

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	SUMMARY OF FINDINGS.....	3
1.2	SUMMARY OF RECOMMENDATIONS.....	4
2.0	EXISTING AND FUTURE TRANSPORTATION CONDITIONS	6
2.1	AVERAGE ANNUAL DAILY TRAFFIC VOLUMES.....	6
2.2	AVERAGE ANNUAL DAILY TRAFFIC VOLUMES (CONTINUED).....	7
2.3	GENERALIZED TRAFFIC FLOWS FROM JAY PEAK.....	8
2.4	JAY PEAK RESORT TRAFFIC VOLUMES.....	9
2.5	INTERSECTION CONGESTION & DELAY.....	10
2.6	ROAD SEGMENT LEVEL OF SERVICE.....	15
2.7	PAVEMENT CONDITIONS.....	17
2.8	CRASH ANALYSIS.....	18
2.9	JAY PEAK DIRECTIONAL SIGNS.....	19
2.10	SIDEWALKS.....	21
2.11	BICYCLE ROUTES.....	22
2.12	FUNCTIONAL CLASSIFICATION.....	24
2.13	ROADWAY JURISDICTION.....	25

3.0 SUMMARY OF EXISTING AND FUTURE LAND USE ISSUES 26

3.1 REGIONAL POPULATION AND HOUSING GROWTH..... 26

3.2 TOWN OF JAY 26

3.3 TOWN OF WESTFIELD 31

3.4 TOWN OF TROY..... 33

4.0 TRANSPORTATION & LAND USE RECOMMENDATIONS 37

4.1 VILLAGE ENHANCEMENTS..... 38

4.2 ROAD CAPACITY ENHANCEMENTS & INFRASTRUCTURE IMPROVEMENTS 42

4.3 DIRECTIONAL SIGNAGE IMPROVEMENTS 47

4.4 LAND USE RECOMMENDATIONS..... 49

5.0 IMPLEMENTATION PLAN..... 53

5.1 (TE) TRANSPORTATION ENHANCEMENTS PROGRAM: 55

5.2 (STP) SURFACE TRANSPORTATION PROGRAM/VTRANS CAPITAL PROGRAM: 56

5.3 (MUNICIPAL) LOCAL FUNDS THROUGH THE MUNICIPAL CAPITAL BUDGET: 56

5.4 PRIVATE SOURCES..... 57

LIST OF FIGURES

Figure 1: Study Area2

Figure 2: General Location of Recommendations4

Figure 3: Implementation Matrix5

Figure 4: 2004 Average Annual Daily Traffic Volumes at Selected Locations6

Figure 5: Historical AADT Volumes at Select Locations across the Study Area.....7

Figure 6: Generalized Travel Flows from Jay Peak during Typical Winter Afternoon8

Figure 7: Traffic Volumes on the Jay Peak Access Road during the 2005-06 Ski Season9

Figure 8: Analyzed Intersections10

Figure 9: Road Segment Level of Service16

Figure 10: VTrans Regional Pavement Assessment.....17

Figure 11: Reportable Crashes 2000-2004 (Source: VTrans).....18

Figure 12: Status of Directional Signs in the Study Area.....19

Figure 13: Example of an Official Business Directional Sign Cluster.....20

Figure 14: North Troy Sidewalks & Condition Assessment.....21

Figure 15: Identified Pedestrian Improvements for Troy Hamlet.....22

Figure 16: Regional Bicycle Routes.....23

Figure 17: Functional Classification.....24

Figure 18: Roadway Jurisdiction.....25

Figure 19: Town of Jay Population Data27

Figure 20: Town of Jay Housing Data.....28

Figure 21: Town of Jay Zoning Map (2005).....30

Figure 22: Town of Westfield Population Data.....31

Figure 23: Town of Westfield Housing Data32

Figure 24: Town of Troy Population Data.....34

Figure 25: Village of North Troy Population Data34

Figure 26: Town of Troy Housing Data35

Figure 27: Village of North Troy Housing Data35

Figure 28: General Location of Recommendations..... 38

Figure 29: VT 242 Ascent to Jay Peak Resort 43

Figure 30: Conceptual Sketch of Turn Lanes at VT 242-VT 101 Intersection..... 45

Figure 31: Pavement Conditions along VT 105 46

Figure 32: 2004 VTrans Pavement Management System Evaluation 46

Figure 33: Recommended New Directional Signs 48

Figure 34: Example of an Official Business Directional Sign Cluster 49

Figure 35: Implementation Matrix..... 55

LIST OF TABLES

Table 1: 2026 No Build Level of Service..... 12

Table 2: 2026 Build Level of Service..... 14

Table 3: 95th Percentile Queue Lengths on Eastbound Approach to VT 242-VT101 Intersection..... 44

Table 4: Land Use Planning Recommendations 51

Table 5: Land Use Planning Recommendations cont. 52

Table 6: Cost Estimates - Roadway and Sign Improvements 53

Table 7: Cost Estimates - Village Enhancements 54

APPENDICIES

APPENDIX A – Conceptual Village Enhancement Plans

APPENDIX B – Public Meeting Notices and Materials

APPENDIX C – VTrans and Steering Committee Notes and Comments

APPENDIX D – Land Use Issues and Recommendations



1.0 INTRODUCTION

The Jay Transportation Infrastructure Study is a joint effort of the Towns of Jay, Troy, and Westfield, the Jay Peak Resort, the Northeastern Vermont Development Association (NVDA), the Vermont Agency of Transportation (VTrans), and local residents and business owners to develop a transportation and land use plan to accommodate the potential growth resulting from Jay Peak Resort's planned expansion.

In 2001, the Jay Peak Resort completed a comprehensive Master Plan which focused on expanding the resort's facilities. This plan including the addition of approximately 700 new residential units, increasing the capacity of the hotel, restaurant and conference facilities, and constructing a new 18-hole golf course. The overarching goal of this Master Plan was increase the total number of visitors to the resort by attracting more mid-week winter skiers and off-season visitors in the spring, summer, and fall months.



This expansion at Jay Peak Resort will result in increased traffic flows on the region's roads, additional tourists visiting the region's villages, and additional development pressures for homes and services to cater to these new visitors. The goal of this planning study is to first quantify the scope of these impacts and then work with key stakeholders and residents to develop a set of recommendations to best maintain efficient traffic flows, accommodate growth pressures, and maintain a strong quality of life throughout the region.

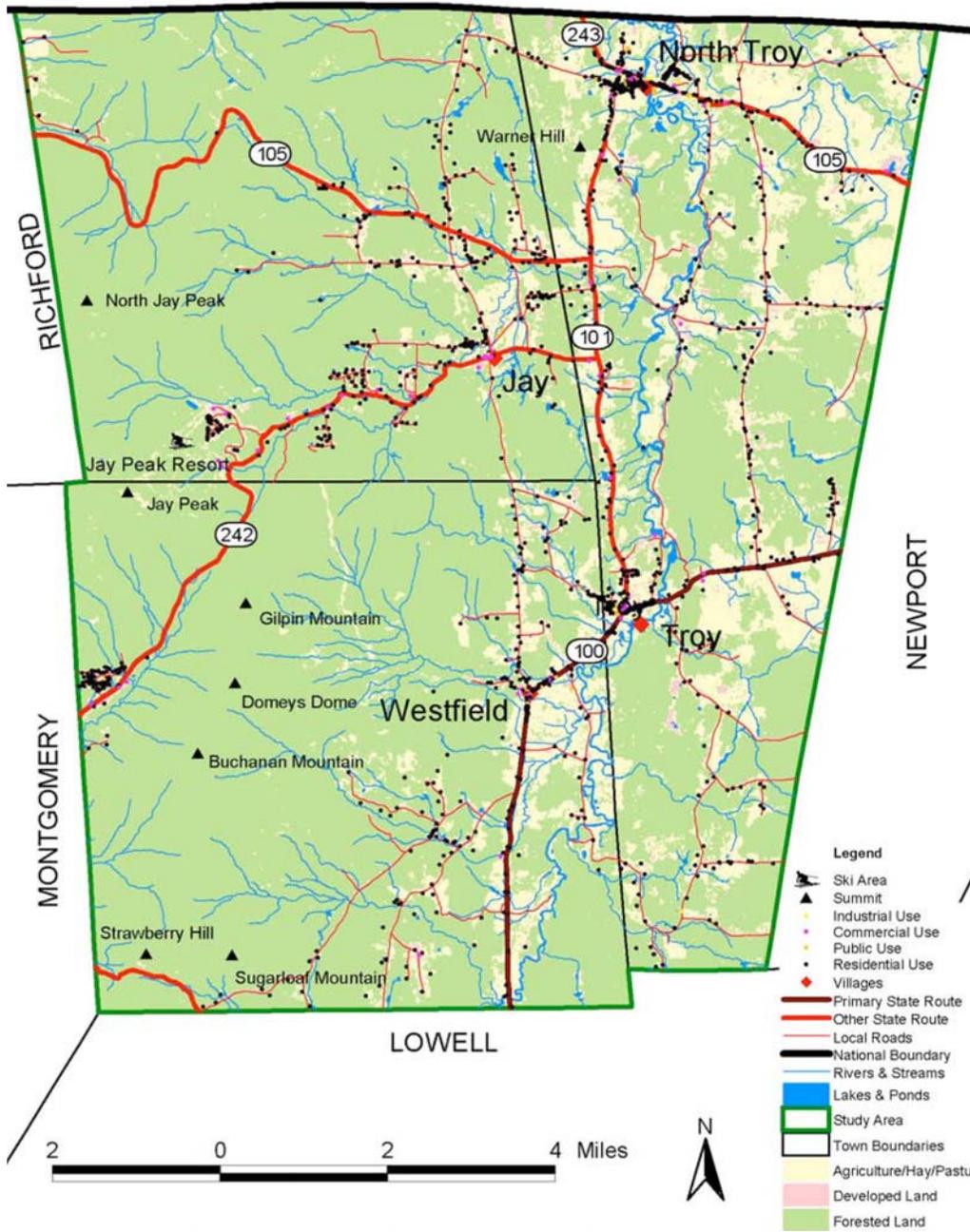
This report includes the following sections:

- Summary of Findings
- Summary of Recommendations
- Existing and Future Transportation Conditions
- Existing and Future Land Use Issues
- Transportation and Land Use Recommendations
- Implementation Plan



The project study area is shown on the next page.

Figure 1: Study Area



1.1 SUMMARY OF FINDINGS

The points below summarize the significant findings from the review of existing and future traffic and land use conditions across the study area.

- **Regional Traffic Trends:** While average daily traffic at six traffic count stations throughout the study area increased an average of 1% between 2002 and 2004, average volumes on the Jay Peak Access Road increased nearly 50% during this same time period. In general, traffic volumes are relatively low compared with counts on US 5 in Newport or VT 105 in Derby.
- **Congestion & Level of Service:** Due to the relatively low traffic volumes in the study area, there were no significant congestion issues identified at the identified intersections, even under a 2026 peak winter scenario. Although the intersections are shown to accommodate future volumes, deficiencies were identified in the level of service along road segments, due primarily to the rugged terrain, limited passing zones, and narrow shoulders. A passing lane on westbound VT 242 from Jay village up to Jay Peak Resort would help to improve segment operations.
- **Traffic Safety:** Two High Crash Locations (HCLs) were identified in the study area: 1) a 3.2 mile segment along VT 242 from Jay Village to Jay Peak, and 2) a 1 mile segment along VT 100 between the Westfield Town Line and River Road in Troy. This section includes the VT 100-VT 101 intersection and the VT 100-River Road intersection. Conceptual plans are currently being developed to address access and mobility issues at the VT 100-VT 101 crossroads.
- **Village Centers:** There are four clusters of development within the study area: Jay Village, Westfield Village, North Troy Village, and Troy Hamlet. Each of these centers experiences some level of impact from Jay Peak traffic. Potential improvements to help mitigate the effects of increased traffic through these areas include new gateway treatments, enhanced signage, new sidewalks and crosswalks, and new traffic calming elements.
- **Directional Signage:** Four specific locations were identified for new directional signage to and from Jay Peak. Currently, only a few Jay Peak Resort signs are currently posted on area roads.
- **Pavement Conditions:** The pavement conditions along VT 242 from Jay village up to Jay Peak Resort, and along VT 105 from VT 101 to North Troy are severely deteriorated and should be rehabilitated as soon as possible to avoid further damage and potential safety hazards.
- **Jay Peak Resort Master Plan:** The 2001 Jay Peak Resort Master Plan lays out a vision for new residential units, expansions to the hotel facilities, and a new 18-hole gold course. This proposed development has been estimated to generate 307 new hourly trips during peak winter conditions.

1.2 SUMMARY OF RECOMMENDATIONS

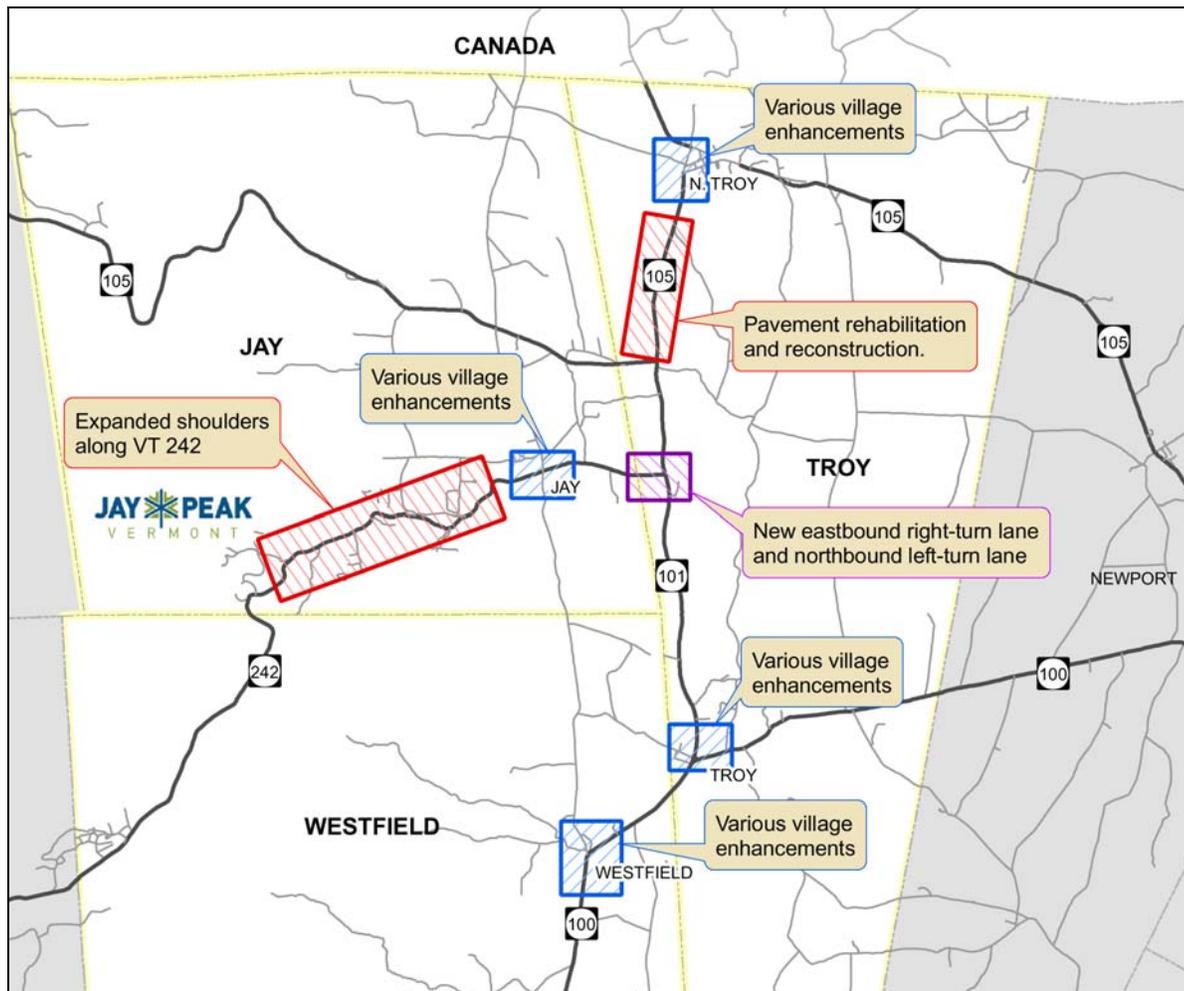
The recommendations presented in this report are based on our assessment of existing and future conditions, field observations, and input from Steering Committee members and the public.

The draft recommendations can be grouped into the following categories:

- Village Enhancements;
- Road Capacity and Infrastructure Improvements;
- Directional Signage Improvements; and
- Land Use Recommendations.

The general location of the various recommendations are shown on the map below.

Figure 2: General Location of Recommendations



To assist each of the Towns in moving the identified recommendations forward, an implementation matrix was developed which identifies project cost estimates, potential funding sources, and implementing partners. Each of the identified recommendations was designated short-term, mid-term, or long-term based on the relative cost, need, and ability to implement and order of magnitude cost estimates were prepared for the each of the recommendations, as shown in the implementation matrix below.

Figure 3: Implementation Matrix

	Improvement	Order of Magnitude Cost Estimate*	Potential Funding Source(s)**	Implementing Partners
Short-Term	Implement Land Use Recommendations	\$0	n/a	Town Planning Commissions, Zoning Boards
	Install New Safety Signs Along VT 242	\$1,000	STP	VTrans District & Traffic Operations
	Replace 4 Traffic Directional Signs	\$1,200	STP	VTrans District & Traffic Operations
	Relocate Two Official Business Directional Signs	\$75 initial; \$60/year	Private	VTrans Sign Control Unit, Jay Peak Resort
Mid-Term	Jay Village Enhancements Sidewalks, Drainage, Streetscaping, Traffic Calming	\$322,000	TE/MUNI/Private	NVDA, VTrans, Jay Peak Resort, Town of Jay
	North Troy Village Enhancements Sidewalks, Drainage, Streetscaping, Traffic Calming	\$336,000	TE/MUNI	NVDA, VTrans, Town of Troy, Village of N. Troy
	Troy Hamlet Enhancements Sidewalks, Drainage, Streetscaping, Traffic Improvements	\$308,000	TE/STP/MUNI	NVDA, VTrans, Town of Troy
	Westfield Village Enhancements Sidewalks, Drainage, Streetscaping, Traffic Calming	\$420,000	TE/MUNI	NVDA, VTrans, Town of Westfield
Long-Term	VT 242 - Shoulder Expansion (Jay Peak to Jay Village)	\$3,000,000	STP/MUNI	NVDA, VTrans, Jay Peak Resort, Town of Jay
	VT 242-VT 101 Northbound Turn Lane	\$250,000	STP/MUNI	NVDA, VTrans, Jay Peak Resort, Town of Troy
	VT 242-VT 101 Eastbound Turn Lane	\$200,000	STP/MUNI	NVDA, VTrans, Jay Peak Resort, Town of Troy
	VT 105 Construction (VT 101 to Vincent Road)	\$1,000,000	STP/MUNI	NVDA, VTrans, Jay Peak Resort, Town of Troy

* NOTE: Cost figures are estimates and should be used for preliminary planning purposes only.

