KFH GROUP, INC.

2012 Vermont Public Transit Policy Plan

Technical Memorandum 4
Transit Needs Assessment

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Prepared for the:

State of Vermont
Agency of Transportation

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Technical Memorandum #4: Transit Needs Assessment

INTRODUCTION

An important component of the update to the Vermont Public Transit Policy Plan (PTPP) is an analysis of transit needs, particularly at the regional and state levels, to guide a policy approach to meet any unmet needs. This technical memorandum presents the results of Task 4, which examined how well the State's existing transit network meets residents' needs and identified service gaps. This "gap analysis" identified issues ranging from geographic gaps and needs for increased service levels to the connectivity of transit and the desire for more information about services.

This technical memorandum is the fourth in a series of eight that will be prepared as the PTPP is developed. It provides an update of the preliminary needs analysis included in the second technical memorandum, and delves into additional data and public input to determine the latest transit needs that should be addressed through State policy. This memorandum includes a number of elements:

- Review of Needs Identified in Previous Studies
- Public Input on Transit Needs
- Demographic Analysis of the Need for Transit
- Travel Patterns and Connectivity

The results of this needs assessment will be used in completing the remaining tasks of this PTPP update, including developing the public transit vision for Vermont and recommending policies, goals, and objectives to improve the State's transit services and ensure that transit needs are met.

REVIEW OF NEEDS IDENTIFIED IN PREVIOUS STUDIES

This portion of the needs assessment examined previous studies related to transit needs, which helped establish a context for this update of the PTPP. The needs identified in previous studies regarding human service transportation coordination, in which public transit operators are active participants, and the transportation needs of elders, persons with disabilities, and youth are described below. Vermont's public transit providers also have Short-Range Public Transportation Plans, which identify local route-level needs, but these were not included in this analysis, which focuses more on statewide trends.

Vermont Human Service Transportation Coordination Plan

The 2008 *Vermont Human Service Transportation Coordination Plan* was an effort undertaken by the Vermont Agency of Transportation (VTrans) to meet new federal planning requirements and guide future coordination activities in the State.[1] The report details current state-level coordination policies and practice in Vermont and the previous Public Transportation Policy Plan, discusses the target population and their access to transportation services, points out regional transportation issues, and provides State coordination strategies.

The Plan described common issues raised by transit providers, human service agencies, and other stakeholders. These issues included regional connection issues, service/trip coordination issues, service availability issues, and financial considerations. The two regional connection issues identified included 1) the weakness of regional connections due to the fact that many providers do not cross jurisdictional boundaries; and 2) the difficulty of transporting clients cost-effectively due to the long distances traveled to the clients and/or to the destinations.

There were a number of common service/trip coordination issues. A primary issue was the need to improve efforts to combine trips or riders. More interaction is needed between transit providers, local human service agencies, and Vermont Agency of Human Services (AHS) regional staff regarding client transportation.[2] Some other issues were related to services and housing locations and how these affect the trips. Service availability was also an area for improvement, specifically the need for expanded service hours, particularly for work trips. Medical transportation for non-Medicaid–eligible individuals is also very limited, and that lack of transportation prevents some seniors from attending adult day health programs.

[1] VTrans Website, **http://www.aot.state.vt.us/ops/PublicTransit/documents/HSCP.htm**.
[2] It is worth noting that for many years regional planning commissions have met monthly with local and regional human service agencies and transit providers to coordinate service and review financial and ridership data.

The Plan offered several state-level strategies to improve coordination. One of the strategies was to encourage trip coordination and vehicle sharing coordination between organizations providing transportation coverage to the same areas. The plan also recommended developing a consolidated information dissemination approach to promote transportation services. Other strategies included holding regular meetings with transportation providers and improving inter-regional coordination.

Vermont Elders and Persons with Disabilities Transportation Program Review

The 2005 report, *Vermont Elders and Persons with Disabilities Transportation Program Review,* commissioned by the Vermont Department of Aging and Independent Living, assesses the Vermont Elders and Persons with Disabilities (E&D) Transportation Program, discusses the program's successes and challenges, and provides recommendations and strategies for future improvement of the program.[3] As more elders and persons with disabilities 'age in place,' a practice supported by the State, they require safe, reliable, and affordable transportation to basic services and amenities. The E&D Transportation Program provides a variety of transportation services, such as trips for medical appointments, senior meals, adult day care, employment, and shopping.

The program has been successful thus far, serving a diverse population that includes persons in Vermont who are over the age of 60 and/or have a disability. Still, the program faces a number of challenges, including the sense of vulnerability to costs, inconsistent service delivery over time, inconsistencies in travel prioritization and rationing, and a lack of outreach or marketing efforts. Another challenge that has been identified through stakeholder input in this PTPP process is providers having to set a budget based on the unpredictability of when their clients will become Medicaid-eligible or –ineligible.

The report found that program funding is not adequate to meet the needs and expectations of program participants. The study recommended that future funding levels should be, at a minimum, tied to inflation costs and changes in the underlying population of qualifying program participants. Another important finding was that land use and urban form have a strong impact on the success of elders who are able to age in place. The study interviewed seniors who are able to use fixed-route bus service and reported that the bus gave them independence and flexibility, among the most important attributes for successful aging in place. The report recommended that

[3]Submitted by Wilbur Smith Associates and JSI Consulting to the State of Vermont Department of Aging and Independent Living. 2005, **http://ddas.vermont.gov/ddas-publications/publications-transportation/publications-transportation-documents/transportation-prog-review-2005**.

opportunities to coordinate land use and transportation planning with human service program design should be pursued and explored.

The Listening Project: Giving Voice to Adolescent Youth Living in Difficult Circumstances

The Listening Project: Giving Voice to Adolescent Youth Living in Difficult Circumstances is a 2007 report developed by Youth Services Incorporated, a nonprofit organization that assists local youth and their families and is also a member of the Vermont Coalition of Runaway and Homeless Youth Programs.[4] The report was developed to provide information that the agency and the community need to better serve youth in Windham County. While this report focused on Windham County, the findings are likely applicable to the youth population throughout Vermont.

The report generates ideas to be used as guides for planning in Windham County, one of which is the importance of providing places for youth to gather. Youth interviewed for the report stated that they want safe and fun places to spend time and to hold activities. An important part of providing these spaces is providing auxiliary services such as transportation, which would enable youth to visit and spend time at such places. Many teens are among the Windham County residents that do not have their own transportation, and consequently have a hard time getting to activities. The report found that outside of the immediate Brattleboro area, teens do not have transit options to go to and return home from activities after school hours. Expanding the hours of transit service, destinations served, and coordination between transportation providers could help teens access educational opportunities, jobs, cultural events, and other daily activities.

