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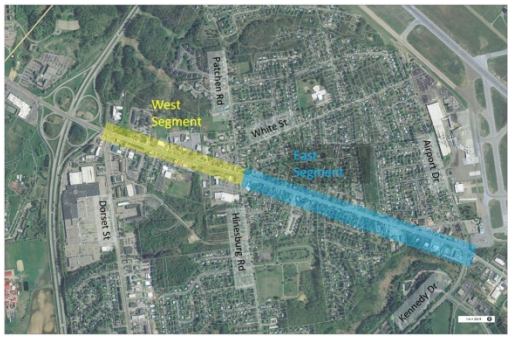

Williston Road Complete Streets Study

South Burlington

Draft Report

February, 2012

DATA ■ ANALYSIS ■ SOLUTIONS

Prepared for:

The City of South Burlington and the Chittenden County Regional Planning Commission

Prepared by:

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Introduction

This study has been commissioned by the Chittenden County Regional Planning Commission (CCRPC) for the City of South Burlington. This study's goal is to explore in detail the possibility of implementing a Complete Street concept for Williston Road (US2) between Dorset Street and Kennedy Drive. This includes reducing the number of vehicle travel lanes from four to three (one lane in each direction with a center lane that accommodates left turns) and adding designated bike lanes within the existing roadway width (curb to curb). Complete streets are designed to enable the safe and efficient travel of pedestrians, bicyclists, motorists and transit riders of all ages and abilities.

One of the fundamental premises of this study was to keep any proposed improvements within the existing curb locations so that implementation could coincide with the planned 2012 repaving project, which requires minimal infrastructure changes for expediency's sake.

There are three potential phases for this study as indicated below. Results/outcomes of Phase I would dictate whether Phases II and III would move forward.

- Phase I – Technical feasibility (traffic performance) of a complete streets design
- Phase II – Public outreach and development of preliminary design plans
- Phase III – Implementation of a pilot test of a complete streets design

This report summarizes outcomes of Phase I, which evaluated the feasibility, as far as vehicle congestion is concerned, of a complete street design along two distinct roadway segments:

a) Williston Road from Dorset Street to Airport/Kennedy Drive (entire study corridor); and
b) Williston Road from Hinesburg Road to Airport/Kennedy Drive (eastern segment).

