifically CRT services. The town of Vernon is among the top five towns for percentage of households without a vehicle, total population under 18 years old, and total population 65 years and older. Vernon also has the third highest density of population in the Region. The town bus system currently does not operate on a fixed route, and is only available upon request to town organizations. Future expansion of service could provide a fixed route within the town that is also linked with CRT service to Brattleboro.
While this section has focused on transit dependent populations, it should be noted that this is not the only group that will readily use public transportation/transit service if it is provided. Commuter and tourist user groups should also be considered when evaluating services. The following sections will cover regionally available public transportation services in more detail, and an analysis of these systems should be done with all available users in mind.
PUBLIC TRANSIT BUS SYSTEMS

Prior to the mid-1990s, the Brattleboro town bus was the only mass public transit provider in the Region. In 1996 the Windham Region welcomed two new transit providers, Town and Village Bus (TVB) and Deerfield Valley Transit Association (DVTA). TVB provided service mainly to the Connecticut River towns, with their offices in Westminster, while DVTA transported people in and around the Wilmington and Dover area, with their offices in Dover. During this time, the largest source of funds for public transit came from the Federal Government through the Congestion Mitigation Air Quality (CMAQ) grant program for new start up transit routes in the region. The local economic conditions made it nearly impossible for Vermont communities to commit significant amounts of money to these new routes or any expanded routes. In the late 1990’s additional funds to support public transit came to the Windham Region in the form of other Federal programs: Job Access Reverse Commute (JARC), Section 5310 grant for elderly and disabled transportation services, Federal earmarks, and rideshare grants.

From 2003-2005 the Region experienced more changes to its public transit network. As TVB closed its doors, Connecticut River Transit (CRT), with heavy involvement from WRC and SWCRPC, was established. CRT provided service to the existing routes and began operating the Brattleboro BeeLine routes in 2010. Additionally, the VTrans began contributing funds to the Public Transit Program through its Surface Transportation Program (STP). Currently, much of the funding for the operations of CRT and DVTA comes from STP and funding for their capital expenditures comes from the Federal government. In 2005, VTrans, in partnership with the Department of Aging and Independent Living, human services agencies, transit providers, and RPCs, adjusted the Section 5311 funding formula to focus the allocation of monies to each transit provider on elderly and disabled populations in each region, distance traveled to facilities served and the volunteer program shared.

CONNECTICUT RIVER TRANSIT (CRT)

The mission of Connecticut River Transit is to provide the populations of Southern Windsor and Windham counties with “a safe, reliable and efficient transportation system that supports economic opportunity and quality of life for the communities [it] serve[s].” The Current, CRT’s bus service, operates a rural demand-responsive service in the Bellows Falls and Route 30 corridor regions, between town/in-town routes for Springfield, Bellows Falls, and Brattleboro, commuter routes between Rutland, White River Junction, Bellows Falls, and Brattleboro, and a seasonal ski area fixed-route service to Okemo. All routes are free of charge, except for the Brattleboro Bee Line route which has fees up to $1.00. CRT does ask for donations for their services on all other routes. Bike racks are available on some buses. In 2010, CRT transported 208,093 individuals throughout the Southern Windsor and Windham Regions. This value demonstrates an almost two-fold increase in ridership from 108,344 individuals, as reported in the previous transportation plan. The 2010 Public
Transit Route Performance Review Report listed all CRT routes within the Windham Region as performing above acceptable levels for all the performance metrics measured. The majority of the routes also performed above the threshold of what was considered successful for each metric.

**DEERFIELD VALLEY TRANSIT ASSOCIATION (DVTA)**

The Deerfield Valley Transit Association’s mission is to improve the quality of life in the Deerfield Valley by providing safe, reliable, timely and courteous transit services to Deerfield Valley residents and guests. This mission relates to the special transportation of elders and persons with disabilities as it has a direct impact on their quality of life. DVTA operates a rural demand-response service that operates between the areas of Mount Snow and Dover, Wilmington, Brattleboro, Whitingham, Jacksonville Readsboro, and Marlboro College. General route maps are available on the DVTA website, but deviations from all routes are available up to one quarter of a mile upon request 24 hours in advance. All Moover buses have transit bicycle racks in season and ski storage racks in the winter. All routes are free of charge. In 2011, DVTA transported 290,867 people through its services, which is an increase of 64% over 2005 ridership. The 2010 Public Transit Route Performance Review Report listed all DVTA routes as performing above successful levels for all the performance metrics measured, except for demand-response boardings per hour, which was measured at acceptable levels.

The increase in public transit service and ridership numbers region-wide has reinforced the need to accommodate all public transportation in an efficient and effective manner. Performance review of the effectiveness of the Region’s transportation systems was delegated to the Regional Public Transit Committee in 2004. The Committee is comprised of the two transit providers, human service agencies, and the WRC and SWCRPC. The purpose of this Committee is to build consensus on service and spending priorities for public transit in both regions.

**PRIVATE RESORT SHUTTLES**

Stratton Mountain offers shuttle service for the resort center area on weekends from December to the end of ski season and also during the week for both the Christmas and President’s Holiday Week. They offer three different types of shuttles: a parking shuttle, a village shuttle for both Stratton Mountain village and Birch Hill; and a shuttle to the former Dostal’s Lodge at Magic Mountain in Londonderry. Stratton Mountain also runs a shuttle from Base Lodge to Base Lodge and a person can access a shuttle from anywhere on Stratton Mountain.
PRIVATE SECTOR INTER-CITY BUS TRANSPORTATION

Private sector inter-city bus transportation is provided by Greyhound and the current schedule and rates can be viewed online. In 1975, Greyhound bought Vermont Transit Company, though they continued to operate it as the Vermont Transit Company until 2008. As of 2010, all of Greyhound’s Vermont bus service is based out of its White River Junction hub; service in the Burlington area is now operating out of the Burlington airport. The Greyhound route in the Region operates a single daily round-trip from White River Junction to Springfield, MA. This route has stops in Vermont at Bellows Falls and Brattleboro. The southbound bus serving this corridor leaves White River Junction well after the arrival of the bus from Burlington, but the northbound arrives in time to allow a rider to connect to either Burlington or Boston bound buses with minimal delay. New York can also be accessed on this route once a day with a layover/transfer in Springfield, MA.

While not currently serving this Region, Megabus and Dartmouth Coach are two inter-city bus services providing transportation around the Region. Megabus provides service around the Region to the cities of Burlington, VT, Saratoga Springs, NY, Albany, NY, Amherst, MA, and Boston, MA. Dartmouth Coach provides service between Hanover, NH and Boston, MA, with stops in between at Lebanon and New Lebanon, NH. Both of these bus service providers could provide additional stops within the Region in the future if demand for services allowed for such an expansion.

PUBLIC TRANSIT ANALYSIS

Public transit in Vermont, as in other states, is funded through fares, donations, local communities, agency-contracted services, and Federal and State transit subsidy programs. In FY10, the operating budgets for public transit operators in the State totaled over $39M. In Vermont, as in many states, the Federal (49 U.S.C.) and State transit programs provide substantial subsidies to the local transit providers. Most of the Federal funds flow through VTrans to rural transit operators. The State is the designated recipient of all Federal rural transit funding as well as funding for specialized services under Section 5310 (Elderly and Persons with Disabilities), Section 5316 (JARC) and Section 5317 (New Freedom). The FY11 State budget for public transit includes about $17 million in Federal funds and $6.8 million in State funds for a total of $26 million (excluding the Federal funds that flow directly from FTA to CCTA). Of this, there was a one-time grant of $2 million in American Recovery and Reinvestment Act (ARRA) funding for vehicles and $600,000 for planning and administration. In addition, local communities contribute to transit services through match and users provide fares and other revenue.