PUBLIC INPUT ON TRANSIT NEEDS

VTrans highly values public input as part of its planning process, and accordingly held the first round of meetings in February 2011 to obtain public input for this update of the PTPP. Three meetings were held, one through the VIT Worldwide (formerly Vermont Interactive Television) public videoconferencing network and two others in Montpelier and Rockingham. Residents were invited to share their input to help shape the vision for transit in Vermont. Several representatives from the transit systems and regional transportation planners also attended these meetings. The discussion topics included strengths and weaknesses of the existing transit network, the characteristics desired for transit in Vermont, and issues that need to be addressed. The detailed notes of input received through the public meetings are included in the

[4] Youth Services, Inc. website, **http://youthservicesinc.org/images/stories/pdfs/listeningproject.pdf**.

attachment to this report, and specific transit needs that were identified are described below. VTrans also has an ongoing online process to collect public input for the PTPP, where residents may download and email a comment card to provide their feedback and perspectives on the transit topics mentioned above. The relevant input regarding transit needs provided through these comment cards are also included in the summary below.

Some of the common needs identified through public input related to service levels and serving specific trip purposes and needy populations. Where transit services exist, residents voiced a need for evening and late night service, particularly to serve employees that work late shifts outside of regular commute hours. There is also a need for expanded service hours and frequencies on existing routes. Residents requested additional types of transit service in some areas. Northeast Vermont, for example, lacks fixed-route service, particularly to serve commuting needs. Residents also identified a need for the Americans with Disabilities Act (ADA) paratransit-like services outside of areas with fixed-route transit, where they are not required to provide complementary ADA paratransit service. Improving transit to serve trip purposes other than commuting was identified as a need. Weekend regional service for non-commute purposes and weekend service to local ski areas during the winter were also requested. Youth and elders were specific population groups that were identified as having transit needs; youth need to access activities outside of school, and elders need to access healthcare, grocery stores, and pharmacies.

Many residents identified the need for inter-regional connectivity. While transit systems may serve their local areas relatively well, it is difficult to travel between regions and provider service areas. The number of regional transit routes, mainly commuter service, has increased in the last few years but additional improvements could be made to increase access to employment, provide weekend service, and allow riders to make longer distance day trips. A LINK express service between Burlington and Jericho and bus service connecting Burlington and Rutland were specifically requested. The Northeast Kingdom is also isolated and lacks regional connections to other parts of the State, as well as an intra-regional connection between the existing local deviated services in Newport and St. Johnsbury. On a related note, residents also discussed the need for regional transit connections outside the State, such as trips to take workers and shoppers across the New York and New Hampshire borders. More intercity bus service to destinations outside of Vermont, including New Hampshire and New York City, was also discussed as a transit need.

Intermodal connectivity was a popular issue that identified the need to make transit more convenient and accessible by promoting other alternative modes, including walking, bicycling, ridesharing, and car-sharing. These modes could help fill gaps in the existing transit network or facilitate access to fixed-route and deviated transit.

Providing options for riders to travel the "first mile" to or "last mile" from a transit stop was another identified need. Intercity bus service in Vermont is not very accessible since there are limited stops in Vermont; then local transit services must be extensive to provide the connection between homes and intercity bus stops. Physical facilities, such as intermodal terminals, increased signage, and information on transit schedules were identified as needs to promote connections between modes. Riders also requested additional park and ride lots to facilitate increased transit use. Transit connections to airports, specifically from Montpelier to Burlington International Airport, was another need identified through public input.

The public input process also identified several needs related to the transit user experience. Transit riders requested additional amenities, such as bus shelters and posted schedules, and safety features, including more lighting at bus stops. Residents also wanted more information about transit services, whether using smart technology to add predictability to transit service or unifying provider information through a statewide trip planner. The public also requested an orientation for new riders to learn how to use transit and become more comfortable leaving their cars at home. Residents also discussed the need to attract new riders by promoting the benefits of transit, such as savings on gas costs and lowering individual carbon footprints, and changing the negative image of transit as the "welfare bus."

DEMOGRAPHIC ANALYSIS OF THE NEED FOR TRANSIT

Demographic and economic characteristics of the population are key factors that highlight the potential need for public transit services. This analysis identified the location of population segments that tend to be more dependent on public transit services, and compared these areas to existing transit services to determine geographic gaps where service might be expanded or new services implemented.[5] This geography-focused assessment complements other input on needs regarding service levels, quality, and connectivity, also discussed in this memorandum.

The demographic analysis included several components: a look at the new 2010 Census data and trends in the past decade; a Transit Dependence Index (TDI) to determine areas of high relative need based on transit-dependent populations; and gap analyses to determine whether the existing transit network serves specific populations, such as young adults and Medicaid recipients. (The working population and

[5] Note that the maps only portray fixed and deviated transit routes, and Vermont's transit providers also provide other types of transit services. Depending on the provider, these other services may have eligibility stipulations, or may be available to the general public. Additional transit needs related to these other types of services are described elsewhere in this memorandum, identified through previous studies and public input.

commuting needs are examined later in this memorandum in the Travel Patterns and Connectivity section.) The methodology for the demographic analysis is described below.

Methodology

A main effort in updating the preliminary needs analysis included in the second technical memorandum involved examining newer data sources that have become available. The first such data was from the 2010 Census, released in February 2011. However, the 2010 Census data is intended for redistricting purposes in each state and only includes information on population counts, race, Hispanic ethnicity, and housing units and occupancy.[6] To date, the only 2010 Census data that is useful for this needs analysis was the total population, which was used to determine population densities across the State. Population densities help identify the type of transit service that may be most appropriate for a community.

Another new source of data examined in this update was the 2005 – 2009 American Community Survey (ACS), released by the U.S. Census Bureau in December 2010. The ACS is different than the Census data and represents "pooled estimates" over the entire given time period, based on sample surveys. Census data, on the other hand, represents total counts at a specific time.[7] The ACS data is accompanied by margin of error measures related to the methodology of sampling, which affects the precision of the data. However, the 2005 – 2009 ACS was useful for this needs analysis because more detailed demographic data, such as transit dependent subpopulations, are available at the block group level.

The demographic analysis examined data at the block group level to more accurately identify and depict areas of potential transit need in Vermont, compared to the county or town levels. The five-year estimate for the ACS is based on the largest sample size and is therefore the most reliable compared to other ACS data collected over shorter time frames. The needs analysis primarily used the 2005 – 2009 ACS data for the TDI, which scored Vermont's block groups relative to each other based on potentially transit-dependent populations, rather than as counts to represent transit needs.

Additional data examined in this needs analysis included employment by town, reported by the Vermont Department of Labor, and transportation-eligible Medicaid recipients, provided by the AHS. (Data on Vermont employer locations from Dun &

[6] Vermont State Data Center, Center for Rural Studies, University of Vermont. "Readme" notes in 2010 Census summary for Vermont. February 2011, **http://crs.uvm.edu/census/**.
[7] Sawyer, Will. "10 Important Points for Tuesday's Census Bureau Data Release." December 2010, **http://crs.uvm.edu/census/acs/acs_10_points_2010.pdf**.