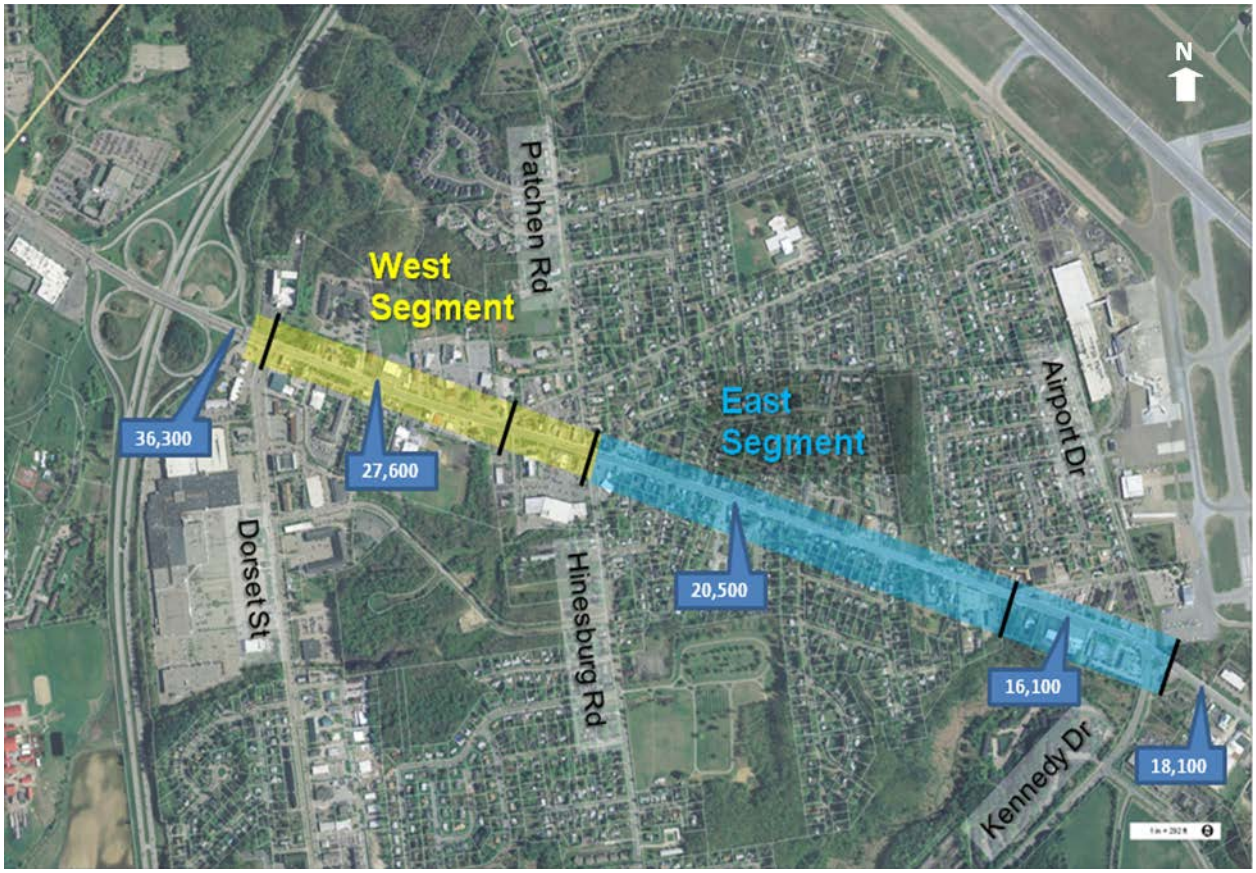
A Steering Committee was formed to oversee the study with representation from South Burlington City Council, Planning Commission, Rec Path Committee, Department of Public Works, Business Community, CCRPC and Consultant staff. The Committee met numerous times to review study results and discuss study conclusions.

Project Area

The study area and the two sub-sections are depicted in Figure 1 below. 2010 Annual Average Daily Traffic (AADT) is also indicated for the various sections of roadway, as reported by the Vermont Agency of Transportation (VTrans) Traffic Research Section[1].

[1] All figures are estimates, with the exception of the VT116-Airport Drive segment where actual counts were performed

Figure 1. Project Area and 2010 AADT



Current Conditions

Currently, Williston Road has two lanes in each direction with no shoulder and a sidewalk on each side of the roadway with a green strip. Figure 2 shows the typical cross-section on Williston Road within the study area. Additional auxiliary (turn) lanes exist at the intersections at Dorset St and Airport Drive. The roadway lane configuration from Dorset Street to Kennedy Drive along Williston Road is schematically shown in Figure 3.