As required by legislation passed in 1998, a Public Transit Policy Plan (PTPP) is developed every five years. The first PTPP was published in 2000 and the second was published in 2007. The most recent document presents a 2012 PTPP update. While the PTPP is updated every five years, it serves as the primary guidance for continued development of public transit in the State over the next ten years.
VTrans submitted a Public Transit Policy Plan in 2012. In addition, a Public Transit Advisory Council (PTAC) was formed to implement the plan and other public transit issues. The most pressing issues that emerged through this update to the PTPP are as follows:

- Funding Levels and Sources,
- Capital Investments,
- Coordination of Services,
- Interface with Land Use Planning,
- Regional Connectivity and Intercity Bus, and
- Improving the “Transit Experience.”

The current framework for Vermont public transit policy includes strategies aimed at:

- Preserving and enhancing existing public transit services that are well used by the traveling public,
- Monitoring the performance of transit services by VTrans and the boards of the transit providers to ensure the maximum value from available resources, and
- Using any additional public transit funds to support and promote the four goals noted above as in 24 V.S.A Chapter 126, S.5083.

VTrans also commissioned The Short Range Transit Plan (SRTP) in 2003, which was summarized in the 2006 Transportation Plan. A follow up document titled Human Service Transportation Coordination Plan was compiled in 2008, and expanded the analysis done in 2003 to include factors such as major employment areas, human services centers, and coordination amongst these entities. Chapter Four of this report covers the Southern Windsor and Windham Regions and includes a detailed strategies section for meeting unmet need in this region. The table from that chapter is included on the next page. Among other goals set forth, the strategies include efforts to coordinate with other public transportation service providers in the Region. The following sections will describe other forms of public transportation in more detail.
Public Transportation

The State of Vermont has long supported passenger service by rail, through supporting inter-modal transportation centers as well as by being one of only ten states that make some financial contribution to intercity rail passenger transportation service. The services are governed by an annual contract between VTrans and Amtrak with funding provided through an annual State appropriation. The annual subsidy is based on the State paying the fully allocated costs over and above the revenues generated by ticket and food & beverage sales on the trains between Burlington, VT and Springfield, MA. This support is important if intercity passenger service is going to continue in the Region, as well as in the State.
Amtrak’s two intercity passenger rail trains that provide service in Vermont are the Vermonter and the Ethan Allen Express. The Ethan Allen Express has stops in Rutland and Castleton Vermont, before continuing its route through New York State. In Windham Region, Amtrak passenger service is provided by the Vermonter along the NERC rail line. It operates seven days a week with one northbound and one southbound train. This daytime service, which replaced the Montrealer in 1995, is geared more to the needs of tourists rather than business travelers. Southeastern Vermonters can access the Amtrak train in Brattleboro or Bellows Falls and reach their destination of New York City, Washington DC (and points in-between) or Montpelier, St. Albans (and points in-between).

As reported in the previous transportation plan, the Vermonter had experienced a decline in ridership statewide, from 79,080 in 2000 to 61,431 in 2004. Since that time, the Vermonter has seen a rebound in ridership, reporting a 3.5% increase in ridership in 2009 over the previous year. In 2010, the Vermonter had reached a total of 78,461 boardings/alightings, a near return to 2000 levels of ridership (Amtrak Fact Sheet State of Vermont, Fiscal Year 2010). The Brattleboro Union Station has experienced an increase in ridership, with 15,479 boardings in 2010, up from 9,597 as reported in 2004. The Bellows Falls station has also seen an increase in the ridership numbers, with 4,652 boardings in 2010, up from 3,128 in 2004.

Vermont recently received $51 million in American Reinvestment and Recovery Act (ARRA) funding for high-speed and intercity passenger rail improvements. The grant funded the upgrade of track and bridge improvements, and the weight capacity of the rail to 286,000 lbs, on the NECR line between St. Albans and the Massachusetts state line. Separate improvements funded by ARRA grants to Massachusetts and Connecticut will increase the carrying capacity of the tracks on the connecting Connecticut River rail corridor to the south. This corridor was among eleven congressionally designated High Speed Rail Corridors that was eligible for funding. The primary aim of these improvements is to decrease travel times and improve the reliability of passenger services between Boston and Montreal. The upgrades will allow trains to travel up to 59 mph (79 mph in some sections), and the estimated reduction in travel time from St. Albans to Springfield, MA is 30 minutes. Once Massachusetts and Connecticut complete the track and bridge upgrades, Windham County residents will be able to access the Bradley Airport, via the Windsor Locks train station.
ADDITONAL PUBLIC TRANSPORTATION & SERVICES

AIRPORT PUBLIC TRANSIT

The five major airports readily accessible to the Region are Albany International, Albany, NY; Bradley International, Hartford, CT; Logan International, Boston, MA; Burlington International, Burlington, VT, and Manchester Airport, Manchester, NH. Residents and visitors to the Windham Region predominately use four major airports, which are all outside the state of Vermont. Burlington, VT airport is rarely used due to distance from the Region. While actual passenger numbers are not available to rank these airports in order of usage, a telephone survey of area travel agents conducted for the previous transportation plan indicated that based on client preferences of service availability, ticket costs, and proximity that Bradley International Airport is the most used followed by Manchester Airport and Albany International. One travel agent indicated that her clients living west of Hogback Mountain prefer Albany Airport to Manchester Airport. The two private public use airports located in the Windham Region are Mount Snow Airport in West Dover and North Windham Airport in Londonderry. Additional airport land strips are private.

TAXI SERVICE

As an alternative to coordinated public transit service to the airport, taxi service is available in some parts of the Region. A number of private companies currently offer service to the surrounding airports, as well as around town transportation. These companies include Brattleboro Taxi, Bellows Falls Taxi, Buzzy’s Taxi, and Valley Cab Service. A private company providing airport service is Thompson Transportation, located in Troy, NH. Figure 5-7 provides a synopsis of the services currently offered in the Region by taxi providers.

<table>
<thead>
<tr>
<th>COMPANY</th>
<th>TOWN</th>
<th>SPECIAL SERVICES</th>
<th># VEHICLES</th>
<th>DISCOUNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valley Cab Service</td>
<td>East Dover</td>
<td>Airports</td>
<td>2</td>
<td>None</td>
</tr>
<tr>
<td>Village Taxi</td>
<td>Bellows Falls</td>
<td>Airports</td>
<td>2</td>
<td>None</td>
</tr>
<tr>
<td>Buzzy's Taxi</td>
<td>West Dover</td>
<td>Airports</td>
<td>19</td>
<td>None</td>
</tr>
<tr>
<td>Brattleboro Taxi</td>
<td>Brattleboro</td>
<td>Airports</td>
<td>3-5 cars, 2 vans, 2 buses</td>
<td>Group Rates</td>
</tr>
</tbody>
</table>
PARK-AND-RIDE

Carpooling in the Region has seen a steady decline since the 1980 Census. The percentage of Windham Region commuters who carpooled to work in 2010 was only 10.17%. Once a strong second choice to driving to work alone, this method of commuting is now only a few percentage points above other options, such as working from home or walking to work, as shown by Figure 5-7. This decline continues in spite of increases in funding for the design and construction phase of park-and-ride lots and for such programs as rideshare. It is expected that the number of commuters carpooling will begin to increase again through the inception of a number of municipal park and ride lots, a proposed Town of Rockingham/CRT lot, and a State park and ride lot, which is in process. Below is a list of the existing and proposed lots throughout the Region, including location and capacity.