Bradstreet and park and ride lots from VTrans were also obtained and are discussed later in this memorandum.)

Mapping

The Geographic Information System (GIS) ArcMap 10 program was used to portray much of the demographic and employment data examined in this analysis. The existing transit services operated by the State's ten providers were also overlaid on the demographic maps in these three categories:

- **Local –** Fixed-route or deviated fixed-route service that generally operates all day and mainly serves one city or town, or connects adjacent cities or towns.

- **Commuter –** Typically longer routes that operate during peak periods, primarily in one direction, and include express segments.

- **Seasonal –** Routes that serve a specific tourism area or destination, such as ski resorts, and typically operate a few months out of the year.

In addition, scheduled intercity bus services provided by Greyhound Lines and Yankee Trails were also included in the demographic maps. Viewing the existing services with the demographic and employment data helped identify areas with unmet needs and opportunities for future transit investments.

Transit Dependence Index

The TDI was part of the demographic analysis that examined potential transit needs through a scoring process. This index included data on five population segments that tend to be more dependent on transit services:

- **Elders –** Persons age 65 and above. This group may include those who either choose not to drive any longer, have previously relied on a spouse for mobility, or because of factors associated with age can no longer drive;

- **Youth –** Persons ages 10 to 19. This group includes young people in their pre-teen or teenage years, who have begun to make their own choices and spend time independent of their families and home life, but they are either too young to drive by themselves or simply do not have access to a vehicle;

- **Persons with disabilities –** Persons age 16 and over who have a disability lasting six months or more that makes leaving home alone for simple trips such as shopping and medical visits difficult for them;

- **Low-income residents** – Persons living below the poverty level who may not have the economic means to either purchase or maintain a personal vehicle; and

- **Autoless households** – Number of households without an automobile. One, if not the most, significant factor in determining transit needs is the lack of an available automobile for members of a household to use.

Data for these potentially transit-dependent population segments were collected from 2005 – 2009 ACS data, with the exception of the data for persons with disabilities, for which 2000 Census numbers were adjusted to reflect population changes up to the 2005 – 2009 period.[8] The TDI calculated a composite score of potential transit need, based on the above population segments, for each Census block group in Vermont. Though it varied depending on the approach to the TDI, described in Table 4-1, this composite score essentially represented the sum of the scores a block group received within each transit dependent category. The scores per transit dependent category ranged from 1 to 5, and were assigned accordingly:[9]

Table 4-1: Scoring per Transit Dependent Category

Score Assigned to Block Group	Where the Value of the Block Group is:
1	<= State Average
2	> State Average and <= 1.33 x State Average
3	> 1.33 x State Average and <= 1.66 x State Average
4	> 1.66 x State Average and <= 2.0 x State Average
5	> 2.0 x State Average

[8] In 2008, the ACS changed its survey questions regarding disability. The changes were drastic enough that data collected through the 2008 ACS and subsequent ACS efforts cannot be compared to earlier ACS results or the 2000 Census data on disabilities. (Source: Brault, Matthew. "Review of Changes to the Measurement of Disability in the 2008 American Community Survey." September 2009, http://www.census.gov/hhes/www/disability/2008ACS_disability.pdf.) The 2005 – 2009 ACS data does not include data for persons with disabilities, since the questions regarding disability changed during the five-year period. Consequently, 2000 Census data on persons with disabilities is still used in this needs analysis and adjusted by the total population growth rate between the 2000 Census and the 2005 – 2009 ACS. Adjusting the 2000 data by this growth rate is meant to provide an approximation of changes in the number of persons with disabilities since 2000. It is recognized that this growth rate is not entirely accurate, since the 2000 Census represents actual counts while the 2005 – 2009 ACS represents "pooled estimates" over five years based on a sample survey.

[9] This scoring methodology (and the overall Transit Independence Index) is modeled off an Environmental Justice Index, which shows relative concentrations of minority or low-income populations. (Source: Forkenbrock, David and Sheeley, Jason. *National Cooperative Highway Research Program Report 532: Effective Methods for Environmental Justice Assessment*. 2004.)

Therefore, block groups with higher numbers or percentages of persons within a transit dependent category received higher scores. Then the composite score, which summed the scores for all the transit dependent categories for the block groups, helped determine areas with more potential transit needs within the State.

The numbers or percentages of persons within the transit dependent categories were used to score the block groups depending on the approach for calculating the TDI. The first approach used the *numbers* of transit-dependent persons and factored in the population density per block group. In this approach, the block groups were also scored based on population density. Then the composite score, called the TDI – Density score (TDI–Density), per block group was calculated by multiplying its score for population density by the sum of its scores for the transit-dependent population segments.[10] The TDI-Density score helped identify areas that have higher concentrations of potentially transit dependent persons, and accordingly more potential needs that may be suitable for new or improved fixed and deviated transit services.

The second approach used the *percentages* of transit-dependent persons to score the block groups per transit dependent category. Then the composite score, called the TDI – Percentage score (TDI–Percentage), per block group was calculated by adding a block group's scores for each transit-dependent population segment. The TDI-Percentage score helped identify areas of transit need where a high proportion of the total population is potentially transit-dependent, though the area may lack population density. This approach is important since Vermont is such a rural state. The TDI-Percentage scores helped determine areas with relatively high transit needs outside of Vermont's urban centers, which may have opportunities for new or improved demand-response or scheduled transit services.

For both TDI approaches, the results were portrayed on GIS maps by thresholds determined by the average score for the State as shown in Table 4-2:

Table 4-2: Relative Levels of Transit Need Based on Composite Scores

Relative Level of Transit Need per Block Group	Where the Composite Score of the Block Group for the TDI approach was:
Very High	More than 200% of State Average
High	151% - 200% of State Average
Moderate	101% - 150% of State Average
Low	51% - 100% of State Average
Very Low	50% or Less of State Average

[10] The scores for population density were assigned in a similar manner, based on the State average, as described earlier; however, the scores ranged from 0 to 4 for population density, instead of 1 to 5. The TDI-Density composite score lays heavy emphasis on the potential concentration of transit-dependent persons in the block group.

The purpose of portraying the results in this manner was to highlight areas that have more potential transit need than the State average. However, the analysis still wanted to recognize areas that might have scored slightly lower than the State average, since they may also have transit needs, but to a lower degree relative to other parts of the State. The results of the TDI analysis are described later in the memorandum.