Figure 2. Existing Typical Cross-Section of Williston Road

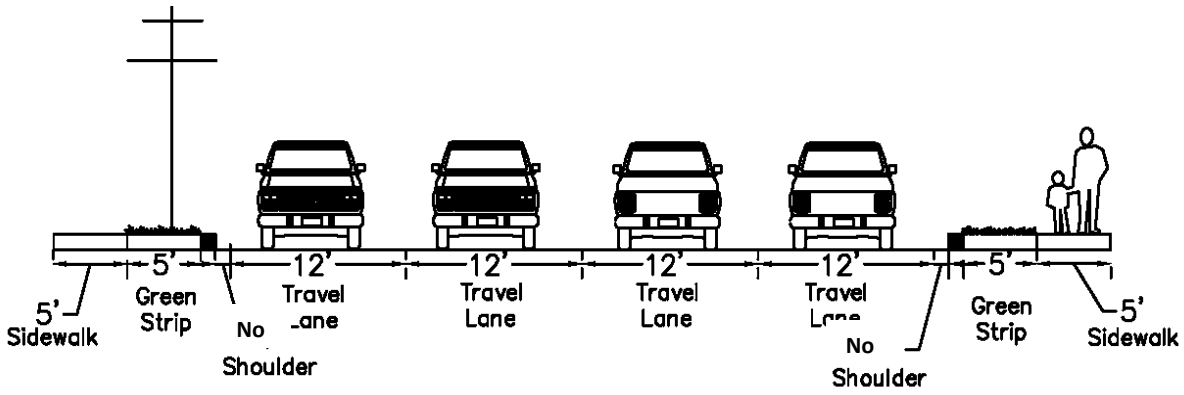
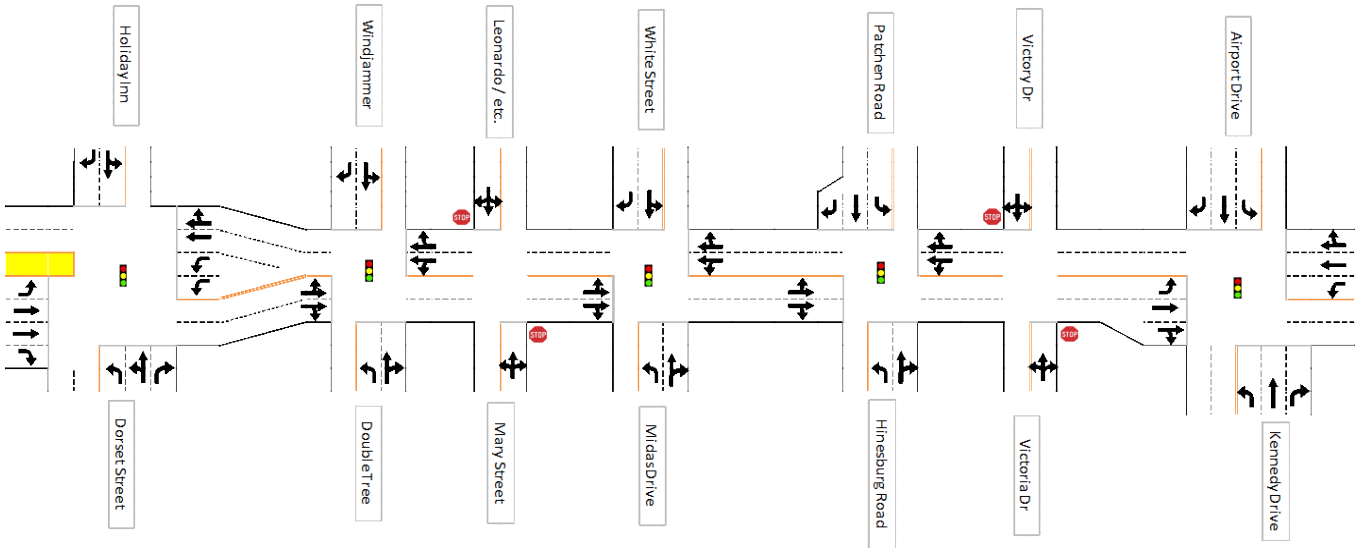


Figure 3. Schematics of Existing Roadway Configuration from Dorset Street to Kennedy Drive



Crash History

Crash records were collected from VTrans (2006-2010) for both western and eastern segments in the study area. VTrans maintains a statewide database of all reported crashes along all state highways and Federal Aid road segments.[2]