** The following funding source abbreviations are used:

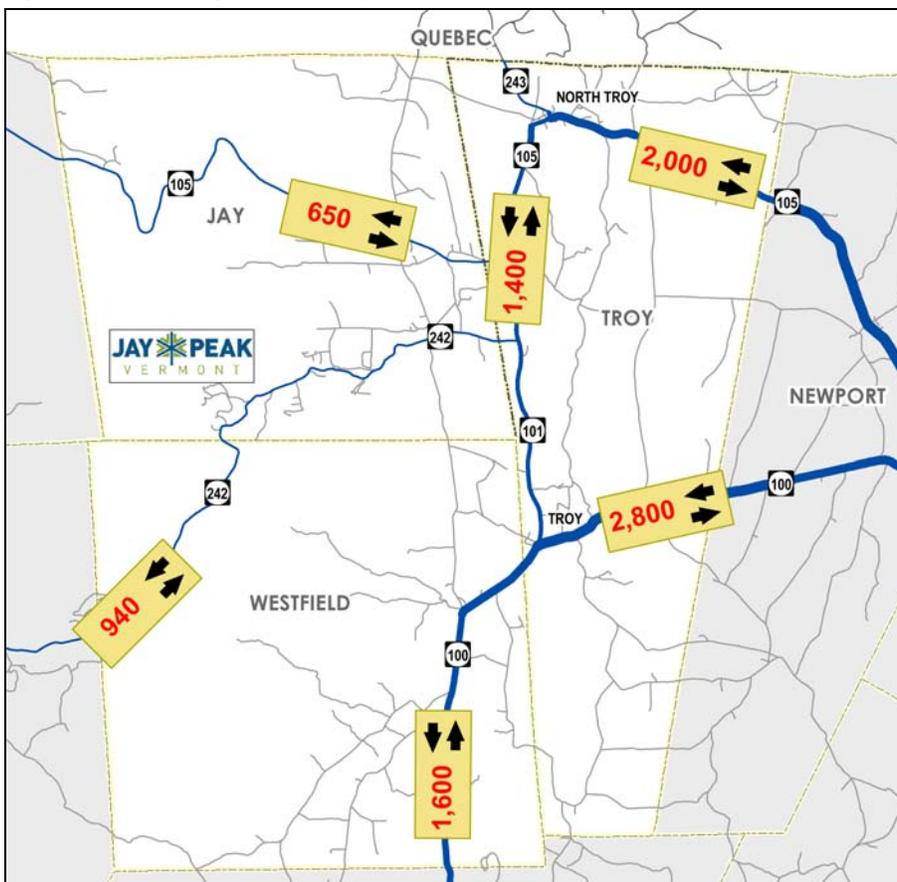
- (TE) - Transportation Enhancements
- (STP) - Surface Transportation Program
- (MUNI) - Municipal/Local
- (PRIVATE) - Private landowners, developers

2.0 EXISTING AND FUTURE TRANSPORTATION CONDITIONS

2.1 AVERAGE ANNUAL DAILY TRAFFIC VOLUMES

Figure 4 below shows 2004 Average Annual Daily Traffic (AADT) volumes on the Vermont State routes traveling through the study area. The figure shows VT 100 between Newport Town and the Troy Hamlet carries the highest volumes in the study area. In Troy, the volumes split roughly evenly between VT 100 and VT 101 to points north and south.

Figure 4: 2004 Average Annual Daily Traffic Volumes at Selected Locations



For comparison purposes, the average daily volumes on nearby roads are shown below:

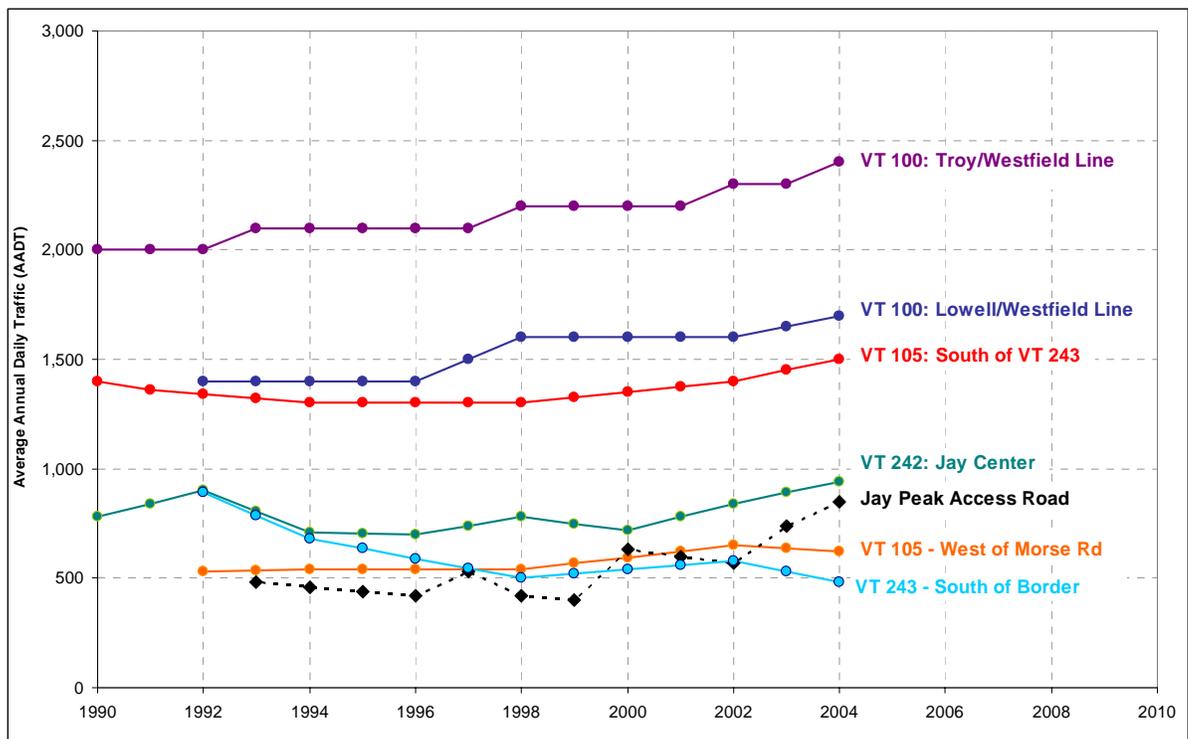
- Main Street in Newport: 15,000 vehicles per day
- US 5 in Derby: 12,000 vehicles per day
- I-91 at exit 28 (US 5): 4,500 vehicles per day

2.2 AVERAGE ANNUAL DAILY TRAFFIC VOLUMES (CONTINUED)

Figure 5 below shows AADT volumes at seven locations across the study area over the last 12-15 years. The volumes show a general upward trend with the exception of the VT 105 count in Jay (orange line) and the VT 243 border crossing count (light blue line), which show volumes decreasing since 2002.

Another point of note on the figure is the relatively large rate of increase in average volumes on the Jay Peak Access Road (black dashed line) over the past three years (49%) – particularly in comparison to changes at adjacent count stations (average 1% growth). This increase reflects recent expansions at the resort and an attempt to attract visitors throughout all four seasons.

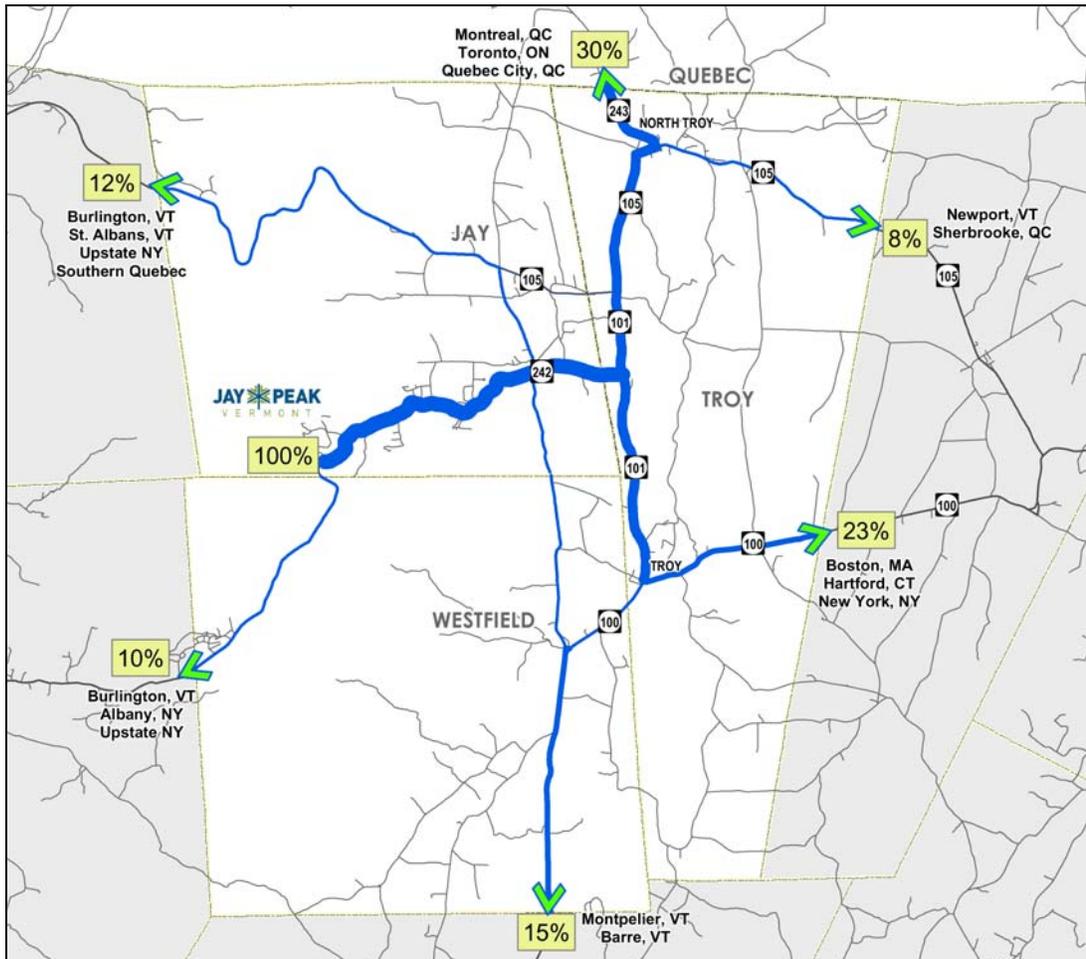
Figure 5: Historical AADT Volumes at Select Locations across the Study Area



2.3 GENERALIZED TRAFFIC FLOWS FROM JAY PEAK

Figure 6 below shows generalized traffic flows from Jay Peak Resort during a typical winter afternoon. The figure shows the distribution of trips along five major routes out of the study area beginning from 100% at the resort. The largest segment of vehicles heads north through North Troy into Quebec (30%) and east along VT 100 towards I-91 (23%). This distribution is based on traffic counts conducted at nine area intersections in February 2006.

Figure 6: Generalized Travel Flows from Jay Peak during Typical Winter Afternoon



The above figure correlates with the license plate inventory conducted on 26 February 2006 in the Jay Peak parking lots. The inventory found that, of the 160 vehicles tallied, nearly 2/3 of the vehicles were from either Vermont or Quebec (Vermont – 38%, Quebec – 27%). The third most common plates were from Massachusetts, representing 7% of the total plates observed.

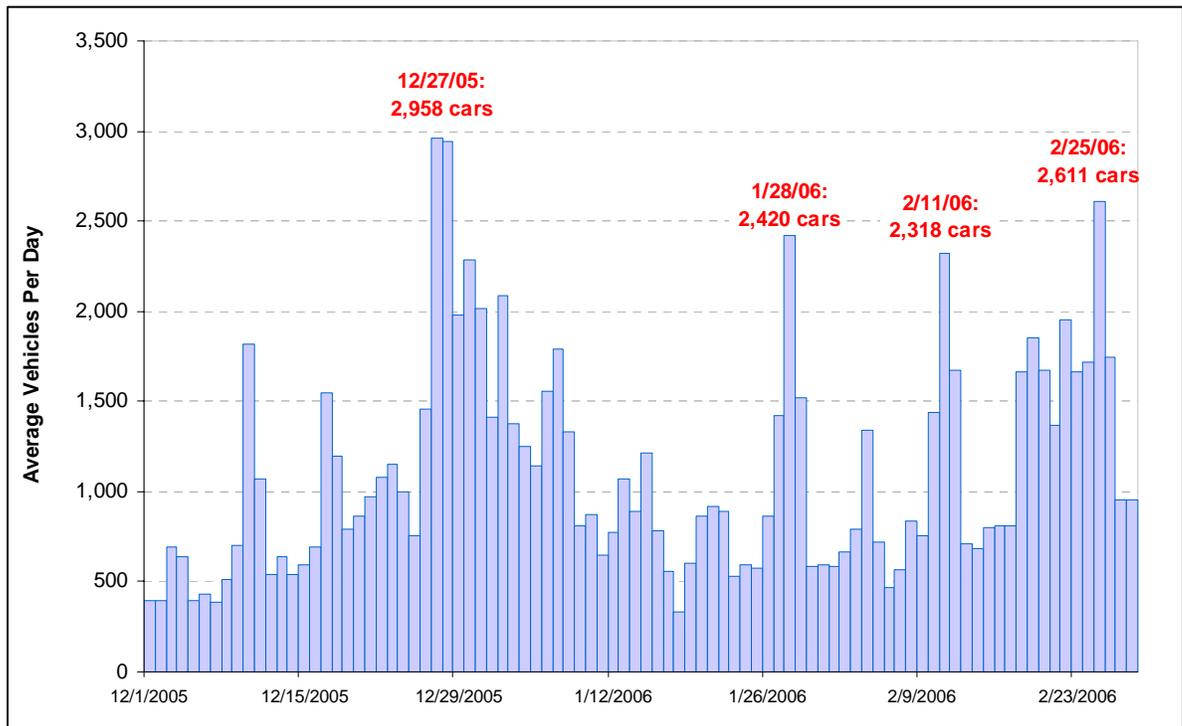
2.4 JAY PEAK RESORT TRAFFIC VOLUMES

Figure 7 below shows the fluctuating traffic volumes on the Jay Peak Access Road (both directions) during the months of December 2005, January 2006, and February 2006. The graph shows general peaks on the weekends, as well as pronounced spikes during Christmas vacation, school vacation week, and President’s day week.

The highest volume day was recorded on 12/27/05, with nearly 3,000 vehicles counted. The highest volume hour was recorded at 4:00 PM on 2/25/06, with 459 vehicles counted in one hour (nearly eight cars per minute).

As Figure 5 above showed, the average volumes over the year along the Jay Peak Access Road have been increasing at a faster rate than the adjacent count stations since 2002.

Figure 7: Traffic Volumes on the Jay Peak Access Road during the 2005-06 Ski Season¹



¹ Source: VTrans Continuous Traffic Count station P052 located on the Jay Peak access road.

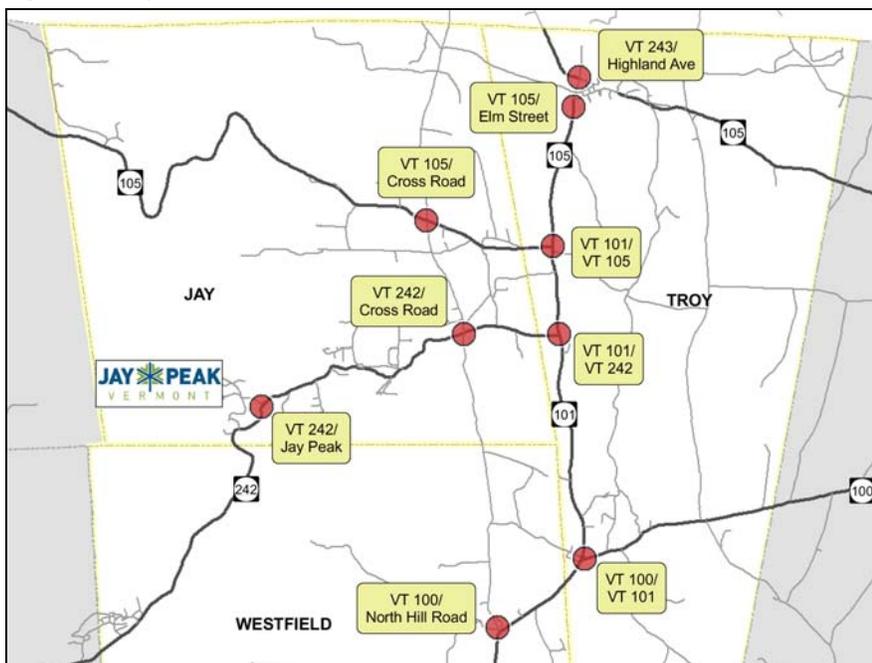
2.5 INTERSECTION CONGESTION & DELAY

Traffic congestion and average delay was calculated at nine intersections throughout the study area. The congestion analysis was examined for 2006 and 2026 conditions without the trips generated by the proposed Jay Peak expansion in place (No Build Scenario) and with the expansion in place (Build Scenario). To get a more complete picture of traffic fluctuations throughout the year, we examined congestion during the following time periods:

- Design Hour Conditions¹ (i.e. 30th Highest Hour);
- Typical Winter Afternoon²; and
- Peak Winter Hour³.

Figure 8 below shows the location of the nine analyzed intersections.

Figure 8: Analyzed Intersections



¹ The Design Hour Volume (DHV) reflects conditions during the 30th highest hour and is typically used in Vermont as the standard for design. The DHV intersection volumes are based on traffic counts adjusted to DHV conditions at the VTrans continuous count station P004 located on VT 100 at the Troy/Westfield line.

² The average winter afternoon conditions are based on traffic counts conducted by RSG on 2/24/06. Based on volumes on the Jay Peak access road continuous count station (P052), 2/24/06 traffic volumes were the 15th highest of the 2005-06 ski season.

³ The peak winter hour volumes reflect traffic levels typical of the busiest hour of the ski season. For the 2005-06 season, the busiest hour occurred at 4:00 PM on 2/26/06. The DHV volumes were adjusted appropriately to reflect these conditions.

2.5.1 Level of Service Analysis

A Level of Service (LOS) analysis is the analytical tool used to estimate congestion at intersections. LOS is a qualitative measure rating the operating conditions as perceived by motorists driving in a traffic stream. The *Highway Capacity Manual*¹ (HCM) defines six grades of LOS at an intersection, ranging from LOS A (free-flow conditions) to LOS F (extreme delays).

