Go! Vermont Strategic Plan
Data Analysis

June 28, 2023
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1. TDM Analysis

1.1 Process

Assessing where there are opportunities to maximize TDM efforts involves a data-backed process, that reviews different population, employment, socioeconomic, and travel variables present in Vermont’s 14 counties. This market analysis reviews each of these variables by county. Following the initial examination, the market assessment creates an index that generates a value reflecting the total volume of TDM variables present in each Vermont county.

1.2 Regional Overview

The State of Vermont is comprised of 14 counties that contain 286 cities and towns. Originally inhabited by members of the Abenaki and Mohican Wabanaki tribes, many of Vermont’s cities and towns began to form as early as the 17th century with current road networks still reflecting patterns of early colonial settlement. From a population perspective, the 2021 American Community Survey (ACS) estimates that more than 641,000 people presently reside in Vermont.

1.3 Population Trends

Demographic information is a critical component of transit and rail planning as it establishes where there are high volumes of trips and where there are opportunities to best apply TDM practices. These TDM strategies can support existing transit, bike and pedestrian modes/users while simultaneously identifying opportunities to expand or introduce new sustainable travel options. Using this demographic information can also play an important role in reducing single occupant vehicle (SOV) trips. Beyond knowing where current populations exist, additional information about current and projected population demographics is vital to planners and policy makers to develop transit and rail plans for the short- and long-term. This section describes population trends in the recent past (2011 –2021), establishing today’s approximate conditions. Data from the 2021 ACS 5-Year Estimate provides the basis for some of the below summary statistics.

1.3.1 Population Density

Vermont’s population is generally clustered in the northern portion of the state with Chittenden County having the highest population density (269.9 people per square mile) (Figure 1). Areas abutting Chittenden County to the east also have high population densities, ranging from 64.3 to 85.7 people per square mile. Essex County is Vermont’s least populated county, with approximately 8.9 people per square mile. In southern Vermont, population densities range between 55 (Bennington) and 64.2 (Rutland) people per square mile.

High-density areas are ideal locations for TDM because the concentration of people increases the likelihood of carpool opportunities, transit options are more prevalent, and commuters live closer to work, presenting the opportunity to bike or walk to employment or other destinations. While Vermont counties are rural in nature with only Chittenden County containing a US census Bureau Urbanized Area (Burlington, VT), all but three Vermont communities (Lamoille, Grand
Island, and Essex) include smaller urban clusters. This indicates that while populations are small, there are several areas that include densities that support lower levels of single-occupant vehicle use and TDM measures.

The Census Bureau identifies two types of urban areas:
- Urbanized Areas (UAs) of 50,000 or more people;
- Urban Clusters (UCs) of at least 2,500 and less than 50,000 people.

Figure 1 Population Density by County

Source: US Census Bureau 2021 American Community Survey (ACS) 5-Year Estimates Table B01001: Sex by Age

1 The Census Bureau identifies two types of urban areas:
- Urbanized Areas (UAs) of 50,000 or more people;
- Urban Clusters (UCs) of at least 2,500 and less than 50,000 people.
1.3.2 Population Growth

In the period between 2011 and 2021, Vermont’s population grew by approximately 16,600 residents, a 2.7 percent increase (Figure 2 and Figure 3). This 2.7 percent increase is not evenly distributed across the state as the Chittenden County population density increased by 7.6 percent whereas Caledonia County decreased by 2.6 percent. In addition to Chittenden County, the second largest increase occurred north and east in Franklin and Lamoille County.