EXISTING MUNICIPAL PARK AND RIDE LOTS

BRATTLEBORO: I–91 (EXIT 3)

Description of use: This existing Municipal Park and Ride lot is located just north of the intersection of I–91 (Exit 3), VT 9/U.S. 5, in the Book Press Building parking lot. VT 9 is a national highway system route and serves as a busy commute and interstate travel route between New Hampshire and New York. US 5 (Putney Road), just south of this site, is a major retail area for the Windham Region. CRT serves this area and this lot, as it travels northbound and southbound on US5. The proposed site is being used for carpooling and parking to access CRT and tourist bus boarding. This site provides convenient access to longer distance carpooling such as to Montpelier or Keene, NH.

The lot has 12 designated spaces; within a larger parking lot for Book Press Building users. This lot was formalized in 2010.
DUMMERSTON: VT 30 @ EAST–WEST ROAD (AT THE COVERED BRIDGE)

Description of use: This existing Municipal Park and Ride lot is located at the intersection of VT 30 and the East–West Road (at the covered bridge). VT 30 is a minor arterial that serves as a busy inter-region and interstate travel route. VT 30 is a busy bicycling route and the West River Trail parallels VT 30 on the east side of the river. This site is used for parking for people riding their bicycles on VT30 and for recreationists utilizing the West River.
This lot was the first Municipal Park and Ride lot in the region and sees consistent use. It can accommodate up to 33 vehicles and a stone step access was developed for easy access to the West River. This lot was formalized in 2005.

WESTMINSTER: I−91 (EXIT 5)

Description of use: This existing Municipal Park and Ride lot is located near the intersection of I−91 (Exit 5) and US 5 on Westminster Heights Rd. US 5 is a major commuter corridor and part of the proposed Connecticut River Scenic Byway. Exit 5 is south of Bellows Falls and north of Westminster Village. This site is being used for carpooling and tourist information for commuters, rideshare and tourists alike. Located near I−91, this site provides convenient access to longer distance carpooling such as to Montpelier. This location offers an excellent opportunity for state partnerships with existing business parking.

The lot can accommodate 30 vehicles and has a bus shelter and lighting. This lot was formalized in 2011.

WHITINGHAM: VT 100 @ VT 112

Description of use: This existing Municipal Park and Ride lot is located behind the Town Offices, near the intersection of VT 100 and VT 112. VT 100 and VT 112 are major collectors and serve inter-region travel routes. A number of southern Windham residents commute to the Greenfield, MA area for work and shopping. The proposed site will be used for carpooling.

This lot can accommodate up to 30 vehicles and has lighting. This lot was formalized in 2010.

PROPOSED MUNICIPAL PARK AND RIDE LOTS

PUTNEY: 1−91 (EXIT 4)

Description of use: This proposed site is an old VTrans storage yard located near the intersection of I−91 (Exit 4) and US 5. US 5 is a major commuter corridor and part of the proposed Connecticut River Scenic Byway. Putney Village is nearby on US 5. Currently a well used informal park and ride exists at the Putney Inn. Also nearby is a bicycle and cross-country skiing shop, where cyclists use the lot as a starting point for bicycling. The proposed site will accommodate parking for carpooling and bicycling and tourist information for the proposed Connecticut River Scenic Byway. When constructed, this will be the first State park and ride lot in the region.

VTrans has confirmed construction of this park and ride location for the FY13-14 construction season; with the RFP going out in Fall 2012. There will be approximately 75 parking spaces, including lighting and a bus shelter.
ROCKINGHAM: I–91 (NEAR EXIT 6)

**Description of use:** This proposed site is located near the intersection of I–91 (Exit 6) and US 5/VT 103. US 5 is a major commuter corridor and part of the proposed Connecticut River Scenic Byway. VT 103 is a national highway system route and serves as a busy commuter and interstate travel route. Connecticut River Transit, Inc. services this area. The proposed site will be used for carpooling and tourist information for the proposed Connecticut River Scenic Byway. Located near the intersection of I–91 and VT 103, this site will provide convenient access to longer distance carpooling such as to Montpelier or Rutland.
CRT is working with the Town of Rockingham and FTA to construction a park and ride lot just north of their facility. There will be approximately 75 spaces, including lighting, a bus shelter and a lobby in the CRT facility available for riders waiting for their ride. The project is planned to be completed in FY13.

**DOVER: VT 100 NEAR MOUNT SNOW**

**Description of use:** This proposed site is located off VT 100 and south of Mount Snow. VT 100 is a minor arterial and serves as a busy inter-region and interstate travel route. The resort area of Haystack Mountain is also located nearby. The MOOVER bus system serves this area and the Valley Trail runs parallel to VT100. The proposed site will be used for carpooling and parking to access the MOOVER and the Valley Trail.

Currently, the existing commercial parking lots along VT 100 are being used for park and ride purposes. It is hard to determine the number of park and ride lot users from the patrons of these businesses. However, once a formal park and ride lot is located in this area and the public is aware of its availability, use of the lot will increase.

**WILMINGTON: VT 9 AT VT 100 (SOUTH)**

**Description of use:** This proposed site is located near the intersection of VT 9 and VT 100 (south). VT 9 is a national highway system route and serves as a busy commuter and interstate travel route. The MOOVER bus system serves this area. The proposed site will be used for carpooling and parking to access the MOOVER. Located near VT 9 this site will provide convenient access to longer distance carpooling such as to Bennington. This site is included in the Deerfield Valley Transit Association’s 1998 Capital Needs Report.

**BRATTLEBORO: I–91 (EXIT 1)**

**Description of use:** This proposed site is located near the intersection of I–91 (Exit 1) and US 5 (Canal Street) on a busy commuter and retail corridor. Exit One Industrial Park is located near the proposed site. CRT serves this area. The proposed site will be used for carpooling and parking to access the Brattleboro Bee Line. Located right off I–91, this site will provide convenient access to longer distance carpooling such as to Montpelier.

Currently, an average of one to two cars a day uses this site for an informal park and ride site. Once a formal park and ride lot is located in this area and the public is aware of its availability, use of the lot will increase.

**RIDE/CAR SHARING**

Developments in communications technology and programs like Go Vermont have made it easier for commuters to connect and coordinate ride-sharing. Go Vermont in particular offers features on their website for carpool/vanpool matching service, tips, and practical information for getting around. Pairing
this information with the more conveniently located park and rides will help commuters have better options to reach their destinations.

An equally important means to improve mobility is to increase awareness and knowledge of the options currently available. A portion of the public knows about the services offered by CRT and DVTA and makes use of them. Another portion may be aware that CRT and DVTA vehicles are running in the county, but may know little about the routes or how to use them. Yet another portion may be unaware that this service exists at all. The goal of this concept is to make it easy for people who have mobility needs to find out how they can be met by the region’s service providers. The key is to provide a single number to call to reach someone who is knowledgeable about the options available and can either provide the needed information directly or connect the caller with the necessary resource.