The VTrans policy on Level of Service identifies LOS C as the minimum design threshold, except in densely settled urban areas, or areas where the improvements required to obtain a LOS C or better would generate significant impacts.

2.5.2 No Build Conditions

Table 1 on the following page shows average delay (seconds), Level of Service grade, and Volume to Capacity ratio² (v/c) by movement for each of the nine analyzed intersections for the 2026 No Build conditions. In this analysis, 'No Build' refers to conditions without the proposed Jay Peak expansion plans implemented.

2026 No Build volumes were calculated by applying a 23% growth factor (3% per year) to the 2006 No Build volumes to account for 20 years of background traffic growth. This value was determined based on steering committee and public input that the Jay Region will be experiencing relatively high growth over the coming 20 years. This growth rate is significantly higher than the statewide growth rate for similar roads (1% per year), and higher than the average traffic growth trend at 7 traffic count locations around the region (0.4% per year).

The 2026 No Build congestion analysis results show all intersection movements operating at LOS B or better under all scenarios in both 2006 and 2026. The longest average delays are shown to result at the northbound approach to the VT 242-Cross Road intersection in Jay, due to the relatively high volume of cars coming down VT 242 from Jay Peak.

¹ Transportation Research Board, National Research Council, *Highway Capacity Manual: Special Report 209*, Washington DC, 2000.

² The v/c ratio is a measure of the amount of the intersection approach utilized under the given volumes and intersection geometry. A v/c of 100% indicates an approach that is operating at capacity.

Table 1: 2026 No Build Level of Service

	2026 - NO BUILD								
	Design Hour			Typical Winter PM			Winter Peak Hour		
	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C
VT243-Highland Avenue									
EB-VT 243	0	A	0%	0	A	0%	0	A	0%
WB-Railroad St	2	A	1%	1	A	0%	2	A	1%
NB-Elm St	9	A	3%	9	A	10%	9	A	9%
SB-Dominion Ave	10	A	1%	10	A	2%	9	A	0%
VT105-Elm Street									
WB-VT105	8	A	8%	8	A	8%	8	A	5%
NB-VT105	7	A	7%	8	A	13%	7	A	14%
SB-Elm Street	7	A	4%	7	A	4%	7	A	2%
VT105-VT101									
EB-VT105	10	A	9%	10	A	7%	10	A	6%
NB-VT101	3	A	2%	2	A	2%	2	A	3%
SB-VT101	0	A	8%	0	A	5%	0	A	4%
VT105-Cross Road									
EB-VT105	0	A	0%	1	A	0%	0	A	0%
WB-VT105	1	A	1%	0	A	0%	1	A	0%
NB-Cross Road	9	A	1%	9	A	0%	10	A	9%
SB-Cross Road	10	A	1%	10	A	1%	9	A	1%
VT242-Cross Road									
EB-VT242	1	A	2%	1	A	3%	1	A	5%
WB-VT242	0	A	0%	0	A	0%	0	A	0%
NB-North Hill Road	10	B	2%	12	B	4%	14	B	2%
SB-Cross Road	10	A	3%	11	B	6%	13	B	3%
VT101-VT242									
EB-VT242	10	A	7%	11	B	30%	14	B	54%
NB-VT101	4	A	4%	4	A	3%	3	A	3%
SB-VT101	0	A	7%	0	A	5%	0	A	5%
VT100-North Hill Road									
EB-North Hill Road	10	B	2%	10	B	2%	10	A	1%
NB-VT100	2	A	2%	2	A	2%	2	A	1%
SB-VT100	0	A	7%	0	A	7%	0	A	9%
VT 100 - VT 101 (northwest corner)									
EB-Minor Drive	0	A	0%	14	B	4%	0	A	0%
WB-TopTriangleLeg	9	A	11%	10	A	12%	9	A	7%
NB-VT101	0	A	0%	1	A	0%	0	A	0%
SB-VT101	5	A	6%	6	A	12%	6	A	17%
VT 100 - VT 101 (southwest corner)									
EB-VT100	2	A	2%	2	A	2%	2	A	1%
WB-VT100	0	A	7%	0	A	5%	0	A	5%
SB-VT101	9	A	6%	9	A	6%	9	A	10%
VT 100 - VT 101 (northeast corner)									
EB-TopTriangleLeg	11	B	13%	12	B	27%	12	B	33%
NB-VT100	0	A	5%	0	A	5%	0	A	4%
SB-VT100	0	A	14%	0	A	11%	0	A	9%
VT 242-Jay Peak Drive									
EB-VT242	2	A	1%	2	A	1%	2	A	0%
WB-VT242	0	A	1%	0	A	2%	0	A	1%
SB-Jay Peak Drive	10	A	19%	10	B	28%	12	B	47%

2.5.3 Build Conditions

To estimate the traffic impact generated by the proposed expansion at Jay Peak Resort, we used a trip generation rate of 0.34 trips per unit¹ (during the PM peak hour) multiplied by the number of units proposed in the 2001 Master Plan (903 units). Thus, the proposed additional trip generation during the PM peak hour resulting from the build out of the Master Plan elements is 307 trips (903 units x 0.34 trips/unit).

The Build scenarios below were calculated by adding the new trips generated by Jay Peak Resort to the No Build traffic volumes. For the 2026 design hour Build scenario, we assumed that the expanded resort and 18-hole golf course would attract an additional 200 trips during the peak hour. For the 2026 typical winter afternoon Build scenario, we assumed that the new units were 75% occupied. For the 2026 peak winter afternoon Build scenario, we assumed that all of the new units are occupied.

Table 2 below shows the 2026 Build LOS results for the average winter and peak winter conditions. While the LOS for average winter conditions remained B or better, the peak winter traffic create LOS C conditions for certain movements. In particular, the eastbound VT 242 approach to VT 101 drops from LOS B under No Build and Build average winter conditions to LOS C under peak winter conditions. Under peak conditions, vehicles at this approach experience an average of 24 seconds of delay and consume 79% of the available capacity.

¹ Trip generation rate based on a ski vehicle intercept study conducted for the Mountain Club Resort at Mount Snow, Bruno Associates, 1996. This trip generation rate assumes 100% occupancy.

Table 2: 2026 Build Level of Service

	2026 - BUILD								
	Design Hour			Typical Winter PM			Winter Peak Hour		
	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C
VT243-Highland Avenue									
EB-VT 243	0	A	0%	0	A	0%	0	A	0%
WB-Railroad St	2	A	1%	1	A	0%	2	A	1%
NB-Elm St	9	A	5%	10	A	14%	10	A	14%
SB-Dominion Ave	10	A	1%	10	A	2%	9	A	0%
VT105-Elm Street									
WB-VT105	8	A	10%	8	A	8%	8	A	5%
NB-VT105	7	A	10%	8	A	19%	8	A	22%
SB-Elm Street	8	A	5%	7	A	4%	7	A	2%
VT105-VT101									
EB-VT105	1	A	10%	10	A	8%	10	B	6%
NB-VT101	2	A	2%	1	A	2%	2	A	3%
SB-VT101	0	A	9%	0	A	5%	0	A	4%
VT105-Cross Road									
EB-VT105	0	A	0%	1	A	0%	0	A	0%
WB-VT105	1	A	1%	0	A	0%	1	A	0%
NB-Cross Road	9	A	3%	9	A	4%	10	A	14%
SB-Cross Road	10	A	1%	10	A	1%	9	A	1%
VT242-Cross Road									
EB-VT242	1	A	3%	1	A	5%	2	A	7%
WB-VT242	0	A	0%	1	A	0%	0	A	0%
NB-North Hill Road	13	B	6%	15	C	6%	20	C	4%
SB-Cross Road	10	B	6%	13	B	8%	17	C	5%
VT101-VT242									
EB-VT242	11	B	14%	13	B	48%	24	C	79%
NB-VT101	5	A	8%	4	A	3%	3	A	3%
SB-VT101	0	A	8%	0	A	5%	0	A	5%
VT100-North Hill Road									
EB-North Hill Road	10	B	2%	10	B	2%	10	B	1%
NB-VT100	2	A	2%	2	A	2%	2	A	1%
SB-VT100	0	A	8%	0	A	9%	0	A	11%
VT 100 - VT 101 (northwest corner)									
EB-Minor Drive	0	A	0%	18	C	6%	0	A	0%
WB-TopTriangleLeg	9	A	15%	10	B	13%	9	A	7%
NB-VT101	0	A	0%	1	A	0%	0	A	0%
SB-VT101	6	A	8%	7	A	19%	7	A	26%
VT 100 - VT 101 (southwest corner)									
EB-VT100	2	A	2%	2	A	2%	2	A	1%
WB-VT100	0	A	7%	0	A	5%	0	A	5%
SB-VT101	9	A	6%	9	A	6%	9	A	10%
VT 100 - VT 101 (northeast corner)									
EB-TopTriangleLeg	11	B	19%	13	B	42%	14	B	51%
NB-VT100	0	A	5%	0	A	5%	0	A	4%
SB-VT100	0	A	16%	0	A	11%	0	A	9%
VT 242-Jay Peak Drive									
EB-VT242	2	A	1%	2	A	1%	2	A	0%
WB-VT242	0	A	7%	0	A	2%	0	A	1%
SB-Jay Peak Drive	11	B	32%	14	B	54%	22	C	79%

2.6 ROAD SEGMENT LEVEL OF SERVICE

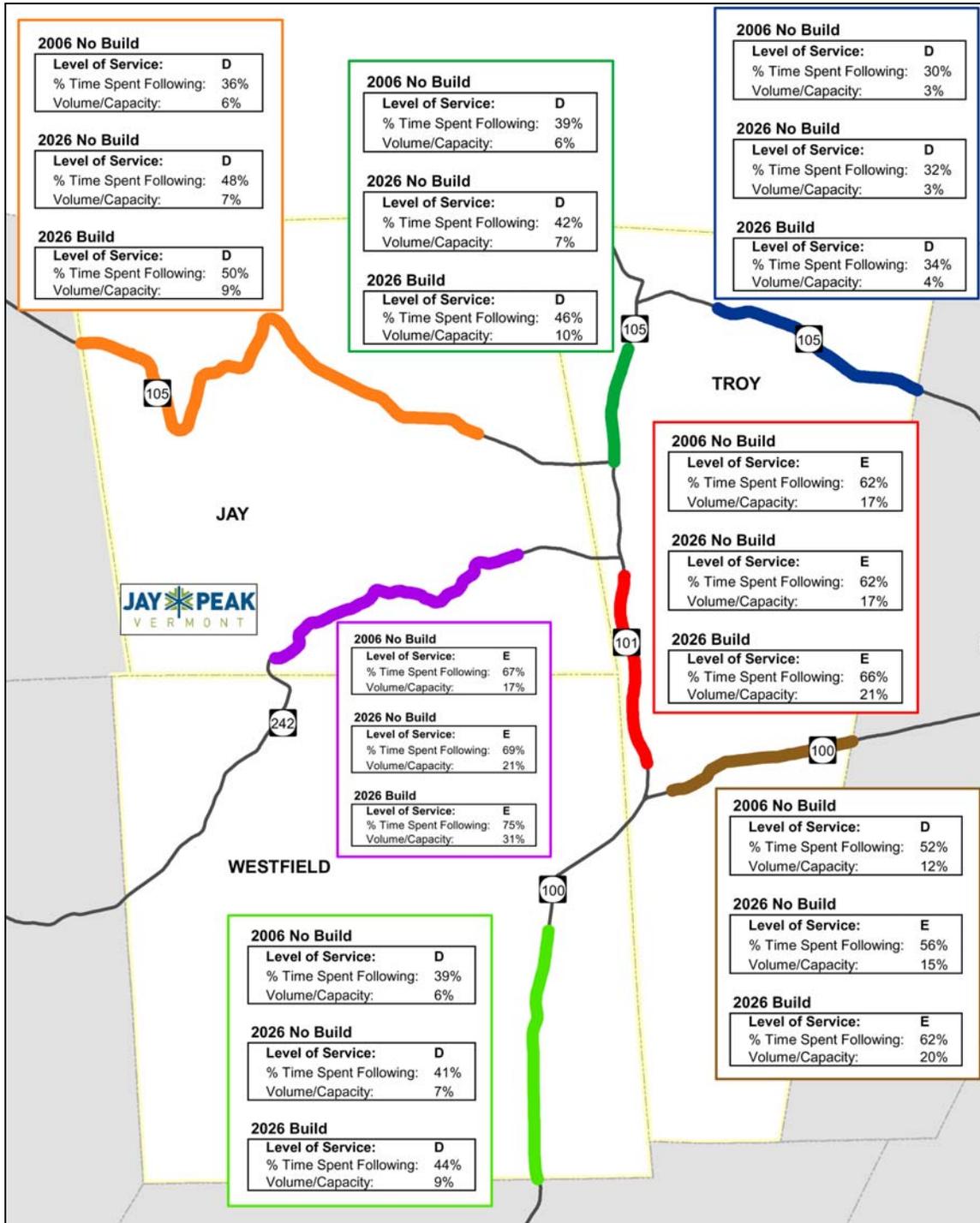
A Level of Service (LOS) analysis was conducted on seven road segments within the study area. Similar to intersection Level of Service, a road segment level of service analysis identifies the level of service from the driver's perspective using the following measures:

- LOS Grade (A through F);
- Volume to Capacity Ratio (v/c); and
- Average Time Spent Following Another Car.

A rural road segment LOS is calculated based on a number of factors including lane geometry, type of roadway, terrain, traffic volume, percent passing zones, number of driveways, and speed. The level of service is particularly guided by a vehicle's ability to maintain free-flow speed. Thus, obstructions to free-flow conditions, such as a high percentage of trucks, steep terrain, and no passing zones, lead to poor levels of service.

Figure 9 on the following page shows the road segment LOS results for the seven road segments during peak winter conditions under 2006 No Build, 2026 No Build, and 2026 Build conditions. The figure shows all segments operating under LOS D or worse under all conditions. The worst measures are found on VT 242 where, under 2026 Build conditions, the average time spent following another car is 75%.

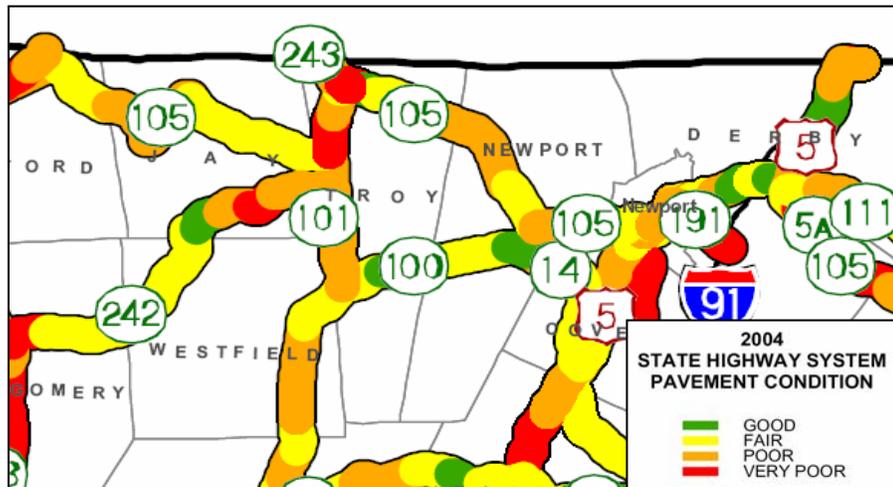
Figure 9: Road Segment Level of Service



2.7 PAVEMENT CONDITIONS

Each year, the VTrans pavement management section monitors pavement conditions around the state and identifies rehabilitation strategies to address the most deteriorated sections of roadway within a set budget. Figure 10 below shows the latest VTrans pavement assessment results in the project area.

Figure 10: VTrans Regional Pavement Assessment



As the figure shows, the following segments are rated as ‘very poor’ in the study area:

- VT 242 between Jay Village and Jay Peak Resort
- VT 105 between VT 101 and North Troy Village
- Railroad Avenue in North Troy Village

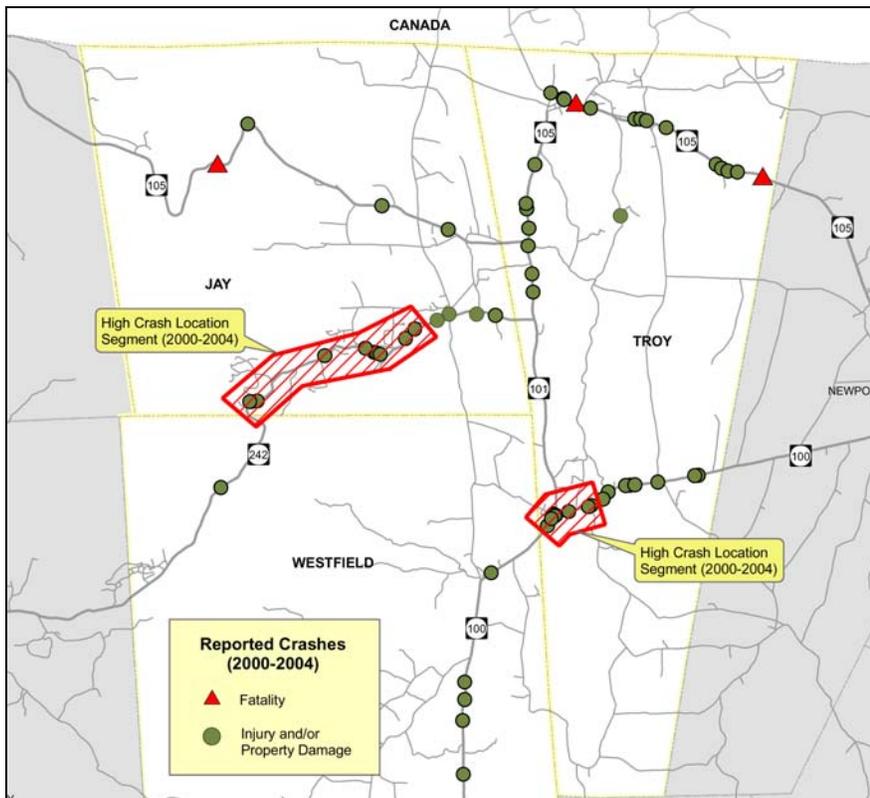
Road segments rated as ‘very poor’ typically have significant signs of deterioration, cracking, and rutting and often require extensive reconstruction to repair. VTrans’ goal is to have no more than 25% of all road segments rated ‘very poor’ statewide.

2.8 CRASH ANALYSIS

VTrans maintains a statewide database of reportable crashes¹ on the state and town road systems. Between 2000 and 2004 a total of 82 crashes were reported in the study area (52 in Troy, 23 in Jay, and 7 in Westfield). 29 of these crashes (35%) involved personal injury and 3 crashes (4%) resulted in fatality. Nearly half of the crashes (46%) occurred during the winter months (November-March), with 30% of the crashes occurring during inclement weather (snow, rain, ice).