![Change in Population 2011 and 2021](source: US Census Bureau 2021 American Community Survey (ACS) 5-Year Estimates Table B01001: Sex by Age)

Given that Chittenden County includes Burlington, Vermont’s only urbanized area, one explanation for these population increases is that people moved to the region for economic and social opportunities. Should these trends continue, it is likely that traffic and congestion could increase in Chittenden and Lamoille counties as their existing infrastructure is now accommodating more people. Working with employers and communities to discourage single-occupant vehicle trips is one tool to promote sustainable growth in these communities.
Figure 3 Percent Change in Population by County

Source: US Census Bureau 2011 and 2021 American Community Survey (ACS) 5-Year Estimates Table B01001: Sex by Age
1.4 Income & Employment Trends

1.4.1 Total Jobs

There are approximately 311,000 occupied jobs available in Vermont with the majority (33 percent) of worksites located in Chittenden County (Figure 4 and Figure 5). Other high-employment locations include Washington (10 percent), Rutland (nine percent), and Windsor (nine percent) counties. Given that these counties account for approximately 62 percent of all Vermont jobs, they likely are places that have high volumes of single-occupant vehicle use and can benefit from TDM measures.

On the other end of the spectrum, Essex and Grand Isle County have a low number of jobs, accounting for less than one percent each. Essex County is part of a region called “the Northeast Kingdom” and it is a more remote area of Vermont, known for its dairy farms and tourism. Given the nature of these employment types, there could be TDM opportunities that connect remote worksites to other population centers with seasonal workers. Grand Isle County is similar in that it is a remote, relatively pastoral community. Given its island nature, many jobs are close to residents, indicating TDM that supports sustainable travel could be possible.

![Figure 4 Total Jobs by County](image)

*Source: US Census Bureau 2019 Longitudinal Employer-Household Dynamics (LEHD) Data*
**Figure 5 Map of Jobs by County**

*Source: US Census Bureau 2019 Longitudinal Employer-Household Dynamics (LEHD) Data*
1.4.2 Where Vermont Workers Live

Approximately 279,000 Vermonters live and work in Vermont, with the number of people working in a county largely matching the number of jobs available in a county. Some places have subtle differences as places like Chittenden County and Windsor County having three percent fewer working residents than jobs available, implying it draws people from other states or Counties within Vermont.

1.4.3 Median Household Income

Communities with lower incomes are less inclined to use single-occupant vehicles because TDM measures like biking, transit and carpooling are potential opportunities to save money. Additionally, these communities include individuals who are conscious about their environmental impact. Vermont’s statewide median income is $69,021 and there are three counties that have median incomes exceeding the statewide median: Grand Isle, Chittenden and Addison County (Figure 6). The three counties with the lowest Median Household Income are Orleans ($58,037), Caledonia ($55,159), and Essex ($48,194) County. Given that individuals in these three counties could have less disposable income, individuals may be receptive to TDM measures that reduce their household transportation costs.

![Figure 6 County-by-County Median Household Income](source)

Source: US Census Bureau 2021 American Community Survey (ACS) 5-Year Estimates Table B19013: MEDIAN HOUSEHOLD INCOME IN THE PAST 12 MONTHS (IN 2021 INFLATION-ADJUSTED DOLLARS)
1.5 Travel Trends

1.5.1 Total Trips

On an average weekday, approximately 2.3 million trips take place in Vermont. These trips consist of various activities like commuting, grocery shopping and leisure trips. The highest volume of weekday trips per capita occur in Washington, Chittenden, and Rutland Counties (Table 1). These counties all contain urban cores that are employment centers. TDM strategies targeting these areas can be effective as there could be opportunities to consolidate trips using TDM strategies.

Table 1 Average Weekday Trips by County (2022 Calendar Year)