VTrans is in the process of rolling out an enhanced transportation information line. The number 1-800-685-RIDE has been in place for many years as an information line for commuters, and advertised as such on roadway signs. In November and December 2012, the responsibility for the information line is being passed from VTrans to the Vermont Energy Investment Corporation (VEIC) which is a non-profit organization “that is dedicated to reducing the economic and environmental costs of energy consumption.” VEIC will have trained staff available from 8:00 a.m. to 6:00 p.m. every weekday to answer questions from callers on any transportation issue, not just commuting. The VEIC information database is being updated and the staff will be able to answer most mobility questions directly. For more complex questions or requests involving scheduling a demand response trip, the caller will be referred to the relevant transit operator. VTrans is embarking on a significant marketing campaign to let Vermonters know about the expanded capabilities of the 685-RIDE number. The agency will publish newsletters and spend about $200,000 over nine months to advertise on television and radio.

In addition to the 800 number, VTrans is working with zimride.com to enhance the existing ride matching service available through Go Vermont. This nationally-known website will make it easier for Vermonters to find rides and set up carpools for regular commuting and occasional trips.

Parallel to the VTrans effort, the United Way of Vermont will seek to enhance the abilities of Vermont 2-1-1 to provide transportation information. Most of the calls to this existing resource number concern housing needs, but transportation questions are already within its scope of activities. Because the 1-800-685-RIDE number will not be available on weekends or overnight, 2-1-1 can be a secondary resource for callers during those times.

The recommendation for this concept is that VTrans and VEIC establish ongoing communication with local United Way staff and all of the transit service providers in the region as well as coordinators of volunteer driver networks and other organizations that have transportation resources. The local staff would then work with the VEIC staff to make sure that the database is comprehensive and up-to-date and that the staff members are well-versed in the transportation options in Windham County. This information would also be provided to the 2-1-1 staff. The transportation partners in the region would participate in this effort to try to focus awareness of 1-800-685-RIDE as the first step in obtaining
transportation information. While CRT, DVTA and others would continue to market themselves to increase awareness of their services, these efforts would be conjoined to information about 1-800-685-RIDE to maximize the effectiveness of the clearinghouse concept. Likewise, social service agencies oriented toward youth, seniors, people with disabilities, and low-income families, would all promote 1-800-685-RIDE as the best means to obtain information about transportation.

Another developing option for residents of Vermont is the opportunity for car sharing. Car sharing programs allow individuals to rent cars by the hour at affordable rates and the cars are systematically located so as to be convenient for a wide range of individuals. The only program of this kind in Vermont is CarShare Vermont, which began in 2008 and is currently only located in Burlington. While this option is not generally feasible in rural areas, it may be an option to consider in the future for the denser areas of Brattleboro and Bellows Falls.

INTERMODAL FACILITIES

Intermodal facilities serve as hubs for integrated service between two or more transportation methods. They allow for more efficient travel by combining access to multiple transportation types. This allows, for example, users of a bus service to expand their destination access by linking their bus trip with a coordinated train route. Providing a hub where multiple transportation methods are combined also promotes coordination between the various service providers and leads to more efficient scheduling between the services. Intermodal facilities also provide a central place for users to park their vehicle or bike and access a public transportation services. Below is a description of the intermodal facilities available within the Region.

BRATTLEBORO TRANSPORTATION CENTER

In 2004 the Brattleboro Transportation Center opened to the general public. This facility provides much needed parking spaces for downtown Brattleboro, while also creating an intermodal facility for the two bus transit providers, taxis, and Amtrak service. Along with the intermodal facility increasing the efficiency of public transportation in the region, having a central, downtown location where residents, business customers and travelers alike can park and walk through downtown removes vehicles from the road and lessens congestion in town.
BRATTLEBORO UNION STATION

The Brattleboro Union Station has provided passenger rail service to the town for over 100 years. The station itself has gone through many changes, initially taking up the entire Brattleboro Museum and Art Center building (current use), that included a pedestrian bridge over the railroad tracks. In 1972, the station moved to the ground floor, where Amtrak took it over for use as a waiting room to serve passengers. In recognition of its material integrity and tangible ties to Brattleboro’s extensive rail heritage, the station was listed on the National Register of Historic Places in 1974.

In 2010, the Town of Brattleboro reignited the Union Station Project. The Project included key players, such as FTA, WRC and NECR. The scope of work focused on improving pedestrian movement and parking on the east side of the tracks. The project also included the demolition of the Gas Works Building, Woods Garage and the Scale house; along with an extensive amount of Brownfield’s assessment and quality control.

PARKING

Public parking facilities exist both officially and informally in the Windham Region’s regional centers and villages. These parking facilities come in the form of off street spaces and curb-side spaces, serving commuters, shoppers, people conducting business, and people using the local services. In some cases, curb side parking in downtown areas also serve as delivery areas for downtown merchants. In general, the regional centers of Brattleboro and Bellows Falls provide more public parking in off street parking facilities than do other towns. Public parking in villages may be provided in the form of marked curbside parking, but village parking often occurs informally along roadways or adjacent to town squares. Outside the Region’s villages and towns, public parking often is available to recreational users on road shoulders. These recreational parking lots may not be officially recognized and occur naturally adjacent to bicycle routes, rivers, scenic views, swimming holes, historic sites, and trail heads.

Over years parking in the vicinity of recreational destinations (e.g. swimming holes) has become a safety issue for some towns in the region. Along VT 30 where the West River and the Rock River flow, there are a number of recreational destinations (swimming holes, historical covered bridges) that have become very popular stops in the summer months. With this popularity there has been an increase in the number of cars wanting to park along the wide shoulder of VT 30 and access these destinations. In 2004, WRC and VTrans conducted a Road Safety Audit Review (RSAR) at two intersections along VT 30 in Dummerston- East West Road at the covered bridge and at Depot Road (Williamsville Road). These are both important public access points for the West River and Rock River and can become very crowded with both vehicles and pedestrians. The safety audits provided recommendations for simple, low cost treatments that may prevent them from becoming High Crash Locations (HCLs). At Depot Road, pedestrian safety and control of parking on the shoulder of VT 30 were addressed by installing pedestrian crossing signs and limiting parking around the intersection to protect sight distance. At East West Road, recommendations included limiting the lot to the one existing access point, installing a stop bar and signs to prohibit passing on VT 30.
Public parking access continues to play a crucial role in the economic development of the regional centers, such as Brattleboro, Bellows Falls and Wilmington. Bellows Falls and Wilmington provide free parking for up to two hours in the village centers, whereas the Town of Brattleboro charges for a significant portion of public parking in the downtown area.

Brattleboro’s lack of adequate parking and on-street parking often exacerbated traffic flow during peak periods. The Town addressed the situation with the addition of 260 downtown parking spaces, the majority covered, in the new Multimodal Transportation Center. This increase in off-street parking reduces the burden on the other public parking lots in town (Harmony, High-Grove, Harris and Bradley) and decreases parking-related traffic on some streets as well.

The Village of Bellows Falls has similar parking issues around the town square and on some neighborhood streets. A Traffic Circulation and Parking Study was completed in January 2005 and focused on road geometry, traffic analysis, and parking availability. Some of the recommendations made by RSG, Inc. included: improve street lighting to encourage use of island parking lots; add additional parking guidance signs to clarify parking locations; create marketing information to promote downtown parking; revise village parking regulations; improve Williams Street to accommodate curbside parking; address poor sight distance at South St/Henry St. intersection; provide shuttle bus service between island lots and the village square; and included three parking policy recommendations.