Based on VTrans average Statewide crash rates, a one mile segment of VT 100 between the Westfield town line and River Road in Troy has been identified as a High Crash Location (actual crash rate exceeds the critical rate for this facility type). This section includes the VT 100-VT 101 intersection and the VT 100-River Road intersection. A second High Crash Location was identified along VT 242 between Jay Village and the Jay Peak Resort entrance.

Figure 11: Reportable Crashes 2000-2004 (Source: VTrans)



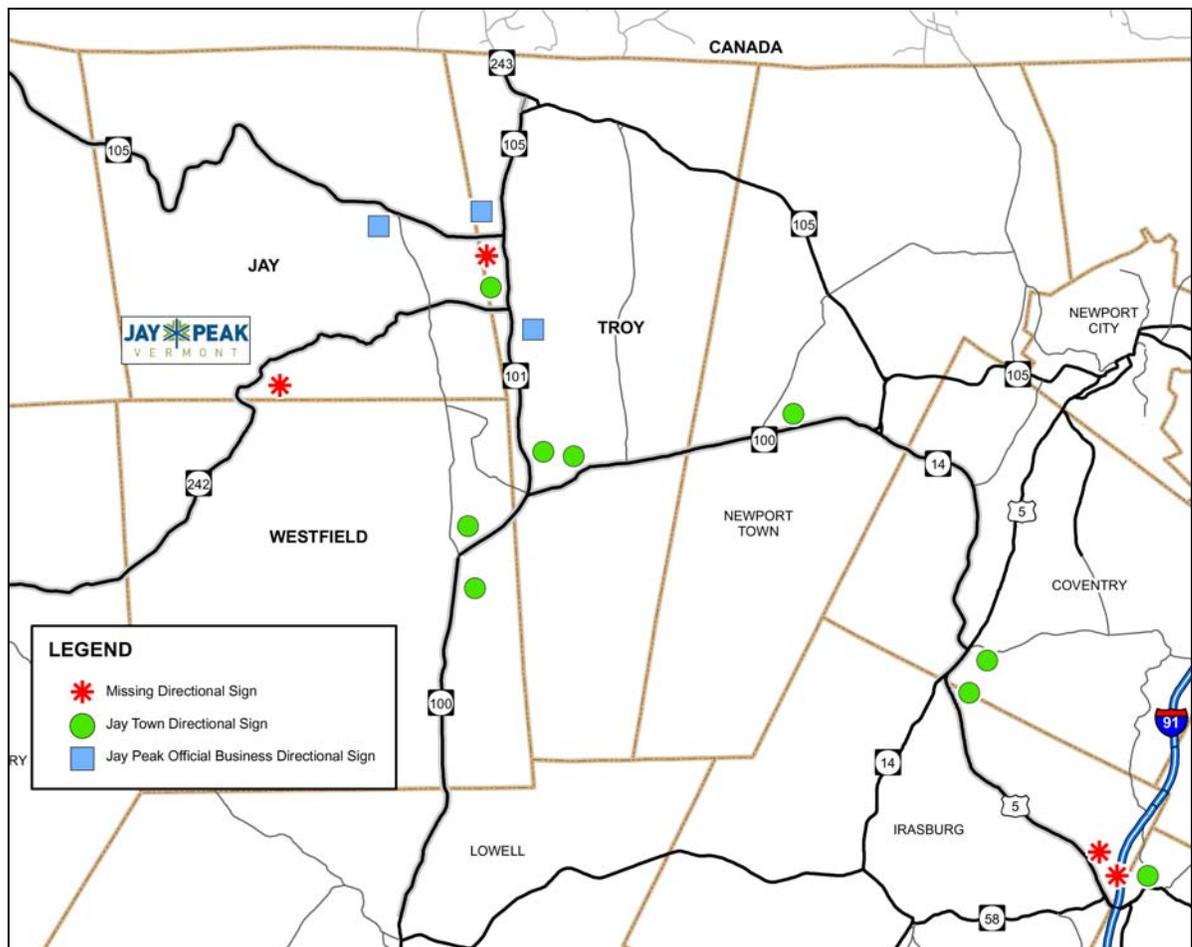
¹ A reportable crash is a crash involving \$1,000 or more in property damage, an injury, or a fatality. Information exempt from discover or admission under 23 U.S.C 409

2.9 JAY PEAK DIRECTIONAL SIGNS

As Jay Peak Resort seeks to attract more destination skiers from out of state, clear directional signage to and from the mountain becomes increasingly important. Figure 12 below shows the major routes to the resort highlighted in yellow. A number of the routes, particularly the route from I-91, follow somewhat circuitous routes with a number of turns and decision points along its length.

Figure 12 also shows the status of directional signs at major intersections along the identified routes. The red stars indicate locations where additional directional signs should be added. The green circles indicate locations where standard town directional signs to Jay are posted. The blue squares indicate locations where Vermont Official Business Directional Signs are posted for Jay Peak.

Figure 12: Status of Directional Signs in the Study Area



The following locations were identified in Figure 12 above for new directional signs:

- Jay Peak Access Drive approach to VT 242: The sign posted for drivers leaving Jay Peak and entering VT 242 only indicates the directions for Jay and Westfield. This sign cluster should also include an indication for I-91 and Canada.
- VT 105 eastbound approach to VT 101: An Official Business Directional Sign should be posted at this approach to indicate a right turn for Jay Peak Resort.
- I-91 Southbound Off-Ramp (Exit 26): The directional sign cluster on the off-ramp should be expanded to include the Town of Jay.
- U5 5 northbound approach to VT 58: Add Jay to the directional town sign cluster.

The Vermont Official Business Directional Signs (OBDS) directing traffic to Jay Peak are located at a number of locations as shown in Figure 12 above. Jay Peak Resort should discuss whether they would like to add OBDS signs to any of the existing locations currently only directing traffic to the Town of Jay. The OBDS signs cost \$75 for initial set-up and \$60 each year. The program is run through the Agency of Transportation.

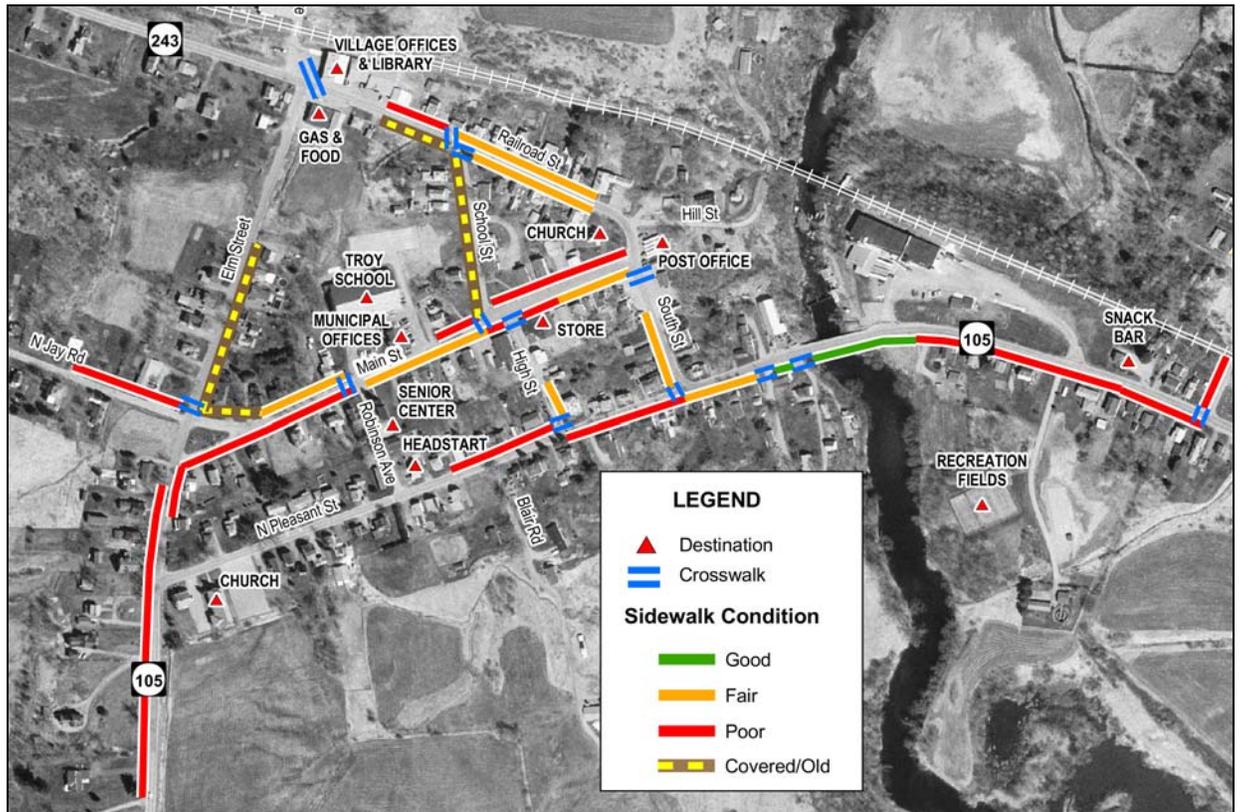
Figure 13: Example of an Official Business Directional Sign Cluster



2.10 SIDEWALKS

The only sidewalks in the study area are located in North Troy Village. Figure 14 below shows the location of the sidewalks, crosswalks, and important pedestrian destinations, along with an assessment of the condition of each sidewalk segment. Although the sidewalk network is pretty extensive throughout the village, the figure shows that most sidewalks are in either *fair* or *poor* condition.

Figure 14: North Troy Sidewalks & Condition Assessment

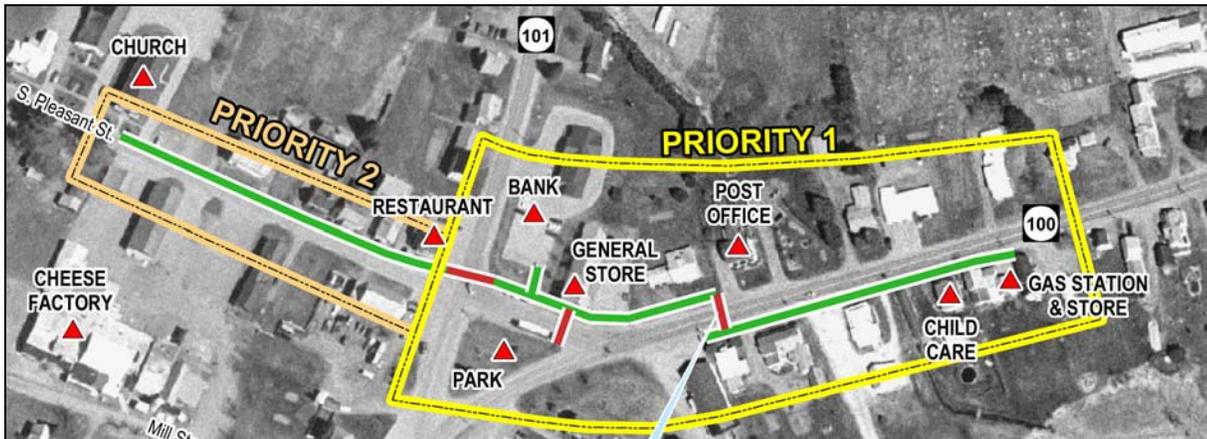


In 2005, RSG identified potential pedestrian facility improvements for Troy Hamlet which are shown below in Figure 15). Conceptual designs are currently being prepared for a portion of these sidewalks between VT 101 and the General Store. Other elements of this conceptual design include the following:

- Re-alignment of the South Pleasant Street-VT 100 intersection to discourage high-speed through traffic;

- Re-alignment of the VT 101-VT 100 intersection to better accommodate truck turning movements; and
- Narrowing the entrance to the General Store parking lot.

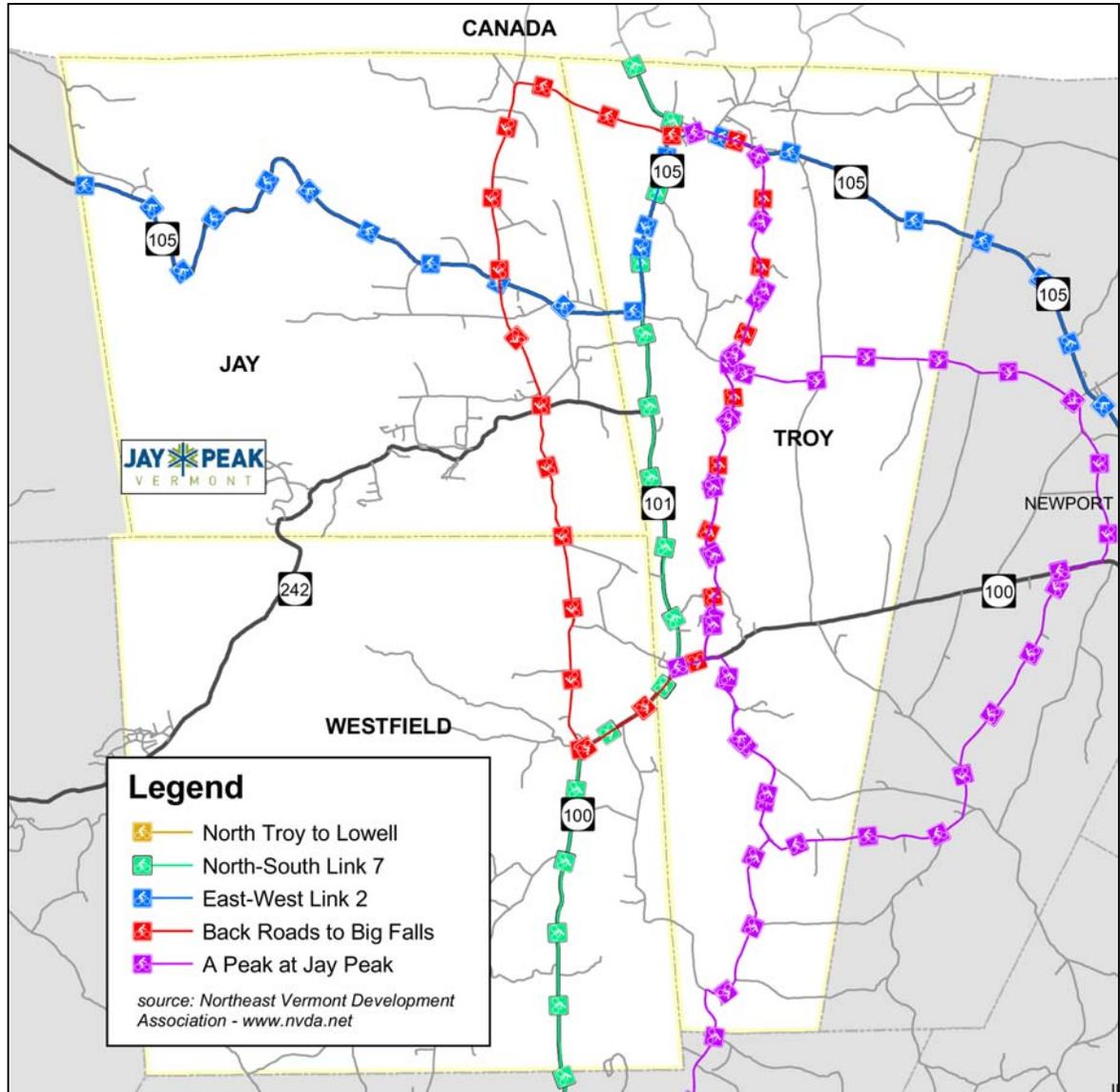
Figure 15: Identified Pedestrian Improvements for Troy Hamlet



2.11 BICYCLE ROUTES

Figure 16 shows the identified bicycle routes through the study area as identified in *Cycling in the Kingdom* (NVDA, 2000) and *Cycling the Kingdom's Back Roads* (NVDA, 2003). Although these routes are unofficial, they provide a good starting point for all levels of bicyclists looking to tour the Northeast Kingdom.

Figure 16: Regional Bicycle Routes



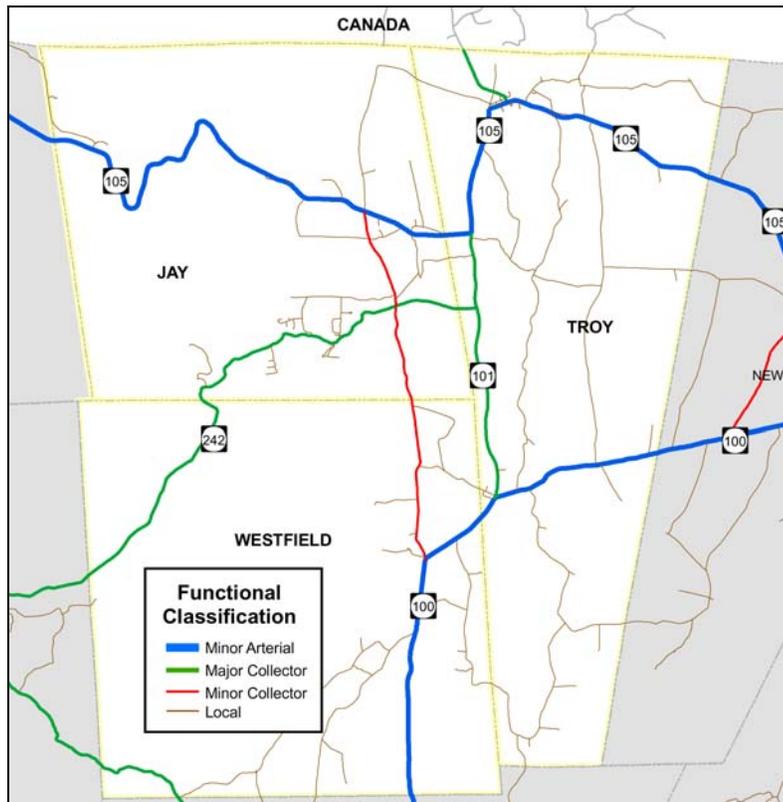
2.12 FUNCTIONAL CLASSIFICATION

The Federal Highway Administration’s roadway functional classification system is organized as a hierarchy of facilities, based on the degree to which the roadway serves mobility and access to adjacent land uses. Freeways and interstate highways, at the top of the hierarchy, are devoted exclusively to vehicle mobility, with no direct access to adjacent land. Arterials and Collectors provide both mobility and access to adjacent land uses. The local road system is devoted exclusively to providing local access, with limited capacity and relatively slow speeds.

The figure below shows that VT 105 and VT 100 are classified as minor arterials and are intended to serve as the primary routes for longer-distance through trips in the region. These routes also provide a level of accessibility to adjacent land uses and carry local trips. VT 105 is also part of the state truck network through the study area and can be expected to carry a higher percentage of through trucks.

VT 101 and VT 242 are classified as major collectors and serve the primary role of providing a connection between the local road network and the arterial network. Cross Road and North Hill Road are classified as minor collectors and provide service for both through and local trips.