<table>
<thead>
<tr>
<th>County</th>
<th>Average Weekday Trips</th>
<th>Weekday Trips per Capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washington County</td>
<td>226,520</td>
<td>3.9</td>
</tr>
<tr>
<td>Chittenden County</td>
<td>630,206</td>
<td>3.9</td>
</tr>
<tr>
<td>Rutland County</td>
<td>217,621</td>
<td>3.7</td>
</tr>
<tr>
<td>Bennington County</td>
<td>131,936</td>
<td>3.7</td>
</tr>
<tr>
<td>Windham County</td>
<td>152,254</td>
<td>3.6</td>
</tr>
<tr>
<td>Lamoille County</td>
<td>89,087</td>
<td>3.5</td>
</tr>
<tr>
<td>Orleans County</td>
<td>91,567</td>
<td>3.4</td>
</tr>
<tr>
<td>Windsor County</td>
<td>186,710</td>
<td>3.4</td>
</tr>
<tr>
<td>Caledonia County</td>
<td>100,940</td>
<td>3.3</td>
</tr>
<tr>
<td>Franklin County</td>
<td>163,517</td>
<td>3.3</td>
</tr>
<tr>
<td>Addison County</td>
<td>120,768</td>
<td>3.3</td>
</tr>
<tr>
<td>Orange County</td>
<td>84,388</td>
<td>2.9</td>
</tr>
<tr>
<td>Grand Isle County</td>
<td>20,005</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Source: Replica, 2023

1.5.2 Vehicle-Miles Traveled (VMT)

VMT is an important TDM data point as vehicles driving longer distances consume higher levels of resources (gas, electricity, etc.) and produce harmful effects (emissions, noise pollution, etc.). The average Vermonter drives approximately 27 miles on a given weekday, a rate similar to nearby Maine (approximately 28 miles) and abutting New Hampshire (approximately 28 miles) (Figure 7). Several Vermont counties have an average weekday VMT-per-resident rate that is higher than the statewide average per resident, indicating there are opportunities to reduce VMT.

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3 Replica bases estimates on a composite of data sources, including but not limited to road traffic, mobile location and financial transaction data. It runs a full activity-based model that produces disaggregate travel behaviors for the entire synthetic population for a typical weekday and weekend day each week.
throughout the region. This can be explained through population, as areas with lower VMT rates (Chittenden County) have higher populations, pulling Vermont's per-resident rate down. As with other statistics in this study, Vermont's more rural/remote areas like Essex County and Grand Isle County produce the largest levels of VMT. This can be explained by the land use patterns in these communities, transit options, and access to jobs.

Figure 7 Average Weekday VMT for Vermont and County Residents

Source: Replica, 2022

1.5.2.1 Weekday VMT Relative to Weekday Trips
Recognizing that Vermont’s rural communities will generate higher VMT levels due to land use patterns, it is important to place them in the context of the volume of trips. For example, rural Vermonters may drive more, but they might complete more tasks in a single trip (shopping plazas with multiple goods and services, etc.). On the other end of the spectrum, those in urban settings might have lower VMT, but higher trips as it is less important to stack trips, given the proximity of goods and services. Travel data indicates this to be true, as more remote places like Essex County have high VMT, relative to other counties, but low trips on an average weekday (Figure 8). Similarly, counties near urban centers like Rutland and Burlington have lower VMT but higher volumes of trips. One exception to these patterns is Caledonia County, as it has high VMT rates, relative to other counties, and high volumes of trips. This indicates that Caledonia County could be an area for TDM focus as there may be opportunities to consolidate trips via carpooling or transit.
Figure 8 Average Weekday VMT Relative to Trips

Source: Replica, 2022
1.5.3 Trips-by-Mode

Approximately 73 percent all weekday Vermont trips take place via a single-occupant vehicle (SOV). Rutland (approximately 76 percent of all county trips), Bennington (approximately 75 percent of all county trips), and Windsor (approximately 74 percent of all county trips) Counties have the highest percentages of SOV trips shown in Table 2. From a TDM perspective, these areas are high-target areas because they include larger urban/economic centers that presumably are less reliant on vehicle use, but also high SOV rates.

Additionally, there some counties with carpool rates in excess of the Vermont statewide average (approximately nine percent). Chittenden (11 percent), Franklin (approximately 10 percent) and Lamoille (approximately 10 percent) have the highest carpool rates. TDM strategies should target these areas as there is an established demand for carpooling and a culture most-receptive to carpooling.