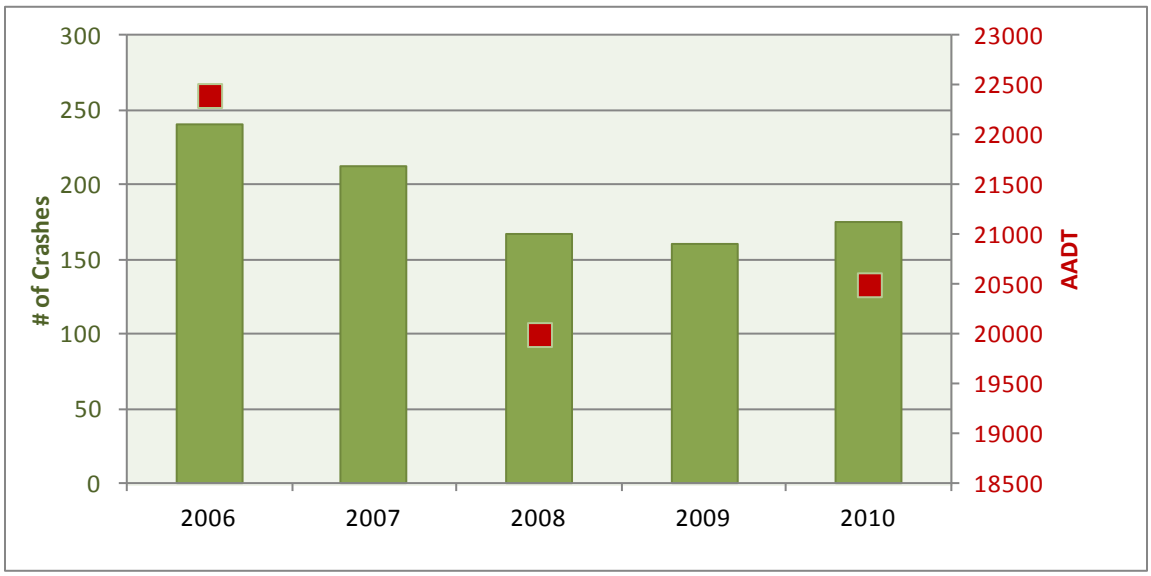
A reportable crash is a collision with at least one of the following results caused by the event:

- property damage exceeding $3,000
- personal injury
- fatality

Figure 4 shows the total number of reported crashes that occurred on Williston Road[3], from Dorset St to Kennedy Drive,, for each year from 2006 to 2010.

The total number of crashes varied from 2006 to 2010 from as many as 241 in 2006 to 161 in 2009. The trend follows the trend in traffic volumes (AADT) somewhat—AADT data is indicated in red (squares and right axis) in Figure 4.

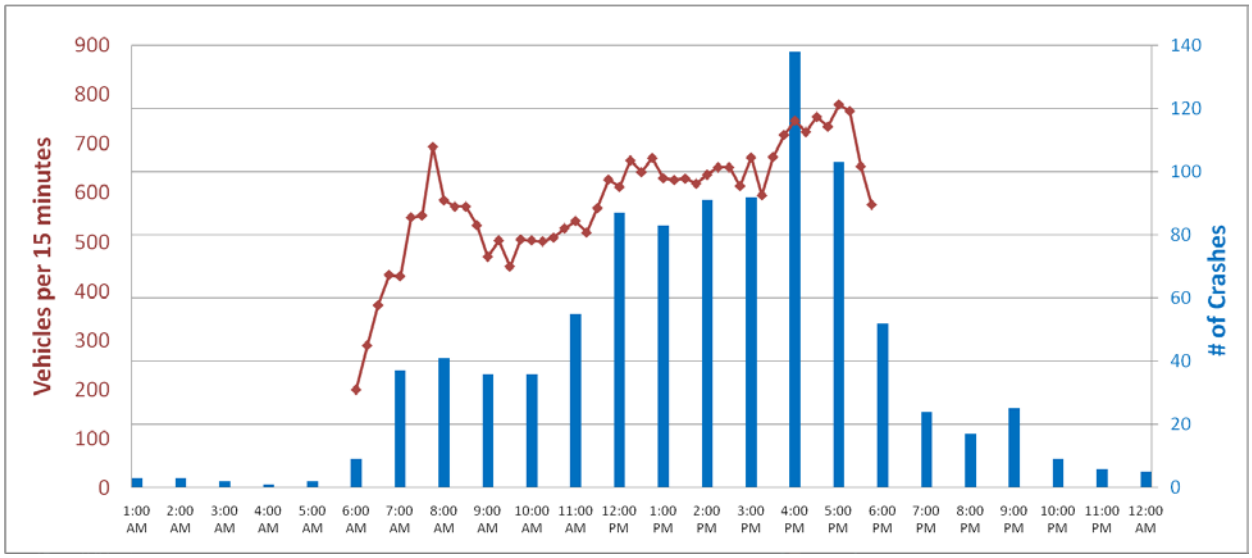
Figure 4. Vehicle Crash History by Year (2006-2010)