**TRANSPORTATION MANAGEMENT**

**TRANSPORTATION SYSTEM MANAGEMENT**

Transportation system planning has typically been pursued by Transportation System Management (TSM), which addresses the supply side of the issue.

TSM programs typically address system problems by increasing:

- Road capacity through construction of wider, straighter and flatter highways;
- Bridge capacity through construction of wider, stronger bridges and through improvements to the geometry of bridge approaches;
- Intersection capacity through the same measures as for roads and through improvements to intersection geometry and the installation or upgrading of traffic signal systems; and
- Public transportation capacity through greater frequencies of bus service or through increases in the number and size of buses in service, etc. This part of "capacity", however, is best thought of on the demand side of the equation because it serves to reduce total demand on the physical infrastructure.
It should be noted that the kinds of system expansion projects outlined above are not limited to the need to increase capacity. Safety and long-term maintenance programs remain the primary driving forces behind many projects, and the underlying needs should not be generalized.

**TRANSPORTATION DEMAND MANAGEMENT**

Increasingly, local and State governments are called upon to include solutions from the demand side of the problem, using Transportation Demand Management (TDM) techniques. TDM is a more recently developed and much less used approach to addressing some of these same issues.

TDM measures can include:

- Efforts to influence the location of transportation demand (that is, the points of origin and destination), such as through the local coordination of town plans, zoning and subdivision rules, and housing and economic development plans (e.g. planned unit developments, planned residential developments, and designing more walkable communities);

- Efforts to influence or control the timing of transportation demand, such as by the use of flexible schedules and alternative work hours, or by the use of alternative circulation plans, such as by directing traffic around congested areas or by implementing one-way loops at peak times (e.g. telecommuting);

- Efforts to influence the mode of transportation demand, such as by making public transportation more convenient and accessible, by significantly raising parking fees in congested areas to encourage the use of public transportation systems, by encouraging the use of employer sponsored transit pass programs, and by encouraging and supporting non-motorized means of commuting, where feasible.

- Efforts to influence the amount of transportation demand, such as through programs to encourage and support ride-sharing. These programs can include traditional carpooling, which may work best where it receives strong support from employers, as well as the less traditional use of park and ride lots and ride matching services.

Most of the TDM measures listed above require support and cooperation of employers in order to have a significant impact. Some, such as ride matching services, may require the direct involvement of a nonprofit or government based program in order to operate effectively and reliably across a wide area. Others, such as increased use of park and ride lots, may rely most heavily on an effective public education program. Increasingly, local and State officials are looking toward the development of comprehensive transportation programs that include several complementary TDM efforts in conjunction
with careful and efficient use of capacity improvement projects in order to effectively manage transportation needs in the coming years.

In the Windham Region, TSM may not be appropriate in all cases because of impact on the landscape and/or community character. In other cases, such as modernization of traffic controls, TSM may be useful. TDM techniques tend to be used more in urban areas where there are large numbers of vehicles and travelers. Different combinations of TSM and TDM may be appropriate for specific situations.

**RESOURCES**

**Figure 5-1:** U.S. Census Bureau. 2010, [http://www.census.gov/](http://www.census.gov/)


**Figure 5-3:** VTrans, *Vermont Public Transit Policy Plan*, 2012, [http://www.aot.state.vt.us/PublicTransit/PTPP.htm](http://www.aot.state.vt.us/PublicTransit/PTPP.htm)

**Figure 5-4:** VTrans, *Human Service Transportation Coordination Plan*, 2008, [http://www.aot.state.vt.us/PublicTransit/documents/HSCP.htm](http://www.aot.state.vt.us/PublicTransit/documents/HSCP.htm)

**Figure 5-5:** Amtrak Vermont Service Map, [http://www.amtrak.com/](http://www.amtrak.com/)

**Figure 5-6:** Phone survey conducted by C. Meves over Summer, 2012

**Figure 5-7:** U.S. Census Bureau, 1980-2010, [http://www.census.gov/](http://www.census.gov/)

**Figure 5-8:** Windham Regional Commission GIS Department, modified by C. Meves

**Figure 5-9:** Windham Regional Commission GIS Department, modified by C. Meves

**Figure 5-10:** Windham Regional Commission Stock Photo
Since the 1950’s, Vermont land use and transportation development, in keeping with a larger national pattern, has been driven by the use and requirements of cars and trucks. This has meant not only the expansion of roads and parking facilities, but also the dwindling availability of effective alternatives like passenger rail, inter-city bus, and bicycle and pedestrian facilities. The land development pattern of this Region simultaneously demonstrates and reinforces this trend. Our village populations have remained stable or shrunk, while population growth has been dispersed throughout our rural lands. At the same time, instead of a mix of services and residences found in villages, development patterns since the 1950’s has tended to be segregated in zones, with shopping centers and services concentrated along major arterials, and housing dispersed throughout the more rural lands. This development pattern makes cars a virtual necessity for most activities of daily life. This has been the dominant pattern across the country for the last half century.

There is now growing evidence of a shift in attitude around both the United States and here in Vermont. Specifically, there is increasing discussion, nationally and locally, of ideas about restoring social aspects of community, having livable communities, and building healthy communities. A key component of the transportation portion of “livable” communities includes advocating “compact, transit-oriented, walkable, bicycle-friendly land use” (Livability in Transportation Guidebook). Expanding the range of transportation choices is a major element for achieving the goals of these initiatives, by “using the quality, location, and type of transportation facilities and services available to help achieve broader community goals such as access to good jobs, affordable housing, quality schools, and safe streets.” Several developing factors have helped to bring the lack of transportation options to a forefront in transportation policy:

- **Economic Factors**: Rising costs for fuel has more people thinking about life style choices that are more fuel efficient.
- **Land Use Factors**: Sprawl development, which is both a product and perpetuator of an automobile centric culture, is increasingly viewed as environmentally unpleasant and also destructive of traditional community lifestyles and values.

- **Personal Well-being Factors**: Public and personal health concerns have increasingly focused on the fact that development of our lands and our modern transportation facilities tend to discourage regular exercise. A growing body of work has established the connection between healthy life styles and our “built environment.” For the predominately rural Windham Region, there is an irony in the studies’ findings that city people tend to walk significantly more than rural dwellers, and are generally leaner as a result.

- **Transit Dependency Factors**: A rising percentage of our population is over 65. This aging demographic trend is national, and includes all Regions of Vermont and the rest of New England. The trend will likely continue several decades to come. Today the overwhelming majority of elderly live where they are isolated if they do not have the use of a car (Commission on Affordable housing and Health). Many among this older group are looking for places to live that are clustered around services and social opportunities, and are safe and convenient for walking.