Table 2 Trips by Travel Mode (2022 Calendar Year – Typical Weekday, All Purposes)

<table>
<thead>
<tr>
<th>Community</th>
<th>Total Trips</th>
<th>Walking</th>
<th>Biking</th>
<th>Transit</th>
<th>SOV</th>
<th>Rideshare</th>
<th>Carpool</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addison County</td>
<td>120,768</td>
<td>13.8%</td>
<td>1.2%</td>
<td>0.5%</td>
<td>69.9%</td>
<td>2.9%</td>
<td>7.4%</td>
<td>4.4%</td>
</tr>
<tr>
<td>Bennington County</td>
<td>131,936</td>
<td>11.0%</td>
<td>1.0%</td>
<td>0.0%</td>
<td>75.0%</td>
<td>1.4%</td>
<td>8.6%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Caledonia County</td>
<td>100,940</td>
<td>10.1%</td>
<td>1.2%</td>
<td>0.2%</td>
<td>74.3%</td>
<td>0.7%</td>
<td>9.4%</td>
<td>4.1%</td>
</tr>
<tr>
<td>Chittenden County</td>
<td>630,206</td>
<td>12.7%</td>
<td>1.5%</td>
<td>1.2%</td>
<td>70.2%</td>
<td>1.6%</td>
<td>11.0%</td>
<td>1.8%</td>
</tr>
<tr>
<td>Essex County</td>
<td>15,643</td>
<td>8.1%</td>
<td>1.4%</td>
<td>0.0%</td>
<td>72.6%</td>
<td>0.6%</td>
<td>8.7%</td>
<td>8.6%</td>
</tr>
<tr>
<td>Franklin County</td>
<td>163,517</td>
<td>11.5%</td>
<td>0.2%</td>
<td>0.6%</td>
<td>73.6%</td>
<td>0.6%</td>
<td>10.2%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Grand Isle County</td>
<td>20,005</td>
<td>8.4%</td>
<td>1.1%</td>
<td>0.4%</td>
<td>74.2%</td>
<td>0.9%</td>
<td>9.5%</td>
<td>5.6%</td>
</tr>
<tr>
<td>Lamoille County</td>
<td>89,087</td>
<td>10.3%</td>
<td>1.2%</td>
<td>0.5%</td>
<td>73.8%</td>
<td>0.7%</td>
<td>9.7%</td>
<td>3.9%</td>
</tr>
<tr>
<td>Orange County</td>
<td>84,388</td>
<td>9.3%</td>
<td>1.6%</td>
<td>0.2%</td>
<td>73.8%</td>
<td>0.8%</td>
<td>9.1%</td>
<td>5.3%</td>
</tr>
<tr>
<td>Orleans County</td>
<td>91,567</td>
<td>9.7%</td>
<td>1.7%</td>
<td>0.1%</td>
<td>73.3%</td>
<td>0.9%</td>
<td>9.1%</td>
<td>5.2%</td>
</tr>
<tr>
<td>Rutland County</td>
<td>217,621</td>
<td>11.6%</td>
<td>0.6%</td>
<td>0.0%</td>
<td>75.9%</td>
<td>1.9%</td>
<td>7.1%</td>
<td>2.7%</td>
</tr>
</tbody>
</table>
When determining which mode to use for transportation, individuals perform a budget-cost analysis that pits the cost of travel against time and convenience\(^4\). TDM interventions can best-serve those who have high transportation costs as it can reduce spending through shared travel options like carpools, vanpools and transit. The average Vermonter spends $51.83 per week on a combination of gas stations, parking, taxis, and other transportation-related costs. Counties with the highest weekly transportation spending per capita include Franklin ($70.52), Grand Isle ($67.25), and Essex ($62.34) (Figure 9). There are a variety of explanations for these differences including proximity to destinations, available transit options, as well as worksite locations. Given that some of these locations require an individual to drive, promoting shared travel options can help lower costs.

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\(^4\) This statement recognizes that for many individuals, especially environmental justice communities, this BCA-concept might be an oversimplification as the cost of some transportation options could be so high relative to a household budget that it is not even considered to be a viable option.