2010 Census Data

The 2010 Census data, representing actual counts, helped establish state and regional demographic trends in the last decade. Vermont's total population grew by 2.8%between 2000 and 2010, with a population of 625,741 at the end of the decade. This growth rate was quite modest compared to the national growth rate of 9.7% over the same time period. Figure 4-1 displays the total population changes (in percentages) over the decade by county. The northern part of the State has seen the largest percentage growth, with Chittenden, Lamoille, Caledonia, and Franklin Counties experiencing more than 5% of growth in the last decade. Seven of the other ten counties also experienced smaller population increases, with Grand Isle, Windham, and Bennington Counties growing the least, by less than 1%. According to the 2010 Census, the populations of Windsor, Essex, and Rutland Counties decreased, but by less than 3% in each county.

Figure 4-2 provides a closer look at these population trends, displaying the percent change in population between 2000 and 2010 by town. Among those towns that have grown more than 10%, those with the highest total populations in 2010 are located in Northwest Vermont and include South Burlington, Williston, Winooski, St. Albans, Fairfax, and Cambridge. The towns with the next highest total populations, which have grown more than 10%, are more dispersed across the northern part of the State and include Newbury, Monkton, Burke, Berkshire, and Wolcott. While several of these towns have existing fixed-route or deviated transit, others including Fairfax, Cambridge, Monkton, Burke, and Wolcott do not. These towns that have experienced significant population growth and have higher total population numbers may be candidates for new or improved transit services, pending further analysis of their potentially transit-dependent populations.

Figure 4-3 displays the cities and towns in Vermont by their total populations in 2010. This map indicates that the existing fixed-route and deviated transit network provides some level of service to nearly all places with a population higher than 5,000, except for Jericho. Some existing fixed-route or deviated service levels are also limited. For example, Colchester is only indirectly served through commuter service at the Chimney Corners park and ride lot, and Northfield has a deviated service that only operates on Wednesday mornings. Several towns with populations less than 5,000 are also served by the existing network, some as stops between larger cities and others as standalone service, such as the deviated route between Newport and Derby Line.

A more specific application of the 2010 Census data used the total population counts to examine Vermont's population density by block group, shown in Figure 4-4. As described in the TDI approaches, population density is one indicator of the type of transit service that may be most feasible in an area. For example, fixed-route or deviated transit service is often prioritized for areas with higher population densities (1,000 – 2,000 or more persons per square mile), while demand response or scheduled service is more feasible for low or moderate density areas (with less than 1,000 persons per square mile).

The map of population density indicates that all of Vermont's higher density areas are served by some fixed-route or deviated transit service. In fact, nearly all areas with moderate and high population densities are served by local transit, with the exceptions of Milton, Waterbury, and Windsor, which are only served through commuter routes. Ludlow, near the Okemo Mountain Resort, is another moderate density area that is served by local and commuter transit, but these services are commuter-like in that trips are only provided in the morning and evening peak periods. The population density map also indicates that several low density areas have fixed-route or deviated transit service. For example, Enosburg Falls, Lyndon, and Bristol are served by local transit; and Chester, southwest of Springfield, is served by seasonal commuter service. A "low" density community that is not currently served by fixed or deviated transit is Jericho, east of Burlington. While Jericho's population density is portrayed as low, it nearly reaches the threshold for moderate density and could feasibly support new fixed-route or deviated service. (Keep in mind that this demographic analysis primarily highlights the geographic extent of existing transit, and communities with existing services may still have additional transit needs related to service expansions or improvements.)

Transit Dependence Index

TDI-Density

As described earlier, the TDI-Density score helped identify areas that have higher concentrations of potentially transit dependent persons. These areas represent feasible candidates for new or improved fixed-route and deviated transit services. Figure 4-5 displays the results of the TDI factoring in population density per block group. The block groups shaded in green represent those that scored higher than the State average; the darkest green areas scored more than double the State average. The yellow and white areas scored less than or equal to the State average, with the yellow representing block groups that scored 50% of the State average up to the average itself.

The results are fairly similar to the general population density map, though some areas with moderate general population density scored higher in TDI-Density, indicating high concentrations of transit-dependent populations in those communities. All the cities that have high general population densities also scored "very high" in TDI-Density: St. Albans, the greater Burlington area, Montpelier, Barre, St. Johnsbury, White River Junction, Rutland, Springfield, Bellows Falls, Brattleboro, and Bennington. Additional areas that scored very high in TDI-Density included Swanton, Enosburgh, Newport, Vergennes, Middlebury, Randolph, and Windsor. Most of these areas have moderate general population densities, except for Enosburgh and Randolph, which have low and very low population densities, respectively. All places that scored very high in TDI-Density are currently served by fixed-route or deviated transit, including local service except for Windsor, which is served by commuter service and Amtrak.

The next group of communities that scored "high" in TDI-Density included Milton, Jericho, and Waterbury. (Many of the places that scored very high also included block groups with high scores.) While Milton and Waterbury are served by commuter routes, Jericho is not currently served by fixed-route or deviated transit. The areas that scored "moderate" in TDI-Density were more dispersed across the State, including parts of Lamoille County, Bristol, Castleton, Fair Haven, Ludlow, Chester, and Manchester. Most of these areas with moderate transit needs based on density currently have some form of fixed-route or deviated transit except for the areas near Johnson and Wolcott in Lamoille County.

The areas in yellow shown on the map also have some level of density and transit-dependent populations, though they scored lower than the State average. These areas may be better candidates for new or improved demand-response or scheduled transit service. A few of the transit systems such as The Current, the Green Mountain Express, and Green Mountain Transit Agency (GMTA), provide demand-response or Dial-A-Ride service to the general public; while other systems provide ADA paratransit service and demand response service to eligible or specialized populations only. Increased demand response service open to the general public may be an opportunity to improve transit where the systems do not currently provide this service.

TDI-Percentage

Shown in Figure 4-6, the results of the TDI-Percentage scores complemented the TDI-Density scores by highlighting additional areas with relatively high transit needs outside of Vermont's urban centers. The TDI-Percentage results identified block groups with high proportions of transit-dependent persons, regardless of population density. Again, the block groups shaded in green represent those that scored higher than the State average, while the yellow and white areas scored less than or equal to the State average. Three cities scored "very high," or more than twice the State average, in terms

of their percentages of transit-dependent persons: St. Johnsbury, Barre, and Bennington. Many of the places that had scored very high in TDI-Density also scored "high" in TDI-Percentage: Swanton, St. Albans, Burlington, Winooski, Newport, Vergennes, Middlebury, Randolph, Rutland, Springfield, Bellows Falls, Brattleboro, and Bennington. Additional places that scored high in TDI-Percentage were Johnson, Northfield, Fair Haven, and Manchester. Nearly all these communities are currently served by the existing fixed-route and deviated transit network, except for Johnson.