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**SHIFTING OPINIONS**

A Bureau of Transportation Statistics study (Omnibus Household Survey (OHS) conducted in 2009, released summer of 2011) may provide more context for observations of the shifting public interest in our region. That study revealed that the accommodation of pedestrians ranks nearly as high as it does for cars. The highest numbers of “important” votes went to the categories “major roads” and “adequate parking,” which drew 94.4 and 89.2 percent. Third and fourth place vote rankings, of eight categories on the list, went to “pedestrian friendly streets in downtowns” and “safe sidewalks or paths,” at 85.2 and 85 percent. The year 2009 was the first OHS that included the eight items which were intended to gauge public attitudes on “transportation related characteristics of livable communities.” The report breaks out the responses by the three fundamental community types: rural, urban, and suburban. Rural and suburban tended to track pretty closely with each other. Both ranked sidewalks as significantly more important (about 94%) than did urban dwellers (at about 66%). Also of interest, rural dwellers ranked sidewalks at 95%, higher than major roads at 92%. Taken in conjunction with the walking commute data for Windham region which is higher than the national average, this seems an appropriate comparison to this Region.
Transit Dependency Factors: There is growing recognition of a significant population that does not drive and has transportation needs that are inadequately met. This includes those too young to drive, people with certain health conditions such as visual impairments, seizure disorders, or frailty, as well as the economically disadvantaged.

Economic Factors: In studies looking for factors driving the economic vitality of communities, focus groups repeatedly found that young talented workers are interested in communities with services, recreation, business and home intermingled and readily accessible (R. Florida, *Rise of the Creative Class*).

Personal Well-being Factors: A growing awareness of the pedestrian interface. Every trip by car or other mode of transportation begins and ends with a pedestrian trip. People want to feel safe and comfortable where they must walk, and driving becomes safer for both the pedestrian and the motorist when the respective travel routes are separated in use.

All of these factors contribute to a growing focus on public transit, walking, and bicycling as an important, but largely neglected element in our rural or ex-urban transportation system. Of these three modes, bicycle and pedestrian needs have received the least attention in most Vermont planning discussions. They are usually lumped together as bicycle/pedestrian, in spite of the differences between the two modes and the facilities they require. State statute treats bicycles more as vehicles than as pedestrians (19 V.S.A. § 2301). Bicycles are allowed to ride in the travel lane of Vermont highways and they are prohibited from sidewalks. The statute provides the following definitions for bicycle and pedestrian transportation routes:

- "Bicycle route" means any lane, way, or path, designated by appropriate signs, that explicitly provides for bicycle travel.

- "Bicycle lane" means a portion of a roadway which has been designated for the preferential or exclusive use of bicycles. It is distinguished from the portion of the roadway for motor vehicle traffic by a paint stripe or similar device. Paved road shoulders are considered bicycle lanes.

- "Bicycle path" means a separate trail or path which is for the preferential or exclusive use of bicycles, when authorized by state law or municipal ordinances. Where a trail or path forms a part of a highway, it is separated from the roadway for motor vehicle traffic by an open space or barrier.

- "Sidewalk" means the portion of a street or highway right-of-way designated for primary or exclusive pedestrian use.
Bicycle and Pedestrian Networks

CURRENT CONDITIONS IN THE REGION

While nationally there is growing interest in having walkable and bikable communities, one of the advantages our region has over much of the rest of the U.S. is the survival of a large portion of the traditional land use development pattern. Much of our built environment dates back to an age when the majority of people mostly walked to their daily destinations. One can still see this in the downtowns and even in the villages. There are cut-throughs specific to pedestrian uses, such as the stairs into the central square in Bellows Falls (Figure 6-2, left). Entrances for many of the municipal buildings have long flights of stairs leading up from the sidewalk, such as is the case in the Grafton building pictured at the right (Figure 6-2, right). Many surviving villages tend to be close enough to each other so that people who lived on the farms were close enough to “town” that they could make a round trip on foot in the course of a day. The historic land development pattern was pedestrian oriented. Much of this is more or less intact, and gives the Region a solid basis for making our communities more favorable towards walking and biking. It is also a Regional planning goal to continue and expand this "traditional" pattern of development.

FIGURE 6-2: BELLOWS FALLS CUT-THROUGH & GRAFTON TOWN CENTER BUILDING

While the general layout of the villages and downtowns make them amenable to developing walkable communities, the general terrain of the region does make it difficult for developing bike route corridors. Winding routes, steep grades, and limited width for paved shoulders makes developing regional connections for bike routes challenging. The Windham Region currently has two dedicated bike lanes, both located in Brattleboro. The location and length of these bike lanes can be found on the Bike Suitability Map.

ENCOURAGING HEALTHY COMMUNITY DEVELOPMENT

Funded by the National Centers for disease control and Prevention, and the Robert Wood Johnson foundation, the YMCA of the USA, along with Stanford, Harvard, and St. Louis Universities has established a Community Healthy Living Index. The WRC has provided support and technical assistance with this effort to a regional coalition that includes the Meeting Waters YMCA. The coalition’s goal is improved public health through focused attention to community and land-use planning.

In 2000, the Windham Regional Bike/Pedestrian Plan was completed, with specific recommendations for the Region. The recommendations put forth in that document are summarized below, followed by a table summarizing specific bike/pedestrian improvement projects that have been completed, are under
construction, or are in the planning phases.

BIKE NETWORK RECOMMENDATIONS:

- Implement bicycle storage requirements
- Implement a regional bike to work day
- Develop a bicycle suitability map
- Consider implementing/expanding a "Cops on Bikes" program
- Implement spot maintenance reporting system
- Designate bike routes and install "Share the Road" signage
- Designate bike lanes

PEDESTRIAN NETWORK RECOMMENDATIONS

- Encourage off-site and shared parking
- Create attractive and convenient pedestrian environments
- Address ADA issues
- Municipal policies and regulations for sidewalks
- Develop pedestrian brochures or maps for regional centers and villages

COMBINED NETWORK RECOMMENDATIONS

- Consider pedestrians and bicyclists in site plan review
- Provide clear connections between bicycling and walking and other transportation modes such as public transit
- Encourage employers to accommodate the needs of bicyclists and pedestrians
- Ensure that bicycle and pedestrian safety issues are included in the VT Driver License Manual
- Develop a brochure with tips on improving bicycle and pedestrian safety
- Implement a bicycling and pedestrian safety program in the Region’s schools
- Provide safety workshops for adults
- Coordinate with other advocacy groups in the State working toward similar goals

- Educate local officials about best practices for roadway maintenance design affecting bicyclists and pedestrians

- Police departments should continue to enforce laws affecting motorists, bicyclists and pedestrians

- Narrow travel lanes & widen shoulders

The Windham Regional Bike/Pedestrian Plan was commissioned by the Bicycle/Pedestrian Planning Committee, which was dissolved in 2005. Since then, the Transportation Committee has been fielding all projects in this sector, and includes a representative from the Bike/Pedestrian Safety Group. Figure 6-3 lists some of the current and planned bicycle and pedestrian projects in the Region.