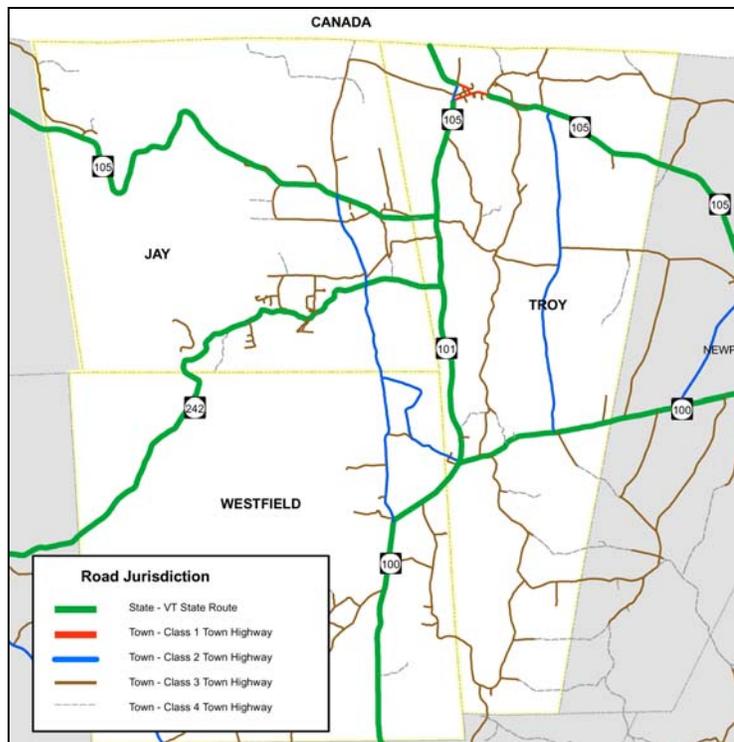
Figure 17: Functional Classification



2.13 ROADWAY JURISDICTION

- State Route: Forms the primary transportation network through the State. State routes include all state numbered highway routes not designated as Class 1 town highways and are the responsibility of VTrans.
- Class 1 Town Highway: Forms the extension of state numbered highway routes through a town, and which carry a state highway route number. Class 1 town highways are subject to concurrent jurisdiction between the Municipality and VTrans on several matters.
- Class 2 Town Highway: Those town highways selected as the most important highways in each town. As far as practicable they shall be selected with the purposes of securing trunk lines of improved highways connecting two towns and to places which by their nature have more than a normal amount of traffic. Class 2 highways are primarily the responsibility of municipalities.
- Class 3 Town Highway: All other town highways that are "negotiable under normal conditions all seasons of the year by a standard pleasure car." Class 3 town highways, including sidewalks, crosswalks, and parking, are the responsibility of municipalities.
- Class 4 Town Highway: All other town highways are considered Class 4 town highways. The majority of these receive limited or no maintenance.

Figure 18: Roadway Jurisdiction



3.0 SUMMARY OF EXISTING AND FUTURE LAND USE ISSUES

The study area is typically defined by its rural residential and agricultural character. The western portions of Jay and Westfield are mountainous and forested, providing spectacular scenery and views. Jay Peak and the northern spur of the Green Mountain chain dominate the western landscape and are visible from all three towns. The eastern portions of the study area, mainly Troy, slope steeply up from the Missisquoi River, and are exemplified by a cluster of civic structures (i.e. Post Office, fire station, library, Town Hall) and related activity.

The population centers or clusters for each of the towns are all within roughly 7.5-miles of one another. The towns share many services such as sewer, recycling and emergency, and are thus affected by each other's growth. Much of the recent development has been single-family residential and is occurring outside the village centers, generally creeping out along the roadways into the more rural areas. Tourism related to recreation and the ski industry generally dominates the economy and growth in this region. Other commercial and industrial uses are very limited and residents and visitors must travel more than 15 miles to Newport or Derby, the closest urban areas, for employment, shopping, medical, and other commercial needs.

The transportation corridors are an integral part of the community's daily life and provide access to the region's breathtaking scenery. The views and vistas are quintessential Vermont – mountains and lofty peaks, wooded rolling hillsides, open pastures and farmland, rivers and valleys, and historic barns and structures. These characteristics make it a popular area to live, work, and play. The towns have identified some of the more noteworthy scenic roads and important travel corridors, which include Routes 242, 105, 100, and 101. A review of how each town addresses transportation and land use along these roads follows.

3.1 REGIONAL POPULATION AND HOUSING GROWTH

Between 2004 and 2020 the population in the three study area towns is projected to increase by approximately 11%. This compares with a projected average growth of 13% statewide during this time period. The latest estimates show that an additional 385 housing units will be constructed within the three towns through 2020. This growth would roughly translate into an additional 3,800 daily vehicle trips on the region's roads.

3.2 TOWN OF JAY

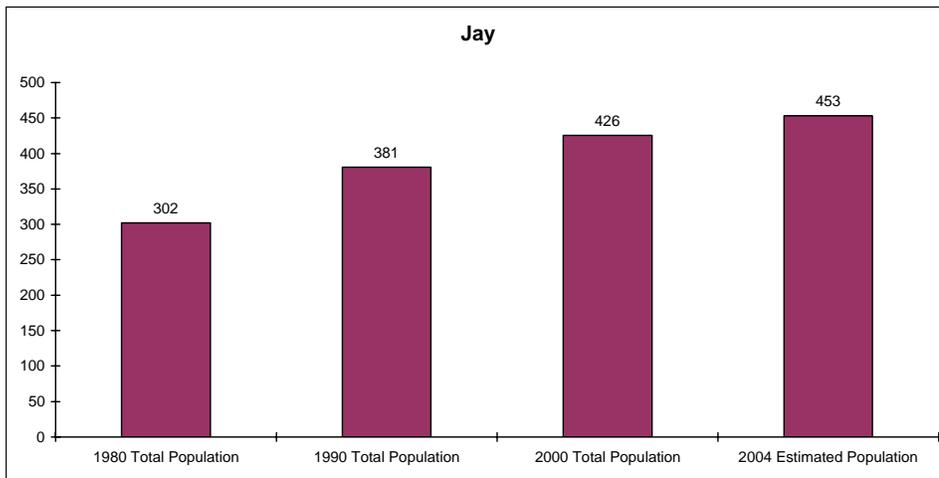
3.2.1 Jay Community Profile

The Town of Jay experienced slow settlement and growth in the 1800s. Today, the town has one population cluster, centered around the VT 242 – Cross Road intersection. The southwestern corner of the town is comprised of Jay Peak State Forest. Jay Peak, with Vermont's northernmost ski resort, is the defining feature of the town today and principal source of economic activity, aside from a few small businesses.

3.2.2 Jay Demographics

Jay has experienced population fluctuations in the past 60 years, including a 20% decline in the 1960s and a 66% increase in the 1980s. Population has continued to increase in Jay at a decreasing rate over the past 20 years. The 2004 estimated population was 453. Using a regression analysis, the town has estimated population growth of 38% over the next 20 years (Jay Community Development Plan). Population density is 12.56 persons per square mile.

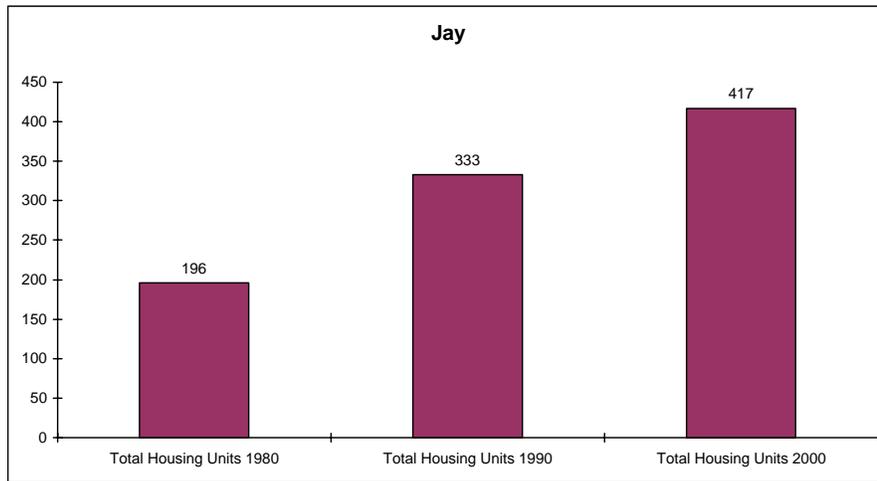
Figure 19: Town of Jay Population Data



3.2.3 Jay Housing Units:

In 2000, there were 158 households in Jay and a total of 417 housing units, 234 of which were seasonal, recreational, or occasional use. This is more than double the number of housing units in 1980. Linear regression analysis predicts 536 housing units in 2020.

Figure 20: Town of Jay Housing Data



3.2.4 Jay Economics:

The ski industry is the backbone of Jay's economy. The resort employs around 325 people, although most positions are seasonal. Other employment in the town is limited and Newport, Troy, and Derby are the nearest employment centers. Jay Peak has continually been improving and expanding into a four season resort, bringing tourists and customers to the town's small tourism-based businesses. Besides tourism, industry in the town is limited to feed-crop farming and timber harvesting for lumber and pulp. Only a few conventional farms remain in operation. In 2004, the unemployment rate was 9.9%, an increase from 7.9% in 2000.

3.2.5 Assessment and Summary of Jay Land Use and Planning Documents:

The Town of Jay is characteristically a rural residential community. Aside from Jay Peak Resort, there are limited commercial and industrial establishments. Residents must typically travel outside the town for employment. Population and related development have been on the rise, particularly in the last 10 years. Based on this current data, it is likely that this growth will continue and will have an impact on development and traffic.

The Town has an adopted town plan and zoning bylaw but does not have subdivision regulations. The plan states "the public highway system is unquestionably the most critical transportation resource in Jay" (p. 15). It further defines Routes 105 and 242 as the gateways into the town and important links to the greater transportation system. Because there are currently no Class One town roads and a minimum number of Class Two, the town fears that increased traffic, particularly from ski traffic, will "not be able to be accommodated if there is no corresponding growth in the local road network" (p. 16). Alternatives identified for controlling traffic congestion and maintaining road

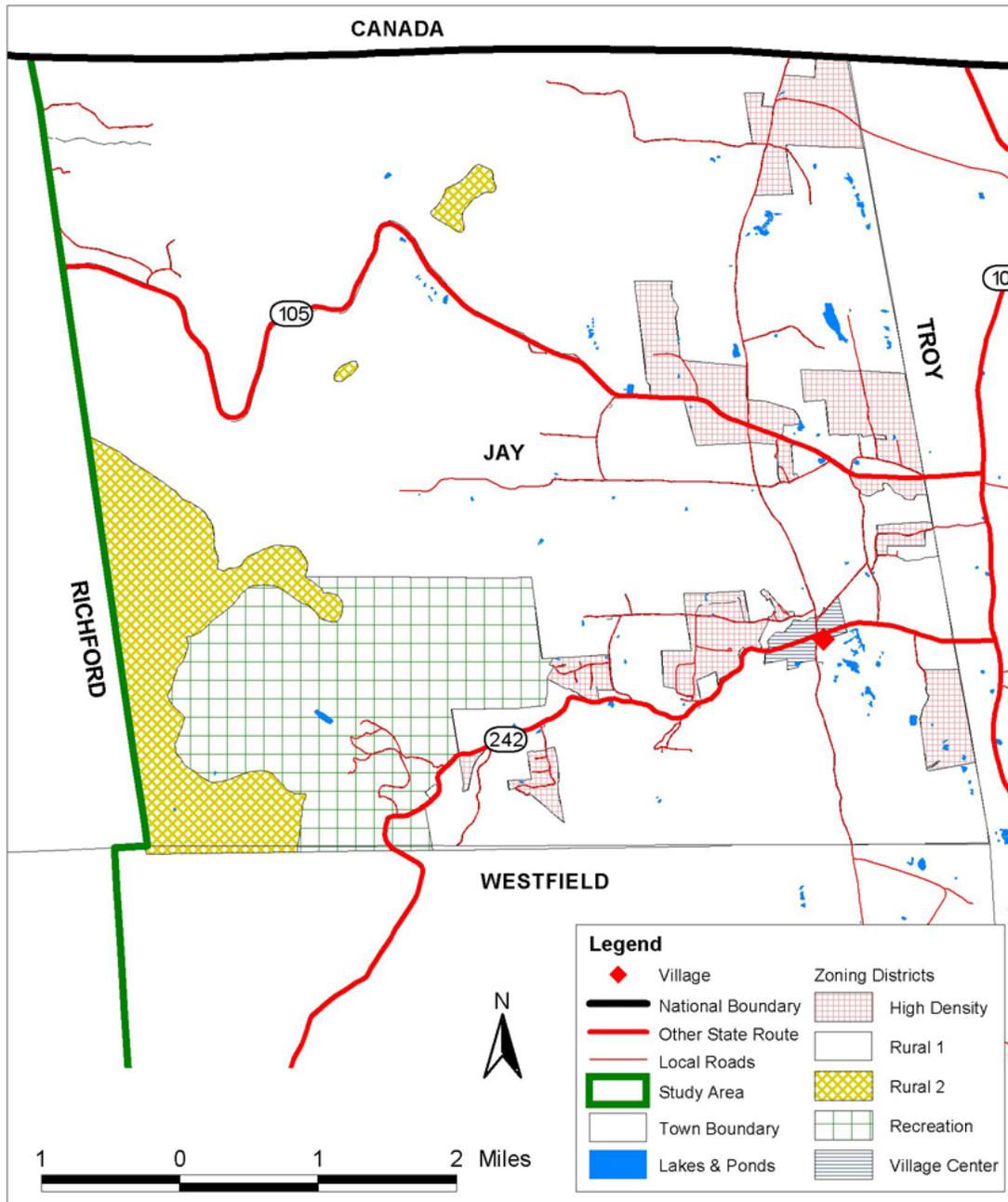
conditions include transit systems (e.g. shuttle and park-n-ride), improved pedestrian and bicycle facilities, and compatible development along the highways.

The plan notes that the majority of development occurs “within 1000 feet of Routes 242, 105... [In particular], Route 242 links the two growth centers together and...is the focus for much of the recreation-oriented development in the community. All of Jay’s tourist lodgings and many of its seasonal homes are located on or close to Route 242” (p. 29). The town recognizes that the development trend is firmly established up and down Route 242 by virtue of its proximity to Jay Peak Resort, and that this trend is likely to continue with the further expansion and four-season use of the ski area. The plan points out “...the majority of the development in the community will likely occur in the area encompassed by Route 105, Cross Road, and Route 242 while development activity along the Troy border will probably continue...proposed improvements at the mountain will not only establish significant new land use patterns but will also drive new development trends in the rest of the community and the area” (p. 30).

Although the town recognizes the increase in population, development, and traffic, and includes some overarching goals essential for smart growth, the plan does not provide any clear language for managing how and where this growth will occur. Implementation policies for the transportation system are general and too broad to guide or proscribe land use along the highways and roads. For example, the plan desires to “ensure that new development along Route 242 and other roads will not worsen traffic” (p. 36). However, there are no specific standards, such as requiring shared access or parking that assist municipal officials in interpreting this goal. In fact, most provisions in the town plan are abstract and advisory in effect and do not provide clear, specific guidance. Moreover, there are no specific regulations in the zoning bylaw, aside from frontage and driveway requirements, which support, implement or provide further direction for the town’s transportation goals. This includes a lack of conditional use or performance standards addressing curb cuts, road layout, sharing and access.

Zoning does provide for a clear definition of districts and objectives and identifies areas for mixed-use and low-, medium-, and high-density development. However, these districts have been delineated based on their historic use, without regard for future use. For example, the High Density District “includes lands that have already been subdivided into relatively small lots” (p. 11). These areas are permitted a minimum lot size of .5 acre and are found at most major road intersections and along Route 242, as shown in the zoning map that follows in Figure 4. High-density, compact developments such as these are desirable for maintaining efficient transportation systems. However, appropriate uses such as commercial or two-family development are not permitted in this district. Rather, areas less desirable for these types of uses, specifically Rural District I, permit them as conditional. Allowing commercial development and two-family in the more rural areas will only contribute to the sprawl of development and place an undue burden on the transportation system.

Figure 21: Town of Jay Zoning Map (2005)



3.3 TOWN OF WESTFIELD

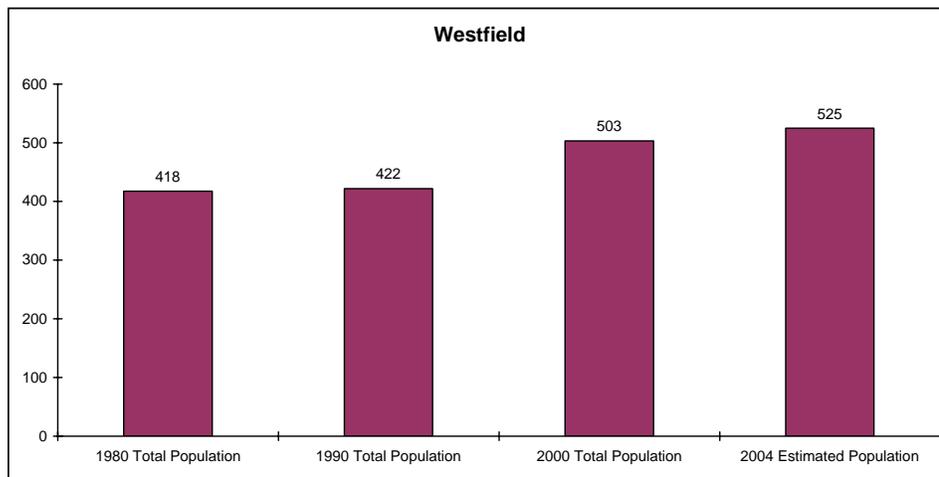
3.3.1 Westfield Community Profile:

Westfield was chartered in 1780. The town supported mill industries until 1964 and is now strongly tied to Jay Peak. Settlement has focused on the eastern edge of the town. The Westfield green serves as a common area, and village settlement in this vicinity has traditionally drawn families retired from area farms. The western side of the town contains more than a dozen summits over 2,000 feet.

3.3.2 Westfield Demographics:

The population of Westfield peaked in the late 1800s at 763 residents and declined by more than half in the 1950s-1960s, reaching a low of 347. Over the next 50 years, population increased by 45% to reach 503 in 2000. The 2004 estimated population was 525. From 1990-2000, the population grew by an average of 2 families per year. Linear Regression analysis predicts a population of 575 in 2020 (this regression has low statistical significance, $R=0.78$).

Figure 22: Town of Westfield Population Data



3.3.3 Westfield Housing Units:

In 2000, there were 200 households in Westfield and a total of 339 housing units, 103 of which were seasonal, recreational, or occasional use. This is an increase of 46% from 1980. Linear regression analysis predicts 439 housing units in 2020.