[2] This data is exempt from Discovery or Admission under 23 U.S.C. 409
[3] between mile markers 0.47 and 2.00

Figure 5 illustrates the crashes by time of day and the corresponding traffic volumes. The highest concentration of crashes in the study area coincides closely with the PM peak hour[4].

Figure 5. Number of Crashes (2006 to 2010) and Traffic Volumes by Time of Day



High Crash Locations

Based on the most recent crash data available from VTrans, the Williston Road corridor from Dorset Street to Kennedy Drive exhibits higher than average vehicle crash rates when compared to similar roadway segments around the state—the corridor includes numerous designated High Crash Locations.

In order to be classified as a High Crash Location (HCL), an intersection or road (0.3 mile) section must meet the following two conditions:

- It must have at least 5 crashes over a 5-year period
- The Actual Crash Rate must exceed the Critical Crash Rate for a similar facility.

According to VTrans' latest crash data there are two HCL Sections and four HCL Intersections along the study corridor (see Figures 6 and 7).

[4] The actual PM peak hour varies from one intersection to the next, starting as early as 4 pm, or as late as 4:45 pm

Figure 6. Reported Crash Locations and HCL Sections and Intersections – Western Section

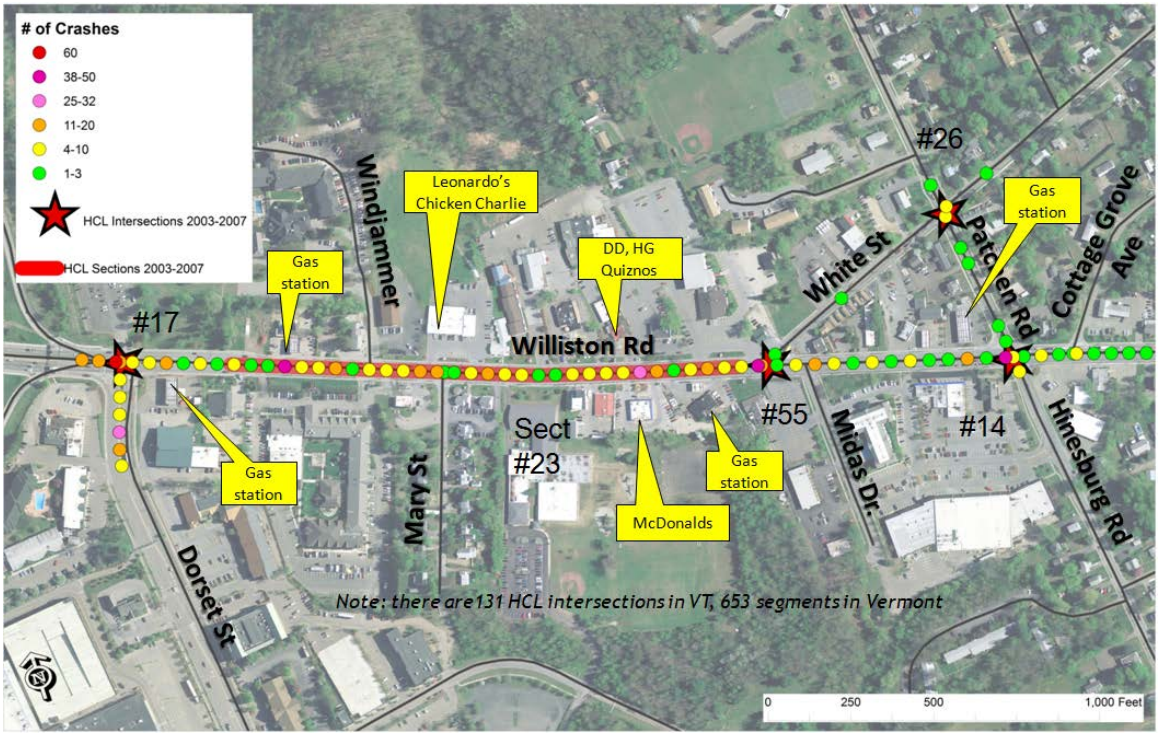


Figure 7. Reported Crash Locations and HCL Sections and Intersections –Eastern Section