\(^5\) This data shows the estimated consumer spend that occurred by residents who live in each county. Transportation expenses include gas stations, parking, taxis, tolls. Trends estimates are based on a composite of data sources, including but not limited to road traffic, mobile location and financial transaction data. Advanced modeling and statistical weighting methods are applied to generate a representative weekly total estimate of consumer spending activity. This does not include any transit expenses. Data reflects spending from the week starting 1/9/23.
1.6 Socioeconomic Trends

Socioeconomic data supplements general population data by providing details on where populations are more likely to embrace and/or benefit from TDM programming. Additionally, examining information on at-risk populations ensures that TDM strategies are being applied in an equitable manner.

Transit-dependent populations typically have demographic and socioeconomic characteristics that include a combination of the following: minority populations, elderly populations, youth populations, lower household incomes, poverty rates, low vehicle availability, disabilities, and limited English proficiency. This section reviews these characteristics in the Vermont context, noting where there are concentrations of these populations.

1.6.1 Vehicle Ownership

Vehicle ownership is a good indicator for TDM as households with access to fewer vehicles are more likely to demand TDM interventions. On the other end of the spectrum, households with multiple vehicles might be uninterested in sharing rides or willing to supply the vehicle for a future carpool as they have more schedule flexibility. Additionally, these households may be uninterested in other TDM strategies like biking or transit because of a perceived convenience associated with their personal vehicle.

1.6.1.1 Zero-Vehicle Households

There are a variety of contexts for zero-vehicle households ranging from people living in urban environments who do not need a car to those who cannot afford to own a car. Regardless of the reason, the counties with the highest levels of zero-vehicle households are Bennington, Caledonia and Washington County (all at eight percent). Those who choose not to own a car could still benefit from carpooling with a different car owner, saving both individuals gas money. Those who cannot afford a car can benefit from forming carpools or vanpools with existing or potential car owners. From a worksite perspective, distribution centers typically employ lower wage workers who live far from the worksite. Utilizing TDM strategies to improve transportation to communities with zero-vehicle households allows employers to retain staff and create more consistent access to their workforce.

1.6.1.2 Single-Vehicle Households

Understanding that TDM in Vermont often involves sharing the ride, households that only have access to a single vehicle are a target population for TDM programs. Approximately 35 percent of all Vermont households only have access to one vehicle. Windham (39.9 percent) and Essex (38.4 percent) Counties have the highest percentage of single-vehicle households. This noted, Essex County has the fewest total housing units, indicating there may fewer opportunities to carpool and that other travel modes such as transit could be a better option. On the other end of the ownership spectrum, Franklin (28.4 percent) and Grand Isle (26.4 percent) Counties have the lowest levels of single-car households, indicating that these areas may have an excess of single-occupant vehicle use and could stand to benefit from TDM measures.

1.6.1.3 Multi-Vehicle Households

Many people living in Vermont have access to at least two vehicles and the three counties with the highest rate of multi-vehicle ownership per occupied housing unit are Grand Isle County (approximately 71 percent), Franklin County (66 percent), and Orange County (64 percent) (Figure 10). Grand Isle County is noteworthy because while it has the highest percentage of households with two or more vehicles, it has the lowest volume of jobs. This could indicate that there are opportunities to reduce single-occupant vehicle use on the island through coordinating carpools, amongst other locations. Given Franklin County’s location relative to employment
centers in Burlington and Montpelier, there are also TDM opportunities to reduce vehicle use in these communities, bringing intra-county benefits.