Figure 23: Town of Westfield Housing Data



3.3.4 Economics:

The town's economy is supported by a diverse variety of industries, although in-town employment is limited. While Jay Peak is important for bringing tourism to the area, agriculture, forestry, manufacturing, and services are important industries as well. Westfield provides the majority of services to the surrounding towns including a level-two community care center. There are nine operating dairy farms, 5,000 acres of actively managed forestland, and six commercial maple-sugaring operations. However, many residents commute to jobs in the surrounding towns and unemployment has been high in the past. In 2004, the unemployment rate was 4.6%, a decrease from 11.4% in 2000.

3.3.5 Assessment and Summary of Land Use and Planning Documents:

Like Jay, there are limited commercial and industrial establishments in Westfield and people must travel outside the town for employment. Farming, logging, maple sugaring and other similar small-scale industries define the rural character of Westfield. Population and related development have been on the rise, particularly in the last 10 years. Westfield is closely tied to Jay Peak Resort and is likely to feel the impact from growth, which is associated with the resort.

Westfield has an adopted town plan and zoning bylaw but does not have subdivision regulations. It is the community's desire to maintain the rural and peaceful character of the town. As development pressures increase, the town is concerned about the demand for services and road maintenance on Class 4 and private roads in the more remote areas of town. Rightfully so, the *Land Use* section of the plan recommends "limit[ing] the number of curb cuts" and "carefully defin[ing] the amount, type, and scale of commercial development to be allowed on Route 100 outside the Village" (p.31) as a means to maintain the existing patterns of land use. The loss of farms and farmland to residential

development threatens the sense of community now enjoyed by townspeople, and the plan recommends protecting the “scenic qualities of the road and the rural, open character of the land” (p. 31). It seeks to control growth of residential, commercial, and industrial uses along Route 242 and to maintain productive forestland and farmland. The town has appropriately identified what areas should accommodate future growth. However, like Jay, most of these provisions are abstract and advisory in effect and do not provide clear guidance on how to achieve them.

A review of the zoning bylaw does not provide further guidance for interpreting the town plan goals. When reviewing site plans, the Planning Commission may impose conditions with regard to adequacy of traffic access, circulation and parking, but zoning does not provide specific, clearly stated standards such as curb cut limitations or shared access. Phrases like “may” or “should” are only advisory in effect and the Commission is therefore not obligated to enforce such provisions. Conditional use does indicate that development shall not adversely affect traffic on roads and highways, but again, no standards for interpretation are provided. This lack of clarity and ambiguity can lead to inconsistent decision-making by municipal officials and inadvertently allow inappropriate development.

3.4 TOWN OF TROY

3.4.1 Troy Community Profile:

The town of Troy contains two distinct centers with compact settlement and commercial and industrial areas: the hamlet of Troy in the south and North Troy village, just south of the Canadian border. Settlement began in the late 1700s along the Missisquoi River and the town retains its historic character today. Agriculture was the basis of early development but iron smelting and mill industries were prominent in the 1800s. The town has been influenced by the French Canadian immigrant population, which remains a strong cultural force in the local communities.

3.4.2 Troy Demographics:

The population of Troy peaked in 1930 at 1898 residents and had declined to 1498 residents by 1980. Starting in 1980, North Troy was censused as well. While population in North Troy has decreased since 1980, the town’s population had grown to 1676 in 2004, reflecting the increase in development outside of the village centers. Linear Regression analysis is not significant in predicting future populations for Troy.

Figure 24: Town of Troy Population Data

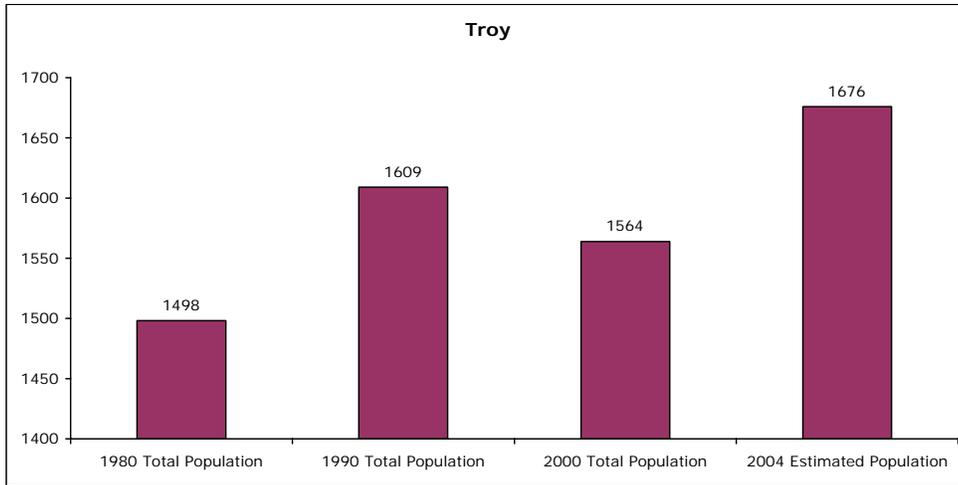
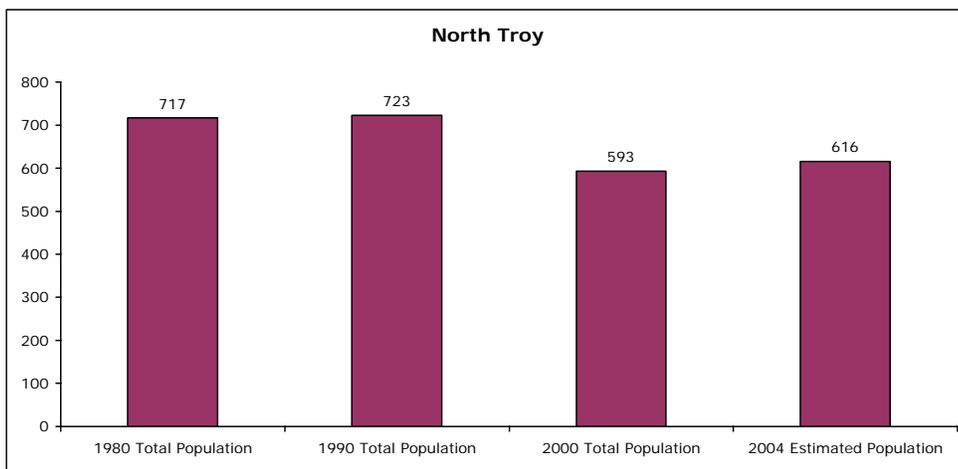


Figure 25: Village of North Troy Population Data



3.4.3 Troy Housing Units:

In 2000, there were 617 households in Troy and a total of 734 housing units, 57 of which were seasonal, recreational, or occasional use. This is an increase of 30% from 1980 (see Figures 9 & 10). The number of housing units in North Troy has remained relatively the same since 1980. Linear regression analysis predicts 900 housing units in 2020.

Figure 26: Town of Troy Housing Data

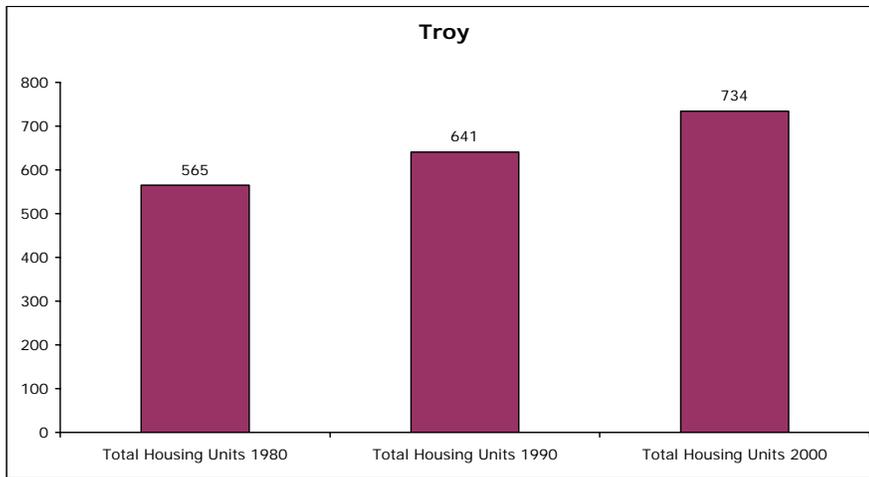
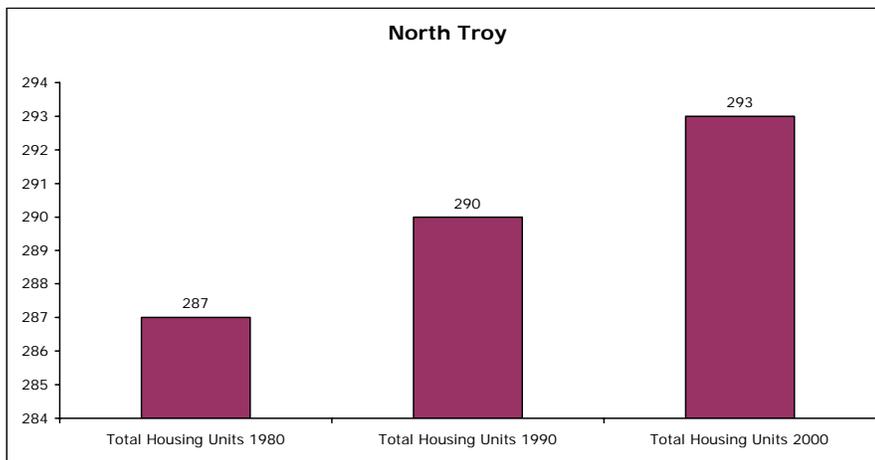


Figure 27: Village of North Troy Housing Data



3.4.4 Troy Economics:

In the past 20 years, Troy experienced economic hardship as major employers have shut down and farming became less viable. Today, Troy supports several small manufacturing plants and is designated as part of the Northeast Vermont Job Zone. This designation provides incentives and assistance for businesses, job training, infrastructure improvement, and business tax credits for job creation. In 2004, the unemployment rate was 3.4%, the lowest it has been in the past 14 years of available information.

3.4.5 Assessment and Summary of Land Use and Planning Documents:

Unlike Jay and Westfield, the Town of Troy is characterized by its compact settlements and historic built infrastructure found in two distinct population and commercial centers, the Village of North Troy and the Hamlet of Troy. It is the site of old mills, municipal buildings (i.e. library, post office), a covered bridge and several commercial and industrial businesses. Farming is an important part of the town's history, but has seen great decline in recent years. Farms have been subdivided and there has been increased development away from the village centers. Population has been declining in North Troy and increasing elsewhere in town, indicating the shift in development outside the village centers. Like Jay and Westfield, the transportation system in Troy is not highly developed, but contains outlying roads that support this new development.

Troy does not have a town plan in effect, nor does it have subdivision regulations. The town plan is the foundation of the municipal regulatory framework and is one of the most important documents a community can develop. It is the tool municipalities use to set broad goals and objectives for the town, and to guide land use and business activities. It also protects and maintains those qualities that are most important to the community like natural, cultural, historic and aesthetic resources.

The town does have a zoning bylaw, which was last amended in June 1987. As such, zoning is very basic in form and content and does not contain the specific standards needed to support an efficient and effective transportation system. Site plan and conditional use review is included in zoning, but it is very limited. Like Westfield, the Planning Commission may take into consideration adequacy of traffic access, circulation and parking when reviewing site plans, and conditional uses shall not adversely affect traffic on roads and highways, but there are no specific standards for their interpretation. Zoning does include provisions for planned unit developments (PUD) to encourage "new communities, innovation in design and layout, and more efficient use of land" (p. 21). However, PUD's may only be used for developments of 10 acres or greater, limiting their effectiveness in managing growth.

Zoning does provide for a clear definition of districts, objectives, and uses. These include 4 delineated areas: Rural, Village, Commercial-Residential and Industrial. Yet, except for the industrial district, these are typically 1-acre zones with roughly similar dimensional requirements. This similarity does not provide for variety in design and layout and only encourages scattered development.

4.0 TRANSPORTATION & LAND USE RECOMMENDATIONS

The recommendations presented in this section are based on our assessment of existing and future conditions, field observations, and input from Steering Committee members and the public. One of the more significant findings from our existing and future conditions assessment was that traffic congestion remains reasonably acceptable even after accounting for 20 years of background traffic growth, the completion of the Jay Peak Resort expansion, and peak ski season traffic flows. Under these conditions, all nine study area intersections were shown to operate at Level of Service (LOS) C conditions or better.

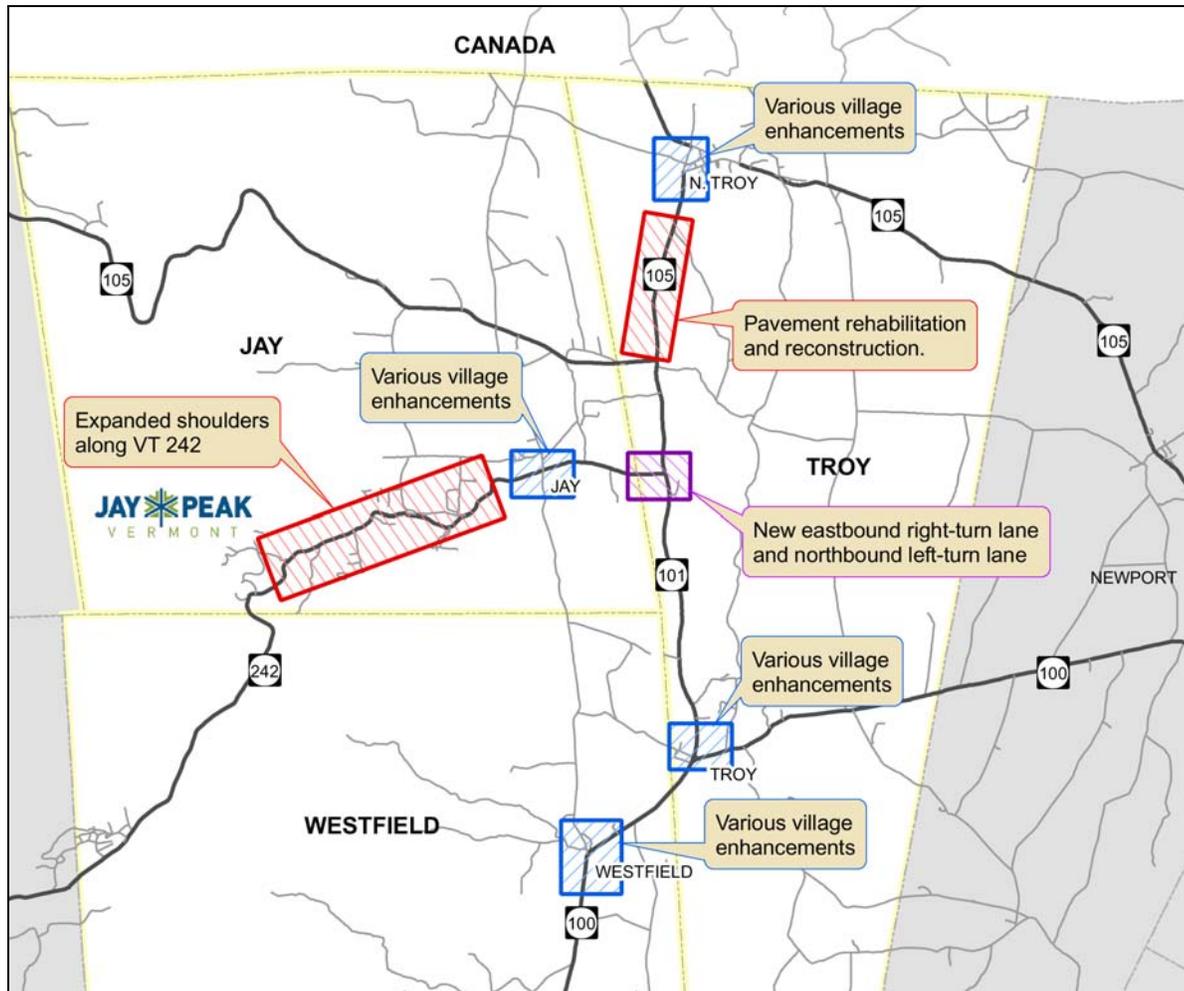
However, the planned expansion at Jay Peak Resort (estimated to generate an additional approximately 300 new hourly trips during the ski season) will certainly have impacts to regional economic development plans, tourism and related commercial development, and secondary growth implications. The recommendations presented in this report were developed to best accommodate the potential impacts from Jay Peak Resort's expansion and include enhancements to surrounding village centers, increased roadway capacity, improvements to the road infrastructure, and enhanced directional signage.

The draft recommendations can be grouped into the following categories:

- Village Enhancements;
- Road Capacity and Infrastructure Improvements;
- Directional Signage Improvements; and
- Land Use Recommendations.

The general location of the various recommendations are shown on the map below and described in detail in subsequent sections.

Figure 28: General Location of Recommendations



4.1 VILLAGE ENHANCEMENTS

The planned expansion at Jay Peak Resort will likely lead to increased visits to the surrounding towns and hamlets as skiers, golfers, and other resort visitors venture out in search of other activities. At the same time, the additional traffic generated by the resort’s expansion will make conditions more difficult in these villages for pedestrians, bicyclists, shoppers, and residents. For these reasons, a set of traffic calming, streetscape, sidewalk, and access management recommendations was developed for Jay, Westfield, and North Troy Village to help mitigate any detrimental impacts resulting from increased traffic while also improving the quality of life, pedestrian safety, and character of these villages. As most of these enhancements fall within the State right-of-way, it will be important to coordinate any plans with VTrans and the District Transportation Coordinator.

The village enhancements include a mix of the following traffic calming measures and enhancements:

- Gateways - which welcome visitors to a community and create a transition point for motorists to slow down via signing, splitter islands, etc.
- Street Tree Plantings - narrow the apparent width of the road, enhance the village and cool the street
- Pedestrian Facilities - creating sidewalks for safe village walking
- Pedestrian Scale Lighting - provides directed illumination for pedestrian and motorists to promote traffic safety while adding an important architectural element to the streetscape
- Neck-downs and Crosswalks - provide safer and better delineated locations for people to cross busy streets by narrowing crossing distance and requiring drivers to yield
- Access Management - organizes entry and exit movements from a highway onto a site and vice versa to eliminate dangerous conflicts and unpredictable vehicular circulation
- Signing and Wayfinding Elements - provide guidance for safe travel and seeking specific destinations as well as encouraging observation of speed limits and potential roadway hazards
- Landscape Enhancements - such as visual and planting improvements to village greens reinforce the “sense of place” for a community and encourage visitors to slow down or even stop - to visit establishments or to take a break from driving.

Conceptual plans showing the village enhancements can be found in Appendix A.