Many more rural areas across the State were determined to have "moderate," above the State average, transit needs in the TDI-Percentage scoring process. Those that are not currently served by fixed-route or deviated transit include North Hero in Grand Isle County; Albany and Barton in Orleans County; Island Pond in Essex County; Chelsea and Corinth in Orange County; Weathersfield in Windsor County; and Readsboro in Bennington County. As seen in the map, many of the remaining block groups in the State were scored as "low" based on the percentage of transit-dependent populations. Large portions of Essex and Rutland Counties scored just below the State average and indicate additional areas that have high proportions of transit-dependent persons, if not high densities.

Other Population Segments with Potential Transit Needs

Autoless Households

While this population segment was included in the TDI, autoless households were also examined separately because the lack of access to a vehicle is one, if not the most, important factor in determining transit needs. The lack of a vehicle is a significant economic issue when households are not autoless by choice *and* public transit is unavailable. Vermont's major employment areas are regional in nature, and inter-town travel is required for many residents to reach employment sites. Members of autoless households may also rely heavily on transit options to access medical services, educational opportunities, shop, and attend social activities.

The density of autoless households, or the number of households without access to a car per square mile, in each block group is shown in Figure 4-7. The highest densities of autoless households are found in Greater Burlington, St. Albans, Swanton, Enosburgh, Newport, St. Johnsbury, Montpelier, Barre, Waterbury, Vergennes, Middlebury, Randolph, Rutland, White River Junction, Windsor, Springfield, Ludlow, Bellows Falls, Brattleboro, and Bennington. Several additional places across the State have moderate need based on the density of autoless households: Morrisville, Bristol, Northfield, Fair Haven, and Chester. All of these communities currently have some form of fixed-route or deviated transit service, but could be candidates for additional or

improved service since their residents, who do not own or have access to a personal vehicle, may have the most urgent need for public transit options.

Transportation-Eligible Medicaid Recipients

Using Medicaid data provided by the State, Figure 4-8 shows the number of transportation-eligible Medicaid recipients by town in 2010.[11] The size of the circle represents the number of residents that are transportation-eligible Medicaid recipients, and the color of the circle represents the percentage of the town population that is comprised of transportation-eligible Medicaid recipients. Towns with darker purple circles have a higher percentage of residents who are transportation eligible Medicaid recipients (more than 20%) while towns with lighter purple circles have a lower percentage of residents who are transportation eligible Medicaid recipients (less than 20%). Statewide, transportation-eligible Medicaid recipients comprise approximately 13.8% of the population.

The cities with the highest numbers of transportation-eligible Medicaid recipients – Rutland, Bennington, St. Albans, Barre, and Brattleboro – are also among the cities with the largest general populations. In addition to having the highest absolute numbers of residents who are transportation-eligible Medicaid recipients, these towns also have percentages (about 20% or more) well above the statewide average.

Most of the other cities with high numbers of transportation-eligible Medicaid recipients (represented by the large circles) have some sort of fixed or flexible route transit service available. Western Franklin and Chittenden Counties have numerous towns with high absolute numbers and above average percentages of residents who are transportation-eligible Medicaid recipients. These counties are served by GMTA's fixed routes and Chittenden County Transportation Authority's (CCTA) fixed routes and commuter routes. Several towns along I-91 in Windham and Winsor Counties have high absolute numbers, as well as high percentages of residents who are transportation-eligible Medicaid recipients. The I-91 corridor is served by CRT's fixed routes and commuter routes. Additionally, Lamoille and Orleans Counties have several towns with large absolute numbers and high percentages of transportation-eligible Medicaid recipients. While most of these towns are served by GMTA and Rural Community Transportation, Inc. (RCT), these counties have the least amount of fixed-route or deviated service available.

[11] Data provided by the Vermont Agency of Human Services in March 2011.

There are four towns in Vermont with over 500 residents who are transportation-eligible Medicaid recipients, that don't have any fixed-route or deviated service available: Barton in Orleans County, Hardwick in Caledonia County, Johnson in Lamoille County, and Northfield in Washington County. While a number of towns have above average percentages of residents who are transportation-eligible Medicaid recipients, and lack fixed-route or deviated transit service, the majority of these towns have smaller absolute numbers of these recipients (less than 400). The percentage of residents who are transportation-eligible Medicaid recipients highlights more rural areas that have potential transit needs but smaller populations. It is telling to look at a town's absolute number of transportation-eligible Medicaid recipients because towns with larger numbers are more likely to have the ridership to support fixed-route or deviated service.

TRAVEL PATTERNS AND CONNECTIVITY

Commuting Patterns

Origins and Destinations

Figure 4-9 displays the number of employed persons by their town of residence in 2010 (shown by the square symbols) and major employment sites with at least 50 employees (shown by the circle symbols). Though the specific travel patterns between these points were not available, the comparison of origins and destinations for work trips helped identify whether geographic gaps exist in terms of the existing fixed-route and deviated transit network serving potential work trips. The data for employed persons by town of residence was obtained from the Vermont Department of Labor's Economic & Labor Market Information in partnership with the U.S. Bureau of Labor Statistics; the data represent averages for 2010. The map indicates that most towns with significant resident workforces of more than 2,000 are served by the existing fixed-route and deviated transit network; the exceptions are Fairfax, Jericho, and Hinesburg outside the Greater Burlington area.

The data for major employer sites with 50 or more employees was obtained from Dun & Bradstreet in March 2011. This data included public and private sector employers as well as all branch locations of the employers with at least 50 employees at the branch. Vermont's largest employers, with more than 1,000 employees per site, are located in Burlington, Colchester, Shelburne, Montpelier, Rutland, and Bennington.[12]

[12] The specific employers with more than 1,000 employees per location include Fletcher Allen Health Care, Vermont National Guard, University of Vermont, American Morgan Horse Institute, General Electric Company, Rutland Regional Medical Center, Vermont Agency of Transportation, Central Vermont Medical Center, and Northshire Medical Center. (Source: Dun & Bradstreet.)

Additional towns that host employers with at least 500 workers per location include South Burlington, Vergennes, Middlebury, Waterbury, and Brattleboro.[13]

Many of these major employment locations are located along interstate or U.S. highways. As seen in the map, the largest clusters of employment locations are currently served by fixed-route or deviated transit services. Moderate size employers, with 270 to 400 employees, that are not served by the existing network include Champlain Valley Union High School District in Hinesburg and Jay Peak Ski Resort and Ethan Allen Orleans Division in Orleans County. South Barre and the corridor along Route 4 in Windsor County are additional areas with a notable concentration of employers that are not currently served by fixed-route or deviated service. Some smaller clusters of employers that lack fixed-route or deviated transit service include North Hero in Grand Isle County, Jericho in Chittenden County, Johnson and Hyde Park in Lamoille County, Greensboro in Orleans County, and Townshend in Windham County. Note that major employers outside the State were not included in the analysis, but public input and Journey to Work data, described below, indicated that Vermonters also commute to New Hampshire and New York and some even to Canada (Montreal).