While several factors contribute to the crashes, inattention, failure to yield right of way and following too closely are three major contributing factors for crashes on Williston Road in the study area (see Table 1). These are factors that could be attributed to congestion and poor access management (multiple conflict points for turning vehicles) in the corridor.

Table 1. Major Contributing Factors of Crashes

	# of crashes	% of crashes
Inattention	359	38%
Failed to yield right of way	292	31%
Followed too closely	202	21%
Visibility obstructed	63	7%
Failure to keep in proper lane	63	7%
Made an improper turn	60	6%
Other improper actions	58	6%
Distracted	44	5%
Unknown	34	4%
Driving too fast for conditions	31	3%
Disregarded traffic signs, signals, road markings	23	2%
Under the influence of medication/drugs/alcohol	13	1%
Operating vehicle in erratic, reckless, careless, negligent, or aggressive manner	11	1%
Swerving or avoiding	8	1%
Wrong side or wrong way	6	1%
Operating defective equipment	4	0%
Fatigued/asleep	2	0%

Note: some crashes have more than one contributing factor.

Inclement weather does not appear to be a significant factor in crashes along Williston Road in the study area since over 80% of the crashes occurred when it was clear or cloudy. There were no fatal crashes reported, and 10% of the crashes resulted in personal injuries (see Table 2).

Table 2. Severity and Weather Related Crashes

	# of crashes	% of crashes
Inclement weather	154	16%
Injury crashes	100	10%
Fatalities	0	0%

Nearly half of the crashes on Williston Road were rear end collisions, while sideswipe and broadside collisions composed almost another half of total crashes (see Table 3).

Table 3. Type of Crashes

	# of crashes	% of crashes
Rear end	399	42%
Sideswipe	220	23%
Broadside, with turns	142	15%
Broadside, no turns	82	9%
Other	58	6%
Single vehicle	32	3%
Head on	19	2%
Turn crash	5	1%
Total	957	100%

Traffic Volumes and Adjustments

The traffic turning movement counts for signalized study intersections along Williston Road were provided by the CCRPC. The analysis was done for PM peak hour (4:45 PM to 5:45 PM) which represents the worst condition in the corridor. The PM peak hour traffic volumes were adjusted to represent the Design Hour Volume (DHV[5]) in 2011 (Appendix A). A detail description of the DHV adjustment factors are provided below:

1. A design hour adjustment factor is based on VTrans' DHV Policy for urban streets. The major DHV adjustment used the AADT along Williston Road at the short-term counter S6D209, in South Burlington, located 100 feet east of Hinesburg Road (VT116), to obtain the seasonal adjustment.[6] The Urban Area "k" factor of 10.4% was applied to the AADT to determine the design hour volume along Williston Road. The DHV design hour adjustment factor increases volumes of the study intersections (except for the Williston Road and Kennedy Drive intersection) by 17% based on the 2008 AADT. We also used two other short-term counters at two intersections in the study area. The short-term counter S6D133 located on VT116 just north of Market Street was used to obtain the seasonal adjustment for the VT116 northbound approach and the Patchen Road southbound through movements, which increases volumes by 9% based on the 2010 AADT. The short-term counter S6D075 located on Kennedy Drive just south of Williston Road was used to obtain the seasonal adjustment for the Williston Road and Kennedy Drive intersection, which increases volumes by 5% based on the 2009 AADT.

[5] The DHV is the 30th highest hour of traffic for the year and is used as the design standard in Vermont

[6] Typically, continuous traffic counters, which collect data year round, are used in calculating the design hour adjustment factors. It was determined that there were no appropriate continuous traffic counters, so VTrans short term counters were used instead, as prescribed in the VTrans Traffic Impact Study Guidelines.