4.1.1 Jay Village

The village of Jay is a relatively small cluster of mixed uses located adjacent to the intersection of VT 242 and Cross Road. The village houses the Municipal Offices, a country store, an inn and lodge, an auto repair shop, and a few ski outfitters. As the closest commercial cluster to the resort, Jay Village provides a number of services to those visiting Jay Peak.

The specific recommendations developed for Jay Village include the following elements:

- New pedestrian facilities including sidewalk, crosswalks, and appropriate signage and striping to improve access and safety for pedestrians and further define the village to drivers;
- New traffic calming elements including crosswalk bulbout, landscape treatments, and gateways at either end of the village to slow through traffic;
- Pedestrian-scaled highway lighting to improve night-time safety, further define the village, and enhance the character of the village;
- Access management enhancements at the Jay Village Inn, the Country Store, and Jay Gas to improve safety and access to the adjoining parcels;

- Streetscape improvements including new trees and sculpture on “town green” to improve the character of the village and to slow through traffic.

Conceptual plans showing the village enhancements can be found in Appendix A.

4.1.2 North Troy Village

North Troy Village is a mid-size village located less than a mile from the Canadian Border. The village is home to a number of residences along with the Town and Village offices, a post office, a fire station, a general store and convenience store, churches, a school, as well as a number of other uses. Situated between the Canadian border crossing and Jay Peak Resort, Elm Street and VT 105 carry a large percentage of trips heading to and from Jay Peak. Reports of out-of-state speeding traffic are currently being countered with enhanced police speed enforcement along Elm Street and VT 105 in the winter.

The recommendations developed for North Troy focus on traffic calming and pedestrian improvements to slow speeds through the village and reduce the need for police speed enforcement. The recommendations for North Troy Village include the following elements:

- New sidewalk and crosswalks, along with appropriate signage and pavement markings to improve pedestrian safety, enhance the village setting, and encourage slower traffic speeds. These improvements include widening two narrow sidewalk segments south of Main Street to 5 feet. These pedestrian improvements were also identified and prioritized in the Troy Bicycle and Pedestrian Master Plan (RSG, 2004).
- New gateway treatments and warning signage at the northern and southern end of the focus area to alert drivers that they are entering a village area.
- New streetscaping elements, street trees, and pedestrian-scale lighting to enhance the character of the village and to encourage slower traffic speeds.
- New curbed divider island at the southeast corner of Railroad Street and Elm Street to enhance the intersection operations, improve traffic circulation, and improve pedestrian safety.

] Conceptual plans showing the village enhancements can be found in Appendix A.

4.1.3 Troy Hamlet

Troy Hamlet is a mid-size cross-roads village located adjacent to the intersection of VT 100, VT 101, and South Pleasant Street. Most of the Jay Peak traffic coming from I-91 and points south travels through Troy Hamlet. Troy Hamlet has a mix of uses including a general store, convenience store and gas station, post office, bank, fire station, industrial uses, homes, and a small green.

The alignment of the VT 100-VT 101 intersection, combined with the relatively high traffic speeds along VT 100, poor intersection sight distance, parking maneuvers associated with the general store,

and a high percentage of truck traffic, leads to less than desirable safety conditions. The most recent 5-year VTrans crash data identified the segment of VT 100 through Troy Hamlet as a High Crash Location.

Conceptual designs have recently been prepared by Lamoureux and Dickinson Consulting Engineers. The following is a summary of their recommendations.

Selected Conceptual Plan¹

The final Conceptual Plan for the Troy Common is designed to have sidewalks with curbing along the northern and western sides of the Common; a sidewalk extension on the northern side of South Pleasant Street; a gazebo with benches, small tables, low shrubs, small flowering trees, relocated flag pole, bike rack and informational sign bordering it; a shade tree along the western sidewalk, and a relocated Dodge monument with shrubs. Stormwater will be redirected to existing and new catch basins on the Common, Route 101 and South Pleasant Street. Route signage will be changed to direct vehicles to the Route 100/101 intersection and existing signage on the Common will be relocated. The existing on street parking bordering the Common on Route 101 is problematic from VTrans perspective. During the next phase of design development, further refinement will be needed as to how on street parking would be incorporated at this location.

Conceptual plans showing the village enhancements can be found in Appendix A.

4.1.4 Westfield Village

Westfield Village is a mid-size crossroads village located adjacent to the intersection of VT 100 and North Hill Road. North Hill Road provides a direct route to Jay Peak from VT 100. The village has a mix of uses including a general store, community center, library, hardware store, homes and a small green.

The recommendations developed for Westfield Village focus on pedestrian access, streetscaping, and improvements to the green. The specific improvements are as follows:

- New sidewalk and crosswalks from the Berry Creek Farm north to the Town Offices and east to the retirement home, along with appropriate signage and pavement markings to improve pedestrian safety, enhance the village setting, and encourage slower traffic speeds.
- New gateway treatments and warning signage at the southern and eastern end of the village to alert drivers that they are entering a village area.
- New streetscaping elements, street trees, and pedestrian-scale lighting to enhance the character of the village and to encourage slower traffic speeds.
- Enhancements to the village green including planting beds, benches, and a flagpole.

¹ Excerpted from "Troy Common Feasibility Study" Lamoureux & Dickinson Consulting Engineers, July 2006

Conceptual plans showing the village enhancements can be found in Appendix A.

4.2 ROAD CAPACITY ENHANCEMENTS & INFRASTRUCTURE IMPROVEMENTS

4.2.1 Expanded Shoulders and Warning Signs on VT 242

The approximately 3.2 mile segment of VT 242 between Jay Village and Jay Peak Resort climbs at an average grade of 5%, with sections in excess of 9%. The grade and curvature of the road do not allow for any passing zones, so lengthy vehicle queues often form behind tour busses (which are common during the fall and winter) and heavy trucks. The shoulders are narrow (<1 foot) in places and are not well maintained.

There are currently a large number of curve warning signs, speed advisories, and arrows, particularly along the eastbound length of this section of VT 242. Comments were raised at the public meeting that the conditions heading downhill on VT 242 are extremely unsafe, particularly during the ski season, due to the slope and curvature. In 2005, VTrans conducted an extensive field review along VT 242, including ball-bank testing to determine the degree of curvature to identify appropriate warning sign treatments. Based on their initial investigation, over 50 potential locations were identified for warning signs. In an attempt to limit the number of warning signs and focus drivers attention on the most severe curves, VTrans is currently proposing to install new "Winding Road Next XX Miles" and warning arrows at specific locations along VT 242. VTrans is currently planning to install the new warning signs during the fall of 2006.

The lack of sufficient shoulders allows drivers little margin for error when navigating the steep, curvy roadway. In the period 2000-2004, there were 11 reported vehicle crashes along this segment. Using standard VTrans conventions, this segment is considered a High Crash Segment. A closer look at the crash data reveals that all but one occurred during the ski season (November-April), 45% occurred in the snow, and 72% were attributable to driving too fast for conditions.

Figure 29: VT 242 Ascent to Jay Peak Resort

A capacity analysis of this segment under 2026 build conditions (including traffic from the Jay Peak expansion) shows traffic flowing at Level of Service E conditions with a 75% percent chance of following another vehicle or vehicle queue.

To mitigate these conditions, we recommend the following two improvements:

1. Work with the VTrans District Office and Traffic Operations section to ensure that proposed new warning signs are installed along VT 242 and to assess the need for additional warning signs.
2. Expand the cross-section of VT 242, where deficient, to minimum Vermont State Design Standards for a rural collector (10' travel lanes and 3' shoulder). In addition to improving drivers' safety, the additional shoulder width will also provide enhanced snow storage and will more adequately accommodate bicycle travel.
3. Work with the VTrans District Office to identify any potential improvements to the current winter maintenance and plowing operations along VT 242.

4.2.2 VT 242-VT 101 Turn Lanes

The VT 242-VT 101 intersection is a three-way intersection with single lane approaches in all directions and a stop control on the VT 242 approach. Although there is currently no development or curb cuts adjacent to the intersection, parcel at two of the corners are currently for sale and local officials feel that it is reasonable to assume some type of commercial development taking place at the intersection over the next twenty years.

According to trip routing trends, over 70% of Jay Peak Resort traffic travels through this intersection. The additional 300 peak hour trips expected to be generated by the Jay Peak Resort

expansion will lead to longer queues on the northbound and eastbound approaches, particularly during the morning and afternoon peak periods during the ski season, respectively.

VT 101 Northbound: Using the traffic volumes developed for this analysis, we conducted turn lane warrants to identify the current or future need to add turn lane(s) to the VT 242-VT 101 intersection. Using Harmelink’s methodology for unsignalized intersections, we found that the additional trips generated by the proposed Jay Peak expansion triggers the need for a northbound left turn lane on VT 101. We further verified the left turn warrants using a second method developed by Kikuchi and Chakroborty (1991), which modified the Harmelink equation to correct errors in its application of queuing theory.¹ This method provided identical results to the Harmelink method.

The 2004 AASHTO Green Book specifies turn lane storage lengths to be long enough to store vehicles arriving during two minutes in the design hour. Using this approach, a 435 foot storage lane would be needed. However, since the peak ski periods only occur periodically throughout the year (with relatively low turning volumes the rest of the year) and since the southbound through traffic is relatively low, shorter turn lane storage lengths were modeled in SimTraffic. Based on this analysis, a 250 foot northbound left turn lane would adequately serve peak period turning movements.

VT 242 Eastbound: Table 3 shows 95th percentile vehicle queue lengths (in feet) at the eastbound approach to the VT 242-VT101 intersection during three different 2026 analysis periods. The analysis included the additional traffic generated by the proposed Jay Peak expansion. The table shows that, without the additional right turn lane, the 95th percentile queue reaches nearly 270 feet (11 cars) during an average ski weekend, and over 500 feet (21 cars) on a peak ski weekend in 2026. The addition of a 200 foot right turn lane significantly reduces the overall queue lengths and will help to improve traffic operations at this intersection, particularly during busy ski and foliage weekends.

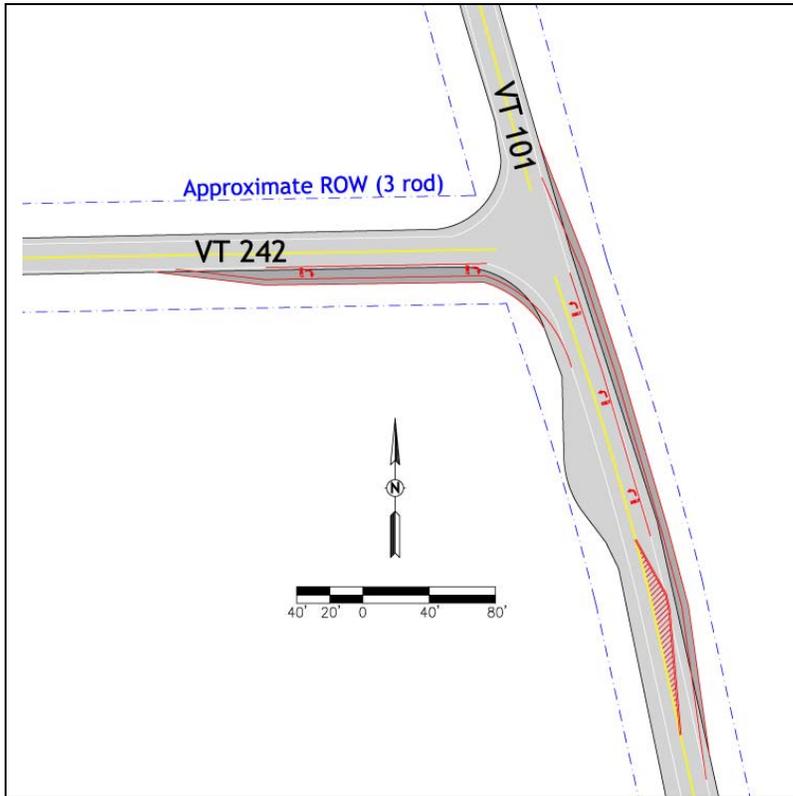
Table 3: 95th Percentile Queue Lengths on Eastbound Approach to VT 242-VT101 Intersection

	95th Percentile Queue Length	
	Without Turn Lane	With 200' Right-Turn Lane
Design Hour Volume	85 ft.	61 ft.
Average Winter Hour	269 ft.	141 ft.
Peak Winter Hour	516 ft.	169 ft.

Figure 30 below shows a conceptual rendering of the recommended turn lanes at the VT 242-VT 101 intersection.

¹ Larson, Larry & Fred L. Mannering, *Method for Prioritizing Intersection Improvements*, January 1997, Washington State Transportation Commission, Department of Transportation and U.S. Department of Transportation, Federal Highway Administration, 2 June 2003.

Figure 30: Conceptual Sketch of Turn Lanes at VT 242-VT 101 Intersection



4.2.3 Reconstruction of VT 105

The condition of the road surface (and presumably the subgrade as well) along an approximately 1.3 mile section of VT 105 between VT 101 and Vincent Road in Troy is significantly deteriorated. The road shows signs of cracking, numerous patches, vertical deformation, and inadequate drainage. The average daily traffic volume along this segment is approximately 1,500 vehicles per day with 8% trucks and 3% heavy trucks. VT 105 is part of the designated Vermont State Truck Network.

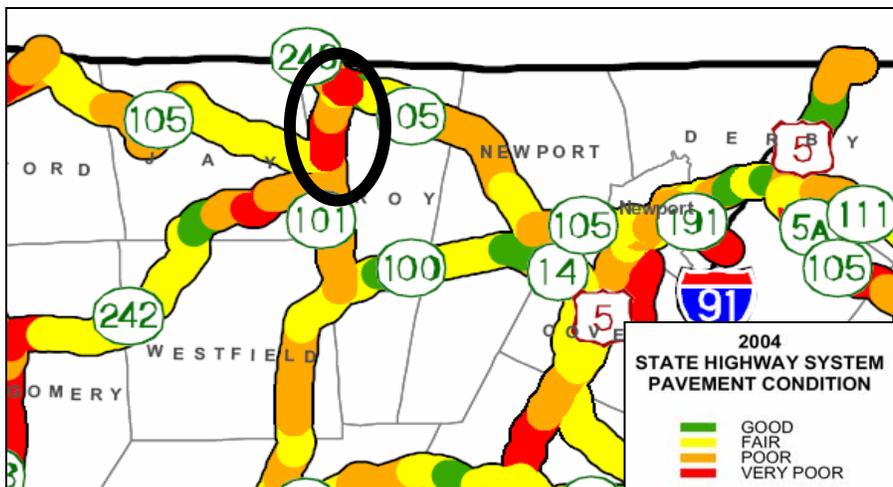
Figure 31: Pavement Conditions along VT 105



To address the deteriorated conditions of VT 105, we recommend a full reconstruction of this segment of VT 105 to include adequate subgrade preparation, top coat, and an expanded cross-section to bring this section of VT 105 up to minimum Vermont State Design Standards for a rural minor arterial (11' travel lane, 4' shoulder). The additional shoulder width will also better accommodate on-road bicycle travel.

Reconstruction of this section of VT 105 has been previously recommended in the Troy Bicycle and Pedestrian Master Plan (RSG, 2004), the VT 105 Corridor Study (Louis Berger & Assoc., 1998), and by Town officials and residents. The segment was also identified as being in 'very poor' condition in the 2005 VTrans Pavement Management Annual Report (see Figure 32 below).

Figure 32: 2004 VTrans Pavement Management System Evaluation



4.3 DIRECTIONAL SIGNAGE IMPROVEMENTS

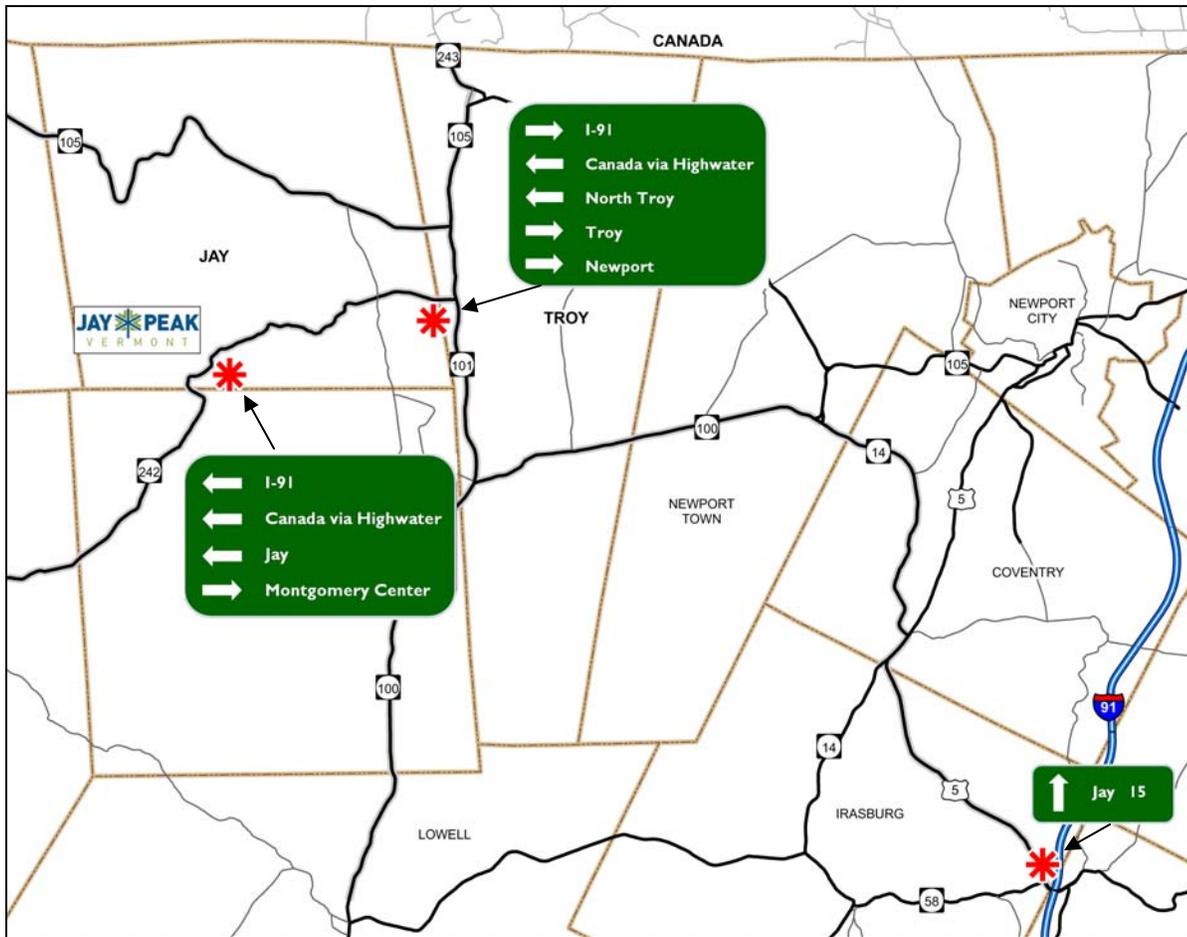
Enhanced directional signage has been identified as one of Jay Peak Resort's top priorities. The location of the resort, near an international border crossing and relatively far from an interstate exit, can make navigation to and from the resort difficult. In particular, the route from I-91 exit 26 (which accounts for approximately ¼ of Jay Peak's traffic) involves travel on five different US and State routes with a number of turns, some of which are not clearly marked. To improve directional wayfinding to the Jay Peak Resort we have recommend a set of improvements to the standard traffic wayfinding signage and to the VTrans Official Business Directional Signs in the vicinity of the Jay Peak Resort.