The existing fixed-route and deviated transit network provides good geographic coverage of Vermont's major commute origins and destinations. When combined with the analysis of Journey to Work data below, the data indicates a few potential connections that could improve transit for the purpose of commuting.

Journey-to-Work

Detailed analysis of Journey-to-Work data from the 2000 Census, the most recent data available, provided valuable information about county-to-county travel patterns, namely where people work and where they live.[14] While the 2000 Census Journey-to-Work data was somewhat dated, this analysis was still helpful in illustrating commuting trends, especially when combined with the analysis of 2010 data for employed residents by town and employer locations. Figure 4-10 highlights the largest out-of-county workflows in Vermont. Note that the Journey-to-Work data also indicated that many Vermonters live and work in the same county; at the State level, 79% of residents take in-county work trips. Highlights from this analysis are described below:

[13] The major employers with at least 500 employees per location in these towns include Vermont Air National Guard, South Burlington High School, Goodrich Sensors and Integrated Systems, Middlebury College, Vermont Department of Corrections, Vermont State Colleges, Windham Southeast Supervisory Union, Brattleboro Retreat, and C&S Wholesale Produce.

[14] Journey-to-Work data is part of the Census Transportation Planning Products (CTPP). The next update of the CTPP will use American Community Survey data from 2006 – 2010, and is expected to be released in 2012. (Source: **http://www.trbcensus.com/newsltr/sr0111.pdf**.)

- The counties where the largest proportions of residents commuted outside of the county included Grand Isle (32%), Essex (41%), and Orange (47%). About half of Grand Isle's working residents commuted to Chittenden County. One-third of Essex County's working residents commuted to New Hampshire, while one-fifth worked in Caledonia County. Nearly one-fifth of Orange County's resident workforce commuted to New Hampshire and Washington County each; about one-tenth commuted to Windsor County.

- About one-fifth (21.1%) of those that worked in Chittenden County commuted from other counties (19.6%) or from out-of-state (1.5%): 7,292 of these trips (37%) originated in Franklin County, 3,969 (20%) from Addison County, 2,821 workers (14%) from Washington County, and around 1,700 workers (9%) each from Grand Isle and Lamoille Counties. Notable numbers of Chittenden County's working residents also worked in other counties (though the percentages were small), namely Washington County and Franklin County with 1,852 (2.3%) and 1,126 (1.4%) of Chittenden County's resident workforce, respectively.

- Other large out-of-county workflows in terms of absolute numbers of commuters included Orange County residents who commuted to Washington County and Windsor County. 2,776 members (19%) of Orange County's workforce commuted to Washington County, and 1,553 members (11%) of its workforce to Windsor County. 1,020 Rutland County residents (3.3% of the resident workforce) also commuted to Bennington County.

- The five counties on the eastern border of Vermont lost a notable portion of their resident workforces to New Hampshire, mainly Grafton County where Dartmouth College and Dartmouth Hitchcock Medical Center are located. As mentioned earlier, about one-third of Essex County's resident workers commuted out-of-state. A quarter of Windsor County's resident workforce commuted out-of-state, mainly to Grafton County, NH and some to Sullivan County, NH. Nearly 20% of Orange County's resident workforce commuted out-of-state, with the majority of residents working in Grafton County, NH. About 12% of Windham County's resident workforce commuted out-of-state, mainly to Cheshire County, NH; and about 9% of Caledonia County's resident workers commuted out of Vermont, most to Grafton County, NH.

- On the western border of Vermont, relatively high numbers of residents from Rutland and Bennington Counties commuted out-of-state. 2,296 members (13%) of Bennington's resident workforce and 1,140 members (4%) of Rutland's resident workforce commuted out-of-state. Berkshire County, MA was the destination for the highest proportion of Bennington County

residents commuting out-of-state, followed by several New York counties.[15] The most common out-of-state employment destination for Rutland residents was Washington County, NY.

When analyzed in conjunction with the origins and destinations of commuters described above, the travel patterns from the Journey-to-Work data indicated that existing commuter routes serve work trips into and out of Chittenden County quite well. Some commuter service currently exists for commuters traveling from Orange County to Windsor County, from Rutland County to Bennington County, and from Bennington County to Williamstown, MA. A noticeable gap is transit for Orange County residents who may be working in Washington County or in New Hampshire. Additional connections to workplaces out-of-state could also provide new transit options for commuters from Caledonia, Windsor, Windham, Bennington, and Rutland Counties.

Park and Ride Lots

Figure 4-11 displays the 27 State-owned park and ride lots throughout Vermont, which provide a total of 1,113 parking spaces for commuters, carpools, and vanpools. The map also shows several of the State's 31 municipally owned park and ride facilities.[16] The lots served by existing fixed-route or deviated transit are circled in yellow. Vermont's transit providers serve about two-thirds of the State-owned park and ride lots and nearly half the municipally-owned lots. The lots are mainly served by commuter services or local services that have commuter-like schedules. About one in five park and ride lots includes shelter of some sort, and a slightly lower percentage has bike racks available; most lots with these amenities are owned by the State. Many municipal lots have been developed through VTrans' Municipal Park-and-Ride Grant Program, which funds engineering and construction activities for small park and ride facilities to be owned and maintained by municipalities.

The Newport and Bennington regions are notable in that they do not have park and ride lots. Newport is currently only served by local deviated transit, and a park and ride lot could be helpful if a new regional service is implemented between Newport and St. Johnsbury. A new park and ride lot in Bennington could also promote use of the existing regional services to Williamstown, MA and Manchester, VT, especially since transfers from the local Bennington routes are not accepted on the northbound trips toward Manchester. These areas have at least three new park and ride facilities

[15] The Journey to Work data indicated that 1,137 Bennington residents commuted to Berkshire County, MA, out of 1,231 residents that commuted to Massachusetts; and 883 Bennington residents commuted to New York, with Rensselaer County, Albany County, and Washington County as the most common destinations.

[16] *VTrans 2011 Fact Book*. **http://www.leg.state.vt.us/reports/2011ExternalReports/264206.pdf**.

planned in Norton, Bennington, and Readsboro, funded through VTrans' Municipal Park-and-Ride Grant Program.[17]

Burlington and Middlebury also lack specifically designated park and ride lots, but transit users and carpoolers may utilize other parking options such as municipal parking lots or private garages. While park and ride lots are generally free of charge, users likely need to pay to use municipal or private parking lots or garages. Commuters in the Windham region will also have additional access to a park and ride facility when the State completes its new park and ride lot at Putney in FY 2012.[18] This new lot contributes to the goal of VTrans' Park and Ride Program to double the number of State-owned park and ride spaces between 2008 and 2018.[19] Input provided during the public meetings regarding the PTPP indicated a need for more lighting and amenities at park and ride lots to facilitate transit use.