The discussion of bicycle and pedestrian transportation needs has been brought to the forefront by the recent passing of the “Complete Streets” legislation. This statute will be discussed more in depth later in this chapter, but in summary, it requires all highway project designers to consider incorporating the needs of all facility users, including those of cyclists and pedestrians. However, an evaluation of the existing facilities must be conducted before the needs of cyclists and pedestrians can be understood and

**FIGURE 6-3: WINDHAM REGION BIKE/PEDESTRIAN COMPLETED AND PLANNED PROJECTS**

<table>
<thead>
<tr>
<th>Bicycle/Trail Network</th>
<th></th>
</tr>
</thead>
</table>
| Completed | Putney Road bike lane installation from Top of the Hill Grill to Rt 9 Rotary  
Bicycle suitability maps completed for eastern portion of region (see M6-1 to M6-3) |
| Planned | Suitability map for western portion of region  
West River Trail improvements planned for trail sections from Marina to Fox Farm Road |

<table>
<thead>
<tr>
<th>Pedestrian Network</th>
<th></th>
</tr>
</thead>
</table>
| Under Construction/Completed | Newfane sidewalk reconstruction on West and Court streets, Completed 2003  
Putney sidewalk reconstruction along a significant portion of Main Street, Completed 2012  
Improvements to the signalized intersection crosswalks on Main Street in Brattleboro, Completed 2011  
Non-infrastructure grant awarded to Brattleboro for Green Street through Safe Routes to School Program, 2008  
Non-infrastructure grant awarded to Bellows Falls routes to elementary and high schools through Safe Routes to School Program, 2008 |
| Planned | Sidewalk reconstruction along Main Street in Jamaica  
Pedestrian improvements to School Street through the Safe Routes to School Program in Saxtons River  
Upgrades to sidewalks along Main Street in Brattleboro  
Improvements on the route from the center of the village downtown out to the school in Readsboro through Safe Routes to School Program |
Economic Impact of Bicycling and Walking in Vermont

In 2009, VTrans commissioned a report to estimate the total economic benefits of walking and biking in the state of Vermont. Previous studies had focused on the economic contribution of shared use paths to the tourism industry. While revenue from tourism and visitor spending is an important component of the overall economic impact of walking and biking, this study provided a more comprehensive approach. The study was meant to be a one year “snapshot” of the total economic and environmental benefit - including direct, secondary and spin-off benefits – of bicycle and pedestrian facilities and activities, including tourism, environmental, improved air quality and reduced greenhouse gas emissions, real estate values, health, reduction in demand on the transportation systems, and other economic benefits.

The report found, among other results, that:

- Combining the totals from bicycle-pedestrian infrastructure and program expenditures, bicycle-pedestrian event tourism, and bicycle-pedestrian-oriented businesses resulted in a total 2009 economic contribution of $82.7 million in output, and over 1,400 jobs with $40.9 million in labor earnings (wages and salaries plus proprietor income).

- The effect of walkability on the value of home sales was also significant. The report found an increase in home values statewide of approximately $350 million because those homes were in more walkable areas.

Each million dollars of bicycle-pedestrian related output generated about 26 direct and indirect jobs in the overall economy. As this research is developed more fully, economic impact is yet another factor that could be considered in evaluation of bike and pedestrian facilities.
EVALUATING THE CURRENT NETWORK

CURRENT METHODS AND TOOLS

The Region’s developing bicycle and pedestrian network, while not new, has only recently received notice in the terms of study and analysis. A key component identified in the Windham Regional Bike/Pedestrian Plan for establishing successful bike and pedestrian networks is to provide “attractive, convenient and safe connections between the places that people need and want to go” (Windham Regional Bike/Pedestrian Plan). Identifying bicycle and pedestrian trip generators is a necessary element of identifying value and potential use by cyclists and pedestrians along any given road segment. One of the most common reasons for not using these modes of transportation is the lack of safe and comfortable accommodations provided along the route. Deciding which corridors to invest in depends upon analysis of potential use and the identification of corridors that make appropriate connections between trip generators for the greatest number of users. This in turn should be an important measure for evaluating relative priority for resource allocation when documenting analysis for “Complete Streets.” The 2000 Bike/Pedestrian Plan started this process with a map of existing conditions and trip generators in the bike and pedestrian transportation network of the Region. That map provided the basis for the Bicycling Suitability Maps subsequently produced by the WRC for the Region. The map inserts found at the beginning of this document show the completed Bicycling Suitability Maps for the Connecticut River Valley side of the Region. A Bicycling Suitability Map for the western half of the Region is forthcoming.

In addition to developing these maps, the WRC has also been measuring actual pedestrian and bicycle use levels at selected sites in the region on a yearly basis since 2006. Just as level of service and use is rated on highways by conducting traffic counts, it seems logical to measure bike and pedestrian importance by evaluating existing volume of bicyclists or pedestrians using these routes. But reliably counting bicyclists and pedestrians with automatic counters is technically challenging. Observed counts are more accurate and more informative, but labor intensive and very costly. There is also the “bad facility” factor to consider in that, just as drivers avoid bad roads, pedestrians may avoid high traffic roads with no sidewalks or paved shoulders, and cyclists will avoid roads without bike lanes or adequately sized shoulders. Counting the number of bicyclists and pedestrians may be more of an indirect measure of the condition of the facility, than it is a measure of potential demand.
DEVELOPING EVALUATION METHODS

In 2010 and 2011 the WRC supported a community coalition of public health and other community groups and town officials in their effort to develop a standard tool for evaluating bicycle and pedestrian suitability of existing and planned transportation facilities. As discussed earlier in this plan, VTrans has developed a method to identify and prioritize transportation improvements on Vermont's highways, known as "Highways Sufficiency Ratings," however the rating system does not include the road sufficiency for bicycles or pedestrians. With the passage of the “Complete Streets” legislation, new evaluation methods will be needed to help guide when bicycle and pedestrian improvements should be included in highway projects.

Determining service levels and suitability of both pedestrian and bicycle facilities depends on identifying appropriate performance measures and adopting a rating system that is sufficiently objective that it will produce consistent and reliable results. This suggests an opportunity for the WRC to devise and apply a suitability standard for evaluating pedestrian facilities, perhaps building on the process employed in developing the Windham Region Bicycle Suitability Maps. These maps attempt to provide objective criteria for determining relative suitability of various routes for cyclists, much as a car road map distinguishes between various levels of service from "controlled access" highway to “recreational unpaved highway.” The development of a system of performance measurements for pedestrian facilities would enable the evaluation and comparison of pedestrian service and vehicular service in the existing system and inform proposals for modifications. These guidelines could draw from the Bicycle Compatibility Index (BCI) discussed in the research report by FHWA, Development of the Bicycle Compatibility Index: A Level of Service Concept, Final Report (FHWA-RD-98-72).

FUTURE IMPROVEMENTS AND PRIORITIES

STATE AND FEDERAL PROGRAMS

COMPLETE STREETS

The “Complete Streets” statute that went into effect July 1, 2011, expressly states that:

“(a) (1) that state transportation policy shall be to encompass, coordinate, and integrate all modes of transportation and to consider "complete streets" principles, which are principles of safety and accommodation of all transportation system users, regardless of age, ability, or modal preference; and ... (c)(2)(A) Consider the safety and accommodation of all transportation system users—including motorists, bicyclists, public transportation users, and pedestrians of all ages and abilities— in all state- and municipally managed transportation projects and project phases, including planning,
As a result of this legislation, bicycle and pedestrian facilities will be receiving more attention in future projects. While the statute does allow for three categorical exceptions for required inclusion of complete streets principals, it will still have a strong impact on the direction and consideration of projects in the future. The statute also requires “appropriate consideration” be given to local, regional and State agency plans. As such, it is in the best interest of the Region to develop specific goals and direction for where bicycle and pedestrian network infrastructure would be most appropriate and most necessary. The Bicycle Suitability Map is an excellent first step in this direction, followed by the Region’s work towards developing a sufficiency tool for prioritizing bike and pedestrian infrastructure improvement projects. Ultimately, a project priority matrix and proposed future project map should be developed for bicycle and pedestrian corridors, individually and at appropriate scales. This map would mirror the future project map that is currently developed for highway projects in Chapter 1 of this plan.