4.3.1 Standard Directional Wayfinding Signs

The following changes are recommended for the standard traffic directional signage in the vicinity of Jay Peak:

1. Jay Peak Access Drive approach to VT 242: The sign posted for drivers leaving Jay Peak and entering VT 242 only indicates the directions for Jay and Westfield. This sign cluster should also include an indication for I-91 and Highwater, Canada to turn left.
2. VT 242 Approach to VT 101: Add a sign directing traffic headed to Canada via Highwater, QC to turn left, and traffic heading to I-91 to turn right.
3. U5 5 northbound approach to VT 58: Add Jay to the directional town sign cluster.

Figure 33: Recommended New Directional Signs



4.3.2 Vermont Official Business Directional Signs (OBDS):

The OBDS program is run by VTtrans and provides for enhanced wayfinding signage. Title 10 VSA Chapter 21 places limitations on the content, number and placement of these signs. Specifically, the law provides for a maximum of four signs per use. Additional signs may be permitted based on review and approval from the Travel Information Council. Further, the OBDS signs must be located either in the same town as the destination or immediately adjacent to the town. The OBDS signs cost \$75 for initial set-up and \$60 each year.

Figure 34: Example of an Official Business Directional Sign Cluster



There are currently three OBDS signs directing traffic to Jay Peak. These are located at the VT 101-VT 242 intersection, at the VT 101-VT 105 intersection, and at the VT 105-Cross Road intersection.

Based on the requirement of the OBDS program, and the existing Jay Peak OBDS signage, the following changes are recommended:

- Relocate the OBDS sign from the VT 105-Cross Road intersection to the eastbound approach at the VT 243-Elm Street intersection in North Troy.
- Relocate the OBDS sign from the VT 105-VT 101 intersection to the southbound approach to the VT 242-VT 101 intersection.

4.4 LAND USE RECOMMENDATIONS

Although all of the towns have some form of land use regulation or development control, as indicated in Figure 11, most documents are lacking in terms of transportation and land use planning. Many recognize the importance of controlling growth and have some degree of reference to this, but none have specific design standards or guidelines for development, specifically its effect on the transportation system. This may have a negative impact on roads and the character of the area because broad references, goals, and visions do not constitute a clear standard. Moreover, a statement or reference that “encourages”, “supports”, or “promotes” is not absolute and its application requires judgment by the developer and decision-maker. Inconsistency in decision-making can inadvertently lead to inappropriate and unwanted development patterns.

As a starting point, each community should adopt this study by reference in its town plan or zoning regulation until such time it is feasible to do the research, review, analysis, and public involvement necessary to incorporate the recommendations provided herein. A second important task would be to explore the feasibility of increasing density in the village centers. A review of infrastructure capability, environmental constraints, and other site issues and opportunities will need to be completed in order to establish the appropriate density. By increasing density in the village or population centers and permitting a mix of uses, it will help support viable transportation alternatives and reduce the burden on municipal services and facilities.

Each town should also consider, as possible, the adoption of subdivision regulations, which will help guide the design and layout of lots, streets, utilities, landscaping, lighting and other public improvements. Subdivision regulations also offer an early opportunity to manage access to a road or highway. Each town would also benefit by strengthening the transportation, traffic, and access management review criteria in site plan and conditional use review. This includes limiting the number of curb cuts, coordinating site uses among separate properties, specifically defining those situations that would be considered undue, adverse, or by requiring a traffic impact analysis for certain developments. In addition:

- The **Town of Jay** should explore the potential for increasing density in the Village Center District so that it can accommodate future, compact development (i.e. maximum density of 4-units/acre). Limit curb cuts or require shared access along Route 242 in the Rural District I if its purpose is to provide “tourist oriented uses.” Improve sign standards or make them conditional uses in some districts. Develop a scenic overlay district to maintain important view corridors. If areas above 2500 feet are fragile environments, then consider making single- and two-family dwellings conditional instead of permitted uses. Redefine the High Density District based on future capacity, rather than historic use. High-density areas should incorporate mixed-use development.
- The **Town of Westfield** should consider allowing or requiring clustered developments (in all districts, for large subdivisions, or in specified districts, i.e. Rural-Agricultural). It may also consider incorporating maximum density in the Rural-Agricultural District (i.e. 1 unit/10 acres) to help preserve this area’s rural character; or, develop a scenic overlay district to maintain important view corridors.
- The **Town of Troy** should update or rewrite its town plan as a matter of priority. The town plan provides a solid foundation for regulatory documents, like zoning, and assists in Act 250 permitting. The Town Plan from 1995 provides an excellent starting point and can be updated to account for recent trends, needs, and opportunities. The town should also consider imposing maximum density in the Rural District (i.e. 1 unit/10 acres) and cluster developments (or PUD’s) should be allowed for any size parcel, not just developments on parcels 10-acres or more.

The tables on the following pages summarize land use recommendations for each town.

Table 4: Land Use Planning Recommendations

Land Use Planning Recommendations ● Strategies recommended for implementation □ Strategies already implemented or referenced but could be improved upon N/A Documents not available for review/not adopted	Jay	Westfield	Troy
TOWN PLAN			
1. Designate areas for concentrated, mixed-use development	□	□	N/A
2. Designate scenic overlay districts	□	●	N/A
3. Locate important historic and environmental resources along the corridor	●	□	N/A
4. Avoid strip development	●	●	N/A
5. Incorporate an access management section under the transportation element	●	●	N/A
6. Coordination	●	●	N/A
7. Provide for pedestrian, bicycle and transit	□	●	N/A
8. Encourage traffic calming in village settings	●	●	N/A
9. Define gateways	●	●	N/A
ZONING REGULATIONS			
GENERAL REGULATIONS			
1. Limit the number of curb cuts	●	●	●
2. Limit access directly on to major highways according to use	●	●	●
3. Coordinate site uses among separate properties	●	●	●
4. Sign control	□	●	□
5. Landscape standards	●	□	□
6. Allow or require cluster developments	□	●	□
7. Local access permit	●	●	●
8. Architectural design and building placement	●	●	●

Table 5: Land Use Planning Recommendations cont.

Land Use Planning Recommendations ● Strategies recommended for implementation □ Strategies already implemented or referenced but could be improved upon N/A Documents not available for review/not adopted	Jay	Westfield	Troy
DISTRICT REGULATIONS			
1. Designate areas for concentrated, mixed-use development	□	□	□
2. Designate scenic overlay districts	●	●	●
3. Define standards for development	□	□	□
4. Allow or require cluster developments	□	●	□
5. Architectural design and building placement	●	●	●
SITE PLAN REVIEW			
1. Limit the number of curb cuts	●	●	●
2. Limit access directly on to major highways according to use	●	●	●
3. Coordinate site uses among separate properties	●	●	●
4. Landscape standards	●	□	□
5. Allow or require cluster developments	□	●	□
6. Provide for pedestrian, bicycle, and transit	●	●	●
7. Financial guarantees	□	●	●
8. Reference zoning standards	□	●	●
9. Architectural design and building placement	●	●	●
CONDITIONAL USE REVIEW			
1. Impact analysis	□	●	●
2. Financial guarantees	□	●	●
3. Reference zoning standards			□
SUBDIVISION REGULATIONS			
1. Define standards for lot layout, driveways and location of buildings	N/A	N/A	N/A
2. Allow or require cluster developments	N/A	N/A	N/A
3. Provide for pedestrian, bicycle and transit	N/A	N/A	N/A
4. Financial guarantees	N/A	N/A	N/A
5. Reference zoning standards	N/A	N/A	N/A
6. Referral to state agency	N/A	N/A	N/A
CAPITAL IMPROVEMENT PROGRAM			
1. Adopt an official map	N/A	N/A	N/A
2. Adopt a capital budget	N/A	N/A	N/A
3. Impact fee	N/A	N/A	N/A

5.0 IMPLEMENTATION PLAN

To assist each of the Towns in moving the identified recommendations forward, an implementation matrix was developed which identifies project cost estimates, potential funding sources, and implementing partners. Many of these recommendations, particularly those involving village enhancements or roadway expansion, will need additional scoping and engineering to determine exact alignments, impacts, and costs. The final selection of a preferred design will be determined through the VTrans project development process.

Order of magnitude cost estimates were prepared for each of the recommendations. The costs for the pedestrian facilities are based on the VTrans Bicycle and Pedestrian Program Unit Cost Database (2/06). The remaining costs are based on the 2006 VTrans Average Bid Price Listing, recent VTrans bid results, and engineering judgment. These costs are conceptual in nature and should be used for general planning purposes only. Additional investigation and refinements are necessary to provide more precise cost estimates.

Specific cost estimates are provided in Table 6 and Table 7.

Table 6: Cost Estimates - Roadway and Sign Improvements

Roadway Capacity & Infrastructure Improvements	
VT 242 - Shoulder Expansion	\$3,000,000
VT 242-VT 101 Northbound Turn Lane	\$250,000
VT 242-VT 101 Eastbound Turn Lane	\$200,000
VT 105 Reconstruction	\$1,000,000
Signage Improvements	
VT 242 Safety Signs	\$1,000
Traffic Directional Signage	\$1,200
Official Business Directional Signs	\$200

Table 7: Cost Estimates - Village Enhancements

1. Village Enhancements	
<u>Jay Village</u>	
Sidewalk and Crosswalks	\$130,000
Drainage Improvements	\$40,000
Mid-Block Crossing	\$20,000
Gateway Treatments	\$10,000
Streetscape Amenities	\$10,000
Driveway Access Management	\$15,000
"Village Green" Enhancements	\$5,000
<i>Construction:</i>	<i>\$230,000</i>
<i>Engineering (15%)</i>	<i>\$34,500</i>
<i>Municipal Project Management (10%)</i>	<i>\$23,000</i>
<i>Contingency (15%)</i>	<i>\$34,500</i>
Total:	\$322,000
<u>North Troy Village</u>	
Sidewalk and Crosswalks	\$140,000
Drainage Improvements	\$30,000
Gateway Treatments	\$20,000
Streetscape Amenities	\$20,000
Curbed Divider Island	\$30,000
<i>Construction:</i>	<i>\$240,000</i>
<i>Engineering (15%)</i>	<i>\$36,000</i>
<i>Municipal Project Management (10%)</i>	<i>\$24,000</i>
<i>Contingency (15%)</i>	<i>\$36,000</i>
Total:	\$336,000
<u>Troy Hamlet</u>	
Sidewalks, Streetscaping, Traffic Improvements	\$221,400
<i>Construction:</i>	<i>\$220,000</i>
<i>Engineering (15%)</i>	<i>\$33,000</i>
<i>Municipal Project Management (10%)</i>	<i>\$22,000</i>
<i>Contingency (15%)</i>	<i>\$33,000</i>
Total:	\$308,000
<u>Westfield Village</u>	
Sidewalk and Crosswalks	\$220,000
Drainage Improvements	\$40,000
Gateway Treatments	\$20,000
Streetscape Amenities	\$10,000
Village Green Enhancements	\$10,000
<i>Construction:</i>	<i>\$300,000</i>
<i>Engineering (15%)</i>	<i>\$45,000</i>
<i>Municipal Project Management (10%)</i>	<i>\$30,000</i>
<i>Contingency (15%)</i>	<i>\$45,000</i>
Total:	\$420,000

Each of the recommendations developed in this report was designated as short-term, mid-term, or long-term based on the relative cost, need, and ability to implement. The implementation matrix shown below identifies the estimated timeframe for implementation, potential funding sources, and implementing partners.

Figure 35: Implementation Matrix

	Improvement	Order of Magnitude Cost Estimate*	Potential Funding Source(s)**	Implementing Partners
Short-Term	Implement Land Use Recommendations	\$0	n/a	Town Planning Commissions, Zoning Boards
	Install New Safety Signs Along VT 242	\$1,000	STP	VTrans District & Traffic Operations
	Replace 4 Traffic Directional Signs	\$1,200	STP	VTrans District & Traffic Operations
	Relocate Two Official Business Directional Signs	\$75 initial; \$60/year	Private	VTrans Sign Control Unit, Jay Peak Resort
Mid-Term	Jay Village Enhancements Sidewalks, Drainage, Streetscaping, Traffic Calming	\$322,000	TE/MUNI/Private	NVDA, VTrans, Jay Peak Resort, Town of Jay
	North Troy Village Enhancements Sidewalks, Drainage, Streetscaping, Traffic Calming	\$336,000	TE/MUNI	NVDA, VTrans, Town of Troy, Village of N. Troy
	Troy Hamlet Enhancements Sidewalks, Drainage, Streetscaping, Traffic Improvements	\$308,000	TE/STP/MUNI	NVDA, VTrans, Town of Troy
	Westfield Village Enhancements Sidewalks, Drainage, Streetscaping, Traffic Calming	\$420,000	TE/MUNI	NVDA, VTrans, Town of Westfield
Long-Term	VT 242 - Shoulder Expansion (Jay Peak to Jay Village)	\$3,000,000	STP/MUNI	NVDA, VTrans, Jay Peak Resort, Town of Jay
	VT 242-VT 101 Northbound Turn Lane	\$250,000	STP/MUNI	NVDA, VTrans, Jay Peak Resort, Town of Troy
	VT 242-VT 101 Eastbound Turn Lane	\$200,000	STP/MUNI	NVDA, VTrans, Jay Peak Resort, Town of Troy
	VT 105 Construction (VT 101 to Vincent Road)	\$1,000,000	STP/MUNI	NVDA, VTrans, Jay Peak Resort, Town of Troy

* NOTE: Cost figures are estimates and should be used for preliminary planning purposes only.

** The following funding source abbreviations are used:
 (TE) - Transportation Enhancements
 (STP) - Surface Transportation Program
 (MUNI) - Municipal/Local
 (PRIVATE) - Private landowners, developers

The potential funding sources identified in the implementation matrix are provided as guidance to assist with project implementation. The list of funding sources includes the following:

- Transportation Enhancements Program
- Surface Transportation Program/VTrans Capital Program
- Various municipal and local funding options
- Private sources

Each of these funding sources is described in more detail below.

5.1 (TE) TRANSPORTATION ENHANCEMENTS PROGRAM:

Federal reimbursement grants for projects that enhance multi-modal transportation goals in the areas of historic preservation, bike and pedestrian paths, scenic protection, archeological planning, mitigation of highway water runoff, tourist and welcome centers, and transportation museums. Preservation projects must have a direct, evident and strong relationship to the surface transportation

system. Proximity to a road alone is not sufficient. Buildings listed in the National Register and/or located within a state scenic byway or along an alternate designated scenic or historic route are most competitive. Project costs range from \$10,000 to approximately \$350,000 and a 20% non-federal fund match is required. Local, state and federal governments and non-profit organizations may apply. More information is available at: <http://www.aot.state.vt.us/progdev/Sections/LTF/LTF.htm>

5.2 (STP) SURFACE TRANSPORTATION PROGRAM/VTRANS CAPITAL PROGRAM:

STP funds have the most flexible uses of any federal transportation funds. STP funds may be used for highway, transit, and non-motorized facility construction and improvements. Facilities must be classified by the State as eligible for federal-aid, although sidewalk projects on local roads that are not on the federal-aid system may also be eligible for STP funding. The non-federal match is 20 percent. For projects that are completely on the state system, the state typically covers the 20% match. When local road or bridges are involved, a local match of 10-20% may be required depending on the classification of the highways involved and other factors.

Projects utilizing STP funds are typically prioritized by a regional planning commission relative to other projects in a region and must pass through the VTrans scoping and project development process. The project development process may take several years and does not necessarily guarantee that funds will be waiting when the studies are completed. This type of funding source is not recommended for a project that needs to be implemented in less than five years.

5.3 (MUNICIPAL) LOCAL FUNDS THROUGH THE MUNICIPAL CAPITAL BUDGET:

The municipal capital budget can be used to match Federal or State funded projects, or to finance all of a project. The particular projects may be identified in advance through a municipal Capital Improvement Plan and should be included in the appropriate budget year(s) for approval at Town Meeting. Larger projects are often funded through municipal bonds.

The Vermont Municipal Bond Bank (VMBB) is a quasi-state agency administered by a board of directors that includes four members appointed by the Governor and the State Treasurer. VMBB operates by purchasing a bond from a municipality. The municipality must have approved the issue of the bond by vote of the legislative body. The VMBB bundles together several individual municipal bonds and sells them as a package to individual or institutional investors. In this way VMBB can secure preferential rates for its municipal Vermont clients.

Bond transaction costs are assumed by VMBB, which is an important advantage of this source of financing. The interest rate accompanying any bond issue is determined at the date of sale. Bond payback terms are typically 20 years for highway-related improvements and 30 years for water/sewer improvements. Payments are made on a monthly basis, and can be calculated for level or declining principal balance.

Local governments have several options available to raise revenue for paying back a bond. The most common options are briefly described below. Careful review of the advantages of each method, including reliable estimates on how these options affect local tax rates, is necessary before selecting an appropriate funding mechanism.

Special Assessment Tax District: A special assessment district can be created where property owners, which presumably benefit from the investment, pay a special tax to cover the cost of bond payments. Special assessment districts could be established for a designated area of the town or can be designated town-wide.

Tax Increment Financing District: A tax increment financing district (TIF) can be established that dedicates the non-school taxes generated by increased property value to paying off the bond. A TIF is most appropriate where property values are expected to increase significantly.

Transportation Impact Fees. Through impact fees, new developments pay a ‘fair-share’ of the costs related to updating and improving infrastructure based on the amount of ‘impact’ the development would have on that infrastructure.

Local Option Sales Taxes: The State of Vermont allows the following taxes to be collected as part of the Local Option Sales Tax: A one percent sales tax; a one percent meals and alcoholic beverages tax; and a one percent rooms tax. The local option sales tax is permitted for VT municipalities that were affected a certain way by Act 60 and Act 68. The legislature is considering a bill that will make it available to all VT municipalities.

5.4 PRIVATE SOURCES

The most common private source of funding for new infrastructure comes from a landowner or developer paying for new or enhanced access to a site or paying for transportation enhancements to offset the impacts of a proposed development. Other private sources may include local non-profit groups, the Vermont Association of Snow Travelers, the Jay Peak Resort, a neighborhood civic organization, and others.