Connectivity – In-State and Out-of-State

Vermont's existing public transit system consists of a collection of services operating in a parallel, but generally complementary, manner. In order for these services to create a "network" that allows Vermonters to reach destinations outside areas served by their local public transit operator and, indeed, outside the State, it is essential that these services connect in a meaningful way. Meaningful connections refer to services that are coordinated to provide convenient overall transit trips for riders. Examples include service schedules that are coordinated such that riders can transfer from one route to another with a relatively short wait time; transfer points or intermodal hubs where riders can physically transfer between services with ease; and the availability of information regarding connecting services on the providers' websites and rider brochures.

This section focuses on the existence of such connections and their effect on the statewide public transit system in Vermont, including:

- The need for in-state (regional) and inter-state connections,
- Whether and how well they are being served by the current public transit system, and
- Organizational structure affecting the ability to improve connectivity.

[17] VTrans. "Vermont Municipal Park-and-Ride Grant Program Summary." January 2011, http://www.aot.state.vt.us/parknride/Documents/2011MunicipalParkandRideAwardSummary01-26-11.pdf.
[18] According to April 2011 email from Matt Mann, Senior Planner, Windham Regional Commission.
[19] Zicconi, John (VTrans Director Planning, Outreach & Community Affairs). "Improved and Expanded Waterbury Park & Ride Opens." June 2010, http://www.aot.state.vt.us/pressreleases/2010/June/WaterburyParkAndRideOpens.htm.

Need for Regional and Intercity Connections

Since the last PTPP, there has been a new emphasis on regional and intercity connections. Travel needs are increasingly long distance in nature, and are not limited to the areas served by the local public transit system. Key markets to be served include:

- Tourists including leisure travelers and day excursions,
- Travelers needing connections to airports,
- Commuters, and
- Transit-dependent populations needing services outside their area to medical appointments or to visit family/friends.

Intra-state or Regional Connections

Being able to access locations in the State that are outside the public transit service area is a challenge for many Vermonters. There are services available to meet many, but not all, of these regional trip-making needs.

Since the 2007 PTPP, there has been a growth of regional commuter services for both year-round and seasonal workers. Current commuter routes that extend beyond the traditional areas served by each of the operators and seasonal connections are described below.

- Addison County Transit Resources (ACTR) extends into Chittenden and Rutland Counties with commuter services. Rutland to Middlebury is operated jointly with Marble Valley Regional Transportation District (MVRTD) (partially as a replacement for the Vermont Transit Route that was discontinued in the Western Corridor). ACTR also operates a seasonal route called the Snow Bowl.

- MVRTD extends local services in Rutland into Middlebury, Manchester, Bellow Falls, Ludlow, and Fair Haven. It also has a seasonal route to Killington, primarily for workers.

- Connecticut River Transit (CRT) has a number of commuter routes that connect to other transit systems: the Rockingham – Lebanon route connects to Advance Transit (AT) and Stagecoach Transit Services (STSI), while the Bellows Falls - Brattleboro route connects with Deerfield Valley Transit Association (DVTA). The system also has a seasonal service to Okemo

Mountain Resort and connects to Amtrak in Bellow Falls with the Upper Valley Commuter Route.

- DVTA extends beyond its service area to Brattleboro and has a seasonal route to Mt. Snow.

- GMCN/Green Mountain Express connects to MVRTD, and for out-of-state travel links to Peter Pan, Yankee Trails, and Berkshire Transit (a regional transit authority in Massachusetts).

- GMTA is an example of a coordinated system that was created as a combination of the services operated by Stowe Transit, Central Vermont Transportation Agency, and Network to provide both local services and cross-county commuter and general public routes.

- RCT has a route from St. Johnsbury to Montpelier, which serves various park and ride lots and links to intercity rail in Montpelier. This is operated in conjunction with GMTA.

- STSI operates two commuter routes along the I-89 and I-91 corridors into the employment centers of White River Junction and Lebanon and Hanover, NH.

- CCTA operates the LINK Express commuter service to adjacent counties.

- AT provides commuter service to Enfield and Canaan, New Hampshire. Through the Upper Valley Transportation Management Association (UVTMA), AT coordinates with Stagecoach Transportation Services and CRT in Vermont and Community Transportation Services in New Hampshire to provide information on public transit and promote connections between transit systems in the region. AT also promotes intermodal transportation with connections to Amtrak, Greyhound, and Dartmouth Coach.

Referring back to Figure 4-3, which displays these regional services along with connections to local transit and an overlay of cities and towns by size, the map indicates that all of Vermont's larger cities are served by transit and many are connected through commuter services. Local services complement the commuter network by connecting smaller towns to urban centers. The notable regional gaps in the statewide network are between:

- St. Albans and Newport;
- Newport and St. Johnsbury (this connection was also requested through public input);

- St. Johnsbury and Wells River, to connect to White River Junction (and nearby Hanover and Lebanon, NH); and
- Bennington to Wilmington, to connect to Brattleboro.

The Section 45 study on Regional Connectivity looked at intra-state connections in terms of both possibility and "practicality." The definition of a practical public transit trip was that it would take no longer then two times as long as it would be to drive, and require no more than two transfers among vehicles. It found that route connections exist among most of the State's populated towns and cities (with the exception of the Northeast Kingdom), but that the set of practical connections was limited. Most disconnected from the intra-state fixed-route transit network is the Northeast Kingdom. The study also found that a trip from Burlington to Bennington is possible, but is not very practical, requiring three transfers and most of a day.

Since the study was completed, a Route 2 service has been instituted between St. Johnsbury and Montpelier. A practical connection between Montpelier and White River Junction (and nearby Hanover and Lebanon, NH) is a gap that remains. While STSI provides geographic coverage of the I-89 corridor through two commuter routes, the services are not scheduled such that riders can transfer at Randolph to continue toward Montpelier or White River Junction.

Inter-State Connections

Intercity bus, rail, and air provide connections to out-of-state locations for Vermonters and provide access to Vermont for visitors and tourists. Many of the transit systems in the State provide bus connections to Amtrak and to the few intercity bus stations that remain active – providing for both long distance in-state travel and out-of-state connections. The intercity bus services have been drastically reduced over the past decade. Currently there are only two intercity routes operated by Greyhound, although connections among these routes at White River Junction and connections to the larger Greyhound network offer a wider array of inter-state transportation choices.