![Vehicle Ownership by County](image)

**Figure 10 Distribution of Vehicle Ownership**

*Source: US Census Bureau 2021 American Community Survey (ACS) 5-Year Estimates Table B25044: TENURE BY VEHICLES AVAILABLE*

### 1.6.2 Households that Rent

The renting population is another socioeconomic group that may be more likely to use TDM strategies like carpooling, transit and biking. Individuals who rent often do so to save money, meaning opportunities to reduce transportation costs are appealing. Additionally, renters may often have several roommates who either work at the same jobsite or in an area nearby, potentially leading to carpools. In densely populated areas, like Chittenden County, renters are often clustered together, also creating ideal conditions for finding carpools or bike partners (Figure 11). The average Vermont County has approximately 5,200 occupied renting units and Chittenden County has the most (approximately 25,000), accounting for roughly a third of all occupied units in the county. In addition to Chittenden County, Washington and Rutland County also have high populations of renters.
1.6.3 At-Risk Populations

Understanding the need to ensure TDM is administered in an equitable manner, this analysis included several at-risk populations in the analysis. These populations include people living in poverty, older adult populations, people with limited English proficiency, and people who identify as minorities.

1.6.3.1 Populations Living in Poverty

Budgeting for transportation can be a larger burden for people living in poverty. Individuals who cannot afford to live near work or transit face further challenges as vehicle ownership may be a necessity and the cost of owning multiple vehicles might be too high. Approximately 10 percent of Vermont's population lives in poverty and there are five counties with rates above the statewide rate: Bennington (11 percent), Chittenden (11 percent), Caledonia (13 percent), Windham (13 percent), and Essex (15 percent) (Figure 12). Of these five higher-than-statewide rates, Caledonia, Windham, and Essex are the three highest counties that likely have the largest number of individuals who would benefit from TDM services that reduce their overall transportation budgets.
Figure 12 Percentage of Region's Population that Lives in Poverty

Source: US Census Bureau 2021 American Community Survey (ACS) 5-Year Estimates Table S1701: POVERTY STATUS IN THE PAST 12 MONTHS

1.6.3.2 Older Adult Populations

Ensuring older adults can travel easily throughout Vermont is important for social, economic, and sustainable reasons. Like other transit dependent groups, older adults have unique needs from a financial, service hour, and accessibility perspective. By the age of 75, older drivers are involved in approximately the same number of vehicle accidents per mile as teenagers, meaning access to safe modes of non-driving transportation for this population is important. On aggregate, approximately 20 percent of all Vermont residents are age 65 or older (Figure 13). Like VMT, most Vermont counties (nine) have older adult populations in excess of the statewide average. This indicates that there are areas across the state where TDM programs that include older adults, can make a difference. Counties with the highest percentage of older adults include Essex (26 percent), Windsor (23 percent), and Windham (23 percent). Older adults can benefit from a variety of TDM strategies as some have part-time jobs or require regular transportation to social and personal events.
Past research indicates that wealth differences between people of color and minorities is a reason that white populations have better access to personal vehicles and have access to jobs. Given this general trend, there may be demand, amongst minority communities, for TDM support that helps identify options for commuting work. Approximately eight percent of Vermont’s population identifies as a minority, with Chittenden County (12 percent) having the highest percentage of people identifying as a minority (Figure 14). In Chittenden County, this equates to approximately seven white-identifying people for every one person who identifies as a minority. There are 11 counties with minority percentages below the statewide average and Orange County (five percent) has the lowest percentage of people who identify as a minority. In Orange County, this means there are approximately 17 white-identifying people for every one person who identifies as a minority. Areas with high concentrations of minority-identifying individuals may benefit from additional TDM support as there is likely a need for transportation to employment sites.

Figure 13 Percentage of the Population Age 65 and Up

Source: US Census Bureau 2021 American Community Survey (ACS) 5-Year Estimates Table B01001: Sex by Age

1.6.3.3 Minority Populations

Past research indicates that wealth differences between people of color and minorities is a reason that white populations have better access to personal vehicles and have access to jobs. Given this general trend, there may be demand, amongst minority communities, for TDM support that helps identify options for commuting work. Approximately eight percent of Vermont’s population identifies as a minority, with Chittenden County (12 percent) having the highest percentage of people identifying as a minority (Figure 14). In Chittenden County, this equates to approximately seven white-identifying people for every one person who identifies as a minority. There are 11 counties with minority percentages below the statewide average and Orange County (five percent) has the lowest percentage of people who identify as a minority. In Orange County, this means there are approximately 17 white-identifying people for every one person who identifies as a minority. Areas with high concentrations of minority-identifying individuals may benefit from additional TDM support as there is likely a need for transportation to employment sites.
**Figure 14 White and Non-White Population Demographics**