SAFE ROUTES TO SCHOOL PROGRAM

Prior to the passing of the “Complete Streets” legislation in Vermont, a recent Federal Program also began helping communities that wanted to improve their bicycle and pedestrian infrastructure. The Safe Routes to Schools Program (SRTS) was a Federal-Aid program of the U.S. Department of Transportation’s Federal Highway Administration (FHWA). The Program was created by the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users Act (SAFETEA-LU). The SRTS Program was funded over five Federal fiscal years (FY 2005-2009), with extensions approved through FY 2011, and five towns throughout the Region received funding through this program. The purpose of the SRTS Program was to “empower[s] communities to make walking and bicycling to school a safe and routine activity once again. The Program makes funding available for a wide variety of programs and projects, from building safer street crossings to establishing programs that encourage children and their parents to walk and bicycle safely to school.” As noted in the table on page five, both Saxtons River and the Town of Readsboro received funding to complete sidewalk improvements, and Brattleboro, and Bellows Falls received non-infrastructure grants for projects such as public awareness campaigns and outreach to press and community leaders, traffic education and enforcement in the vicinity of schools, student sessions on bicycle and pedestrian safety, health, and environment, and funding for training, volunteers, and managers of safe routes to school programs.

FUTURE IMPROVEMENT CONSIDERATIONS

DEVELOPING INTER-MODAL LINKS

Bicycle and pedestrian interfaces are particularly adapted to connections with public transit. Many of the public transit destinations are the exact trip generators that were spoken of earlier in this chapter. Being able to easily access a public transit stop on foot or by bike is desirable for many riders because it
eliminates the cost and hassle of parking a personal vehicle. The Region’s transit providers have recognized the benefit of accommodating cyclists as a part of their ridership, and have installed bicycle racks on many of their buses. While this is an excellent first step in promoting these transportation links, cyclists can only access these connections if adequate facilities exist to direct them to these areas. Park and ride lots, bus stops, and train depots are all important hubs that would benefit from improved access by cyclists and pedestrians. As the region moves forward with its analysis of bicycle and pedestrian network corridors, part of the prioritization process should take into account these intermodal link opportunities.

**PARKING AND AMENITIES**

Bicycle parking facilities in the Region are severely limited, as exemplified by the picture on the right, taken in downtown Brattleboro. Lack of facilities forces cyclists to devise their own parking spaces; potentially causing damage to public facilities and occasionally blocking public access routes. There is a developing realization that the once ubiquitous bike racks in school yards, at libraries, and in other public locations have all but disappeared. A number of communities, some with assistance from the WRC, have started to experiment with more bicycle friendly parking facilities. Some examples of facilities around Brattleboro are seen in Figure 6-5. This effort needs to continue, and should be undertaken with input from local cycling enthusiasts and advocacy groups to ensure that facilities are installed where they will provide the greatest benefit and receive the highest use. Simply providing the facilities is not enough, as they provide little use when tucked away in unknown corners of the villages and downtowns.

Bicycle security is another issue to consider in parking for cyclists, especially for the all day periods characteristic of commuters. There should be more consideration of lockers for bikes in business parking locations, at park and ride facilities, and in publicly accessible areas in downtowns. Analysis of existing parking facilities should be included in bike sufficiency evaluations to determine where critical use areas are lacking adequate bike parking capacity. Three bike lockers are located in the transportation center in Brattleboro, but this is far from adequate for a downtown area looking to promote cycling as an option for commuters.
In addition to bike parking facilities, there are other amenities to consider and incorporate when carrying out bicycle and pedestrian improvement projects. Amenities that cater to the safety and security of pedestrians and cyclists help to attract users to newly improved routes and corridors. Availability of these types of amenities is another aspect to consider when evaluating existing routes. The following list gives suggestions for some of the amenities to consider for inclusion in future projects:

- Painted, or otherwise marked, crosswalks
- Curb extensions, also known as “bulb outs”
- Landscape elements, such as street trees
- Pedestrian/bicycle signals
- Refuge islands
- Street furnishings, such as shelters, benches, informational signage and waste receptacles
- Street lighting

While all of these improvements are not necessary to provide an attractive environment for pedestrians and cyclists, providing the improvements at critical junctures can have a profound effect on use levels.
MULTI-USE NETWORKS

Off road routes provide a number of opportunities to pedestrians and cyclists. They can serve as a recreational opportunity, as a detour from traditional road routes, and even as a tourist attraction. These recreational pathways are an important component of a complete system of bicycle and pedestrian facilities. If located in the vicinity of a school, they can provide students with a safe pedestrian route for getting to school. They can also provide beginning riders with a safe place to learn riding skills and promote cycling in a more pleasant atmosphere than what is generally found along highway corridors. Depending on the surface, off road pathways may be primarily used by pedestrians or bikes, and occasionally by other non-motorized means such as roller blades, skateboards, or skis.

Several examples of these off road facilities exist throughout the area. The Whetstone Pathway and Westgate Pathway are pedestrian examples within the Region. The path between Northfield and Amherst, Massachusetts, Ashuelot Rail Trail (New Hampshire), and Chester Rail Trail (New Hampshire) are also combined pedestrian and bike use examples in close proximity to the Region. Use of these routes as a transportation link is sometimes limited by reduced access to destination points along the route’s path. However, the distinction between a recreational pathway and transportation link is often not clear. For example, the West River Trail is an option that might connect certain points along Route 30 and be more desirable for some people than riding in the breakdown lane of Route 30. This could be true whether a person is riding for recreation or to get someplace specific.

This plan identifies three types of off-road bicycle pedestrian pathways:
Non-motorized transportation links: For purposes of this plan, these are bike or pedestrian paths that primarily provide an optional or preferable route connecting destinations. The Whetstone Pathway in Brattleboro is a short pedestrian example. Another might be the Connecticut River Trail with Rail link studied as an alternative to bicycling in the traffic on Putney Road.

Multi-use bike/pedestrian paths: These do link destination points, but tend to have higher “recreational” use. They also provide safe places for novice cyclists to develop skills, and as such are a key piece of our transportation system. The West River Trail is an example.

Off-road bike trails and hiking trails: These are usually seen as simply recreational trails. They are accessed at “trail heads” and traverse scenic terrain, greenways, or linear parks. We have the Appalachian Trail, the Pinnacle trail, and numerous former town highway rights of way that have been designated as Town Trails. These are not considered major transportation elements.

While it is important to encourage development of these types of routes for bicycle and pedestrian transportation, funds are limited for new projects, and off road facilities are not as high a priority for development as projects directly linked with highway corridors. Towns wishing to develop corridors such as these can seek grant funds available through other Federal and State programs to help get their project of the ground. The Bellows Fall Historical Society is following this route to help fund a bike trail connecting a future river-walk park in Bellows Falls with the Town of Westminster. The Windham Regional Commission should provide support for projects such as these, and provide the Regional perspective to help link known projects happening in close proximity to each other.

RESOURCES

Figure 6-1: Flickr: Wilmington VT: Autumn Village, http://www.flickr.com/photos/professorbop/1528390842/sizes/o/in/photostream/

Figure 6-2: Photos taken by C. Meves

Figure 6-3: Windham Regional Commission Bike/Ped Project Information supplied by M. Mann

Figure 6-4: Photo taken by C. Meves

Figure 6-5:Photos taken by C. Meves

Figure 6-6: Photos taken by C. Meves

Figure 6-7: Photos taken by C. Meves