Vermont's transit systems schedule their local services to provide some practical connections with less than two-hour wait times, and some less than one hour, to and from intercity bus services. For example, GMCN's Red Line offers a connection to Yankee Trails service toward Albany each weekday (a second connection is possible, but requires a 2.5-hour wait), providing the opportunity for a day trip to Albany.[20] GMCN's Orange Line provides two connections in Williamstown, MA to Peter Pan Bus Lines' services toward New York and Boston Logan International Airport Monday

[20] However, the rider would need alternative local transportation in Bennington on the return trip, since Red Line service ends at 5:00 p.m. and Yankee Trails arrives back from Albany to Bennington at 7:20 p.m. This bus trip also takes about twice the time that driving would, but still offers an option for those unable to drive.

through Friday. AT's Green Route connects to Dartmouth Coach in Hanover, NH and provides six connections each weekday to Boston South Station and Logan International Airport, with two possible connections for the return trip in Hanover; as well as eight connections to New York City during the week, with one return trip connection available per weekday. Vermont's local operators facilitate these inter-state connections by providing schedule information and highlighting connection points on their websites and brochures. Expanded hours and weekend service for local routes, particularly to accommodate return trips to Vermont, could further improve inter-state travel for Vermonters and visitors.

Information Gap

While some service "gaps" exist, there is also an information gap for potential riders. A central source of information for travelers – one that is *"seamless, efficient, user friendly with usable connections among in-state and out-of-state points"* – is essential to support public transit needs in Vermont.[21] While there have been some strides in compiling and sharing information on all transit services in the State, as well as mention in marketing materials of connections and possible transfers among routes operated by different systems, without one central information sharing mechanism, it remains difficult to navigate through the information available on the various transit system media and websites. While Go Vermont has a start on matching ridesharing trips, there is currently no "trip planner" function on the Go Vermont site.

Organizational Structure

The public transit system in Vermont consists of a collection of many independent parts including ten local public transit providers, intercity bus services operated by the private sector, and shared ride services such as shuttles, car-pooling, and van-pooling.

A 2009 recent legislative report on the organizational structure for providing public transit in Vermont concluded that the existing system has evolved in a logical manner, based on the primary, initial demand for transit services being local.[22] The existing service delivery model grew out of the demand and need for transportation services based primarily at the local and intra-regional level, and it was concluded that this is still the most appropriate model based on the priority of transportation needs and programs currently being delivered. However, the report postulated that as the demand for regional and intercity service increases, the model by which the services are

[21] In the 2007 session, the Vermont legislature directed VTrans to examine the feasibility of making public transportation in Vermont seamless, efficient, and user-friendly with usable connections among in-state and out-of-state points.
[22] *Section 35 Public Transit Study*, Interim Report, March 2009.

delivered may evolve out of necessity. The report recommended that existing systems be allowed to evolve and take action to create efficiencies where interconnectivity opportunities present themselves. It also recommended that this update to the PTPP examine whether high-priority public transit services, including local, regional, and intercity, can be well-served under the current delivery structure.

Determining the State role and the way in which regional services can be addressed, given the federal funding programs, is a key PTPP issue. The fact that such services have emerged and are successful is a tribute to the need especially given the complexity required to secure the "local share" – which communities benefit, which should contribute, and how to determine a fair balance of financial support.

CONCLUSIONS ON PUBLIC TRANSIT NEEDS IN VERMONT

Vermont's existing transit providers generally provide good coverage through fixed- and deviated fixed routes in those parts of the State with the highest densities of potentially transit-dependent populations. All of the providers also offer demand-response, scheduled, and/or volunteer driver services to help meet transit needs in more rural areas, which do not have the density to support fixed-route services. The caveat is that most demand-response services are funded through the E&D Grant, Medicaid, or human service agencies. While E&D program services are open to the public, residents typically must meet eligibility criteria or be clients of the human service agencies to receive services under other programs. Additional demand-response service, scheduled routes, and volunteer driver services would improve the convenience of public transit in outlying areas, where scheduled service to nearby large towns may only operate a few times a month and rides with volunteer drivers are subject to availability.

The Northeast Kingdom, Lamoille, and Orange Counties have areas with high relative transit needs, but limited transit service; these areas also have lower population densities, which make fixed-route or deviated transit service less feasible. Where such services already exist, such as Morrisville or the I-91 corridor in Orange County, these areas may be candidates for expanding service frequencies, hours, or days. In the Northeast Kingdom, where deviated services are limited, new scheduled or deviated service could be implemented as population growth and densities warrant; these new services would play a vital role in connecting the Northeast Kingdom to the rest of the State.

The more urban areas around the State that currently have local or commuter services may also benefit from increased levels of service, such as expanded hours of service or higher frequencies, or new services such as weekend or evening service.

Candidates for such transit growth include the areas surrounding Vermont's major cities: Burlington, St. Albans, Montpelier, Barre, Middlebury, Rutland, Springfield, Brattleboro, and Bennington. Hartford and White River Junction are additional areas with potential for transit growth, since the Upper Valley region hosts several major employers, educational facilities, and medical institutions. Expanding existing services provides further opportunities to coordinate transit between provider areas, both within Vermont and possibly across the State border to New Hampshire, New York, and Massachusetts, and better meet regional travel needs.

Vermont's current transit providers communicate often and engage in notable coordination efforts, from sharing information about other providers and highlighting connection points to sharing capital and training resources. The public transit networks also connect to other transportation modes, including park and ride lots, Amtrak, and Greyhound and other intercity bus providers, whenever possible. Vermont's public transit network provides decent geographic coverage across the State through at least one form of transit (i.e., demand-response or volunteer driver service in the most rural areas). However, numerous opportunities exist to improve existing services, including more interlining of regional services and between local and intercity bus services, and introduce new types of transit to boost local and regional accessibility.

Improvements to regional and inter-state connectivity, specifically making longer-distance trips feasible through fewer transfers and shorter travel times, were among the top transit needs provided through public input. In the past, Greyhound (Vermont Transit) routes allowed Vermonters to travel between towns in-state. Increasingly, the in-state trips are being provided by local transit providers, and the gaps in long distance trips within Vermont are slowly being filled by regional and commuter services operated by the transit providers. However, many existing commuter and local routes have limited service hours, targeted toward commuters, and consequently do not meet regional transit needs for other trip purposes. Vermonters also frequently travel across the State borders for work, shopping, and recreation. With the reduction in intercity bus service, Greyhound now primarily provides the out-of-state linkages. Additional connections to New Hampshire especially would better meet the daily travel needs of Vermont residents and potentially encourage out-of-state visitors to Vermont.

While the demographic analysis focused on potentially transit-dependent populations, "choice riders" present another potential market for public transit. Choice riders are those that own personal vehicles, but may choose to use transit services to save the costs related to owning an automobile, to reduce the environmental impacts of their transportation, or to experience less stressful commutes. Improvements in the convenience and reliability of transit services are especially important for attracting these types of riders and increasing new transit users. Improvements ranging from

increased service levels to additional amenities to technology, which provides real-time information and a trip planning function were needs identified during this assessment.