*Source: US Census Bureau 2021 American Community Survey (ACS) 5-Year Estimates Table B03002: HISPANIC OR LATINO ORIGIN BY RACE*

### 1.6.3.4 Limited English Proficiency Populations

Limited English proficiency refers to one’s ability to speak English relative to one’s primary language. One of the TDM challenges associated with language barriers is that an inability to sufficiently understand English may prevent these individuals from fully utilizing a region’s transportation network, denying them access to various employment, health, and leisure locations. TDM strategies that explain options available or connect these populations with other forms of sustainable travel like cycling or carpools can help reduce barriers to opportunity faced by these populations. Both Vermont and its individual counties have trace amounts of people who primarily speak a non-English language but cannot speak English well. Statewide, approximately 0.5 percent of Vermonters struggle to speak English. All counties, except Chittenden County (1.3 percent) have rates lower than the statewide average.

### 1.7 TDM Score

The TDM score was calculated using an index (with all factors weighted equally) that considers the above-mentioned data points (all normalized by area in square miles). Areas with very high TDM scores relative to the full state have residents or workers with higher propensities to utilize or benefit from TDM interventions. Counties with the highest scores include Windham (48 points), Chittenden (46 points), and Rutland (46 points) (Figure 15). These counties contain a blend of urban and remote areas and have the highest likelihood for adopting non-drive alone travel options. Conversely, Grand Isle (35 points), Orange (36 points), and Addison (36 points) County scored the lowest. This doesn’t mean they should be ignored, rather, it means that the top scoring counties have the highest likelihood for TDM success.

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7 Excluding zero-vehicle households, where Vermont workers live, and population growth
2. Existing Documents and Studies

Recognizing that many past studies have examined Vermont’s transportation trends and demand, the project team conducted a detailed review of these studies, keeping an eye out for past evaluations regarding the locations where there is high demand, gaps in the existing public transportation network and opportunities to encourage sustainable travel.

The project team reviewed six reports, and this section includes a summary of each study’s findings, as relevant to the parameters of this multimodal analysis.

The list of reports includes the following:

- 2040 Vermont Long-Range Transportation Plan (2018)
- VTrans Public Transit Policy Plan (2020)
- VTrans Climate Action Plan (2021)
- VTrans Bicycle and Pedestrian Strategic Plan (2021)
- VTrans Coordinated Intermodal Connections Review (2022)

1.7.1 2040 Vermont Long-Range Transportation Plan (2018)

- General Travel Trends
  - Over 80% of survey respondents indicated that the automobile, and therefore the highway system, is their primary mode of transport.
  - Approximately 88% of workers reported driving alone or carpooling as their primary mode to work.
  - Approximately half of Vermont’s owned and maintained 1,525 park and ride spaces are occupied on average each day. The trend of park and ride use follows gas prices closely (Figure 17).
  - As of 2017, travel time reliability on highways was approximately 99.6 percent, non-interstate reliability is lower, at approximately 88.2 percent.

- Transit
  - One popular intercity bus connection is the Vermont Shires Connector, which provides Bennington County residents access to Amtrak’s Albany-Rensselaer station.
  - Restoration of passenger rail service to Montreal and expansion of the Ethan Allen Express to Burlington are among the top rail priorities for Vermont.8

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8 In 2022, the Ethan Allen Express service began operating in Vermont.
Greenfield, MA, and its Valley Flyer Amtrak service is a connection opportunity for those living and working in and around Brattleboro.

1.7.2 VTrans Public Transit Policy Plan (2020)

- There is generally a lack of transit access in rural parts of the state, and the issue is compounded by Vermont's aging population, which is expected to grow by 60 percent in the coming years.
- Labor trends are shifting, with job growth concentrating in the northwest portion of the state (Chittenden County). Simultaneously, commute distances are increasing for the rest of the state, increasing the importance of long-distance transportation for vulnerable populations.
- Public perception and knowledge of public transit options are inconsistent. Many people in rural communities are unaware of the services available. Chittenden County might be the exception, as many are aware of their service but unaware about its connections.

1.7.3 Vermont State Rail Plan (2021)

- There is a need to enhance bus connections to existing Amtrak stations (Figure 17). Nine of the twelve Amtrak stations in Vermont (including Claremont, New Hampshire) are close to fixed route bus service, but schedules may not match in a useful, reliable manner.
- There are two opportunities for connectivity improvements:
  - A connection from the new Vergennes/Ferrisburgh station to Vergennes along Route 22A; and
  - A connection in Castleton between the Amtrak Station and the Marble Valley Regional Transit District's Fair Haven Route bus stop (~ 0.3 miles).
- One proposal for future service would involve running a second Ethan Allen route through Albany and southern Vermont. Such a service would require additional connections to local and regional bus services.

1.7.4 Vermont Climate Action Plan (2021)

- Vermonters collectively spend over $1 billion on fossil fuels for transportation. Approximately 70% of those dollars leave the state’s economy every year.
- Lower-income and rural Vermonters spend a far greater proportion of their incomes on transportation-related costs than more urban and upper income Vermonters.
- Transportation costs – primarily ownership, operation and maintenance of a vehicle – equate to 45% of total energy expenditures for the average Vermont household. This reality places a disproportionate economic burden on lower income Vermonters.
- Research has also found that “possession of a driver’s license and a car was a stronger predictor of leaving public assistance than even a high school diploma”.
- With an estimated 2018 Vermont population of 626,299 people, 237 per capita emissions were approximately 13.8 tons of climate pollution – higher than the per person average of any other New England state.
There are many Vermonters who chose to use a single occupant vehicle because of a lack of schedule and insufficient knowledge of the complete Vermont's Intercity Bus, Ferry, Amtrak, and Transit Agency Service Areas.

1.7.5 VTrans Bicycle and Pedestrian Strategic Plan (2021)

- Stakeholder engagement revealed that there are opportunities to identify improvements to education surrounding people walking and bicycling, ultimately encouraging walking or bicycling or using proper behavior when driving in the vicinity of people walking or bicycling.
- There is stakeholder desire for VTrans to develop a program to implement high quality bike parking options.

1.7.6 VTrans Coordinated Intermodal Connections Review (2022)

- Some Vermont communities have effective intermodal service, but there is an opportunity to better communicate the service to the public.
- Similar to other studies, though many Vermonters engage in intermodal travel, there are many who don't because of a lack of schedule and insufficient knowledge of the complete Vermont's Intercity Bus, Ferry, Amtrak, and Transit Agency Service Areas.

1.7.7 VTrans COVID-19 Transportation Dashboards

- In the period between 2020 and 2022, VTrans monitored travel data during the COVID-19 pandemic.
- During the initial months of the COVID-19 pandemic, automated traffic data collection indicated that the number of annual crashes decreased before slowly increasing again.
- General traffic patterns decreased significantly during the early portions of the pandemic (March/April 2020) before returning to similar, but slightly lower levels in March/April of 2022.\(^9\)

1.8 Key Findings

Several key findings were consistent in multiple documents. Mainly, the concentration of jobs in Vermont's urban environments increases travel demand in these places. This noted, the concentration also draws more commuters from rural areas with limited public transit options for regional travel. Both of these groups are TDM opportunities as the urban areas could grow their transit-share through transit network education whereas the rural commuters might be open to intercity bus or carpooling.

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\(^9\)As of June 26, 2022, VTrans archived COVID-19 dashboards and are no longer updated the data.