2. An annual adjustment factor, which represents general background traffic growth, is based on estimated growth in the area. The annual adjustment factor is based on the expected growth rate from the *VTrans Continuous Traffic Counter Grouping Study and Regression Analysis*[7] and it decreases volumes by 2% between 2008 and 2011, and holds volumes the same between 2009 and 2011, and 2010 and 2011.

Traffic Performance

Congestion in the Williston Road corridor is controlled by the performance of the signalized intersections, especially the three major intersections of Dorset Street, Hinesburg Road and Kennedy Drive. Traffic performance of the corridor was measured using Level-of-Service (LOS), Volume to Capacity ratio (V/C) and queue analyses at signalized intersections.

Intersection operation is usually assessed based on Level-of-Service analyses. LOS is a qualitative measure describing the operating conditions as perceived by motorists driving in a traffic stream. LOS is estimated using the procedures outlined in the Highway Capacity Manual. Key inputs for LOS analyses include traffic volumes, number of lanes at each intersection and the traffic signal timing plans.

The Highway Capacity Manual (HCM) defines six grades to describe the level of service at an intersection. LOS is based on the average delay per vehicle. Table 4 shows the various level-of-service grades, qualitative descriptions, and quantitative definitions for signalized intersections.

Table 1. LOS Criteria for Signalized Intersections

LOS	Characteristics	Signalized Total Delay (sec)
A	Little or no delay	≤ 10.0
B	Short delays	10.1-20.0
C	Average delays	20.1-35.0
D	Long delays	35.1-55.0
E	Very long delays	55.1-80.0
F	Extreme delays	> 80.0

[7] VTrans - http://www.aot.state.vt.us/Planning/Documents/TrafResearch/Publications/Redbook2009.pdf

In general, the VTrans policy on Level of Service indicates that an overall LOS C should be maintained for state highways and other streets accessing the state facilities, especially in rural areas of the state.

Lower LOS are acceptable for urban and village centers and other developed areas where achieving a LOS C will have negative impacts on the natural and/or build environment or other resources.

Due to the severe constraints posed by the existing build conditions, this study assumes that LOS D is acceptable within the Williston Road study corridor.

In addition to LOS analyses, vehicle queues were also evaluated, particularly those that extend beyond adjacent intersections, thereby reducing available capacity of those intersections.

Traffic performance for signalized intersections within the study area was estimated using SimTraffic (v7 by Trafficware), a microsimulation software.

Traffic Results

Table 5 summarizes the results of the traffic performance analysis for the existing conditions (2011). Notable signs of excessive congestion are highlighted in yellow.

Table 2. 2011 PM Peak Hour Performance Results for the Existing Condition

PM Peak Hour	Existing Condition		
Signalized Intersections	**2011 DHV**		
Williston Rd. (US2)/Dorset St./Holiday Inn	**LOS**	**Avg. Delay (s)**	**Avg. Queue (ft)**
Overall	**F**	186	N/A
Northbound	**F**	569	2705
Southbound	**E**	68	19
Westbound	**D**	42	569
Eastbound	**C**	31	165
Williston Rd. (US2)/Windjammer	**LOS**	**Avg. Delay (s)**	**Avg. Queue (ft)**
Overall	**F**	107	N/A
Northbound	**F**	187	100
Southbound	**F**	115	96
Westbound	**F**	95	921
Eastbound	**F**	121	583
Williston Rd. (US2)/White St./Midas Dr.	**LOS**	**Avg. Delay (s)**	**Avg. Queue (ft)**
Overall	**F**	88	N/A
Northbound	**F**	188	182
Southbound	**F**	392	312
Westbound	**C**	25	218
Eastbound	**F**	81	408
Williston Rd. (US2)/Hinesburg Rd.	**LOS**	**Avg. Delay (s)**	**Avg. Queue (ft)**
Overall	**F**	190	N/A
Northbound	**E**	67	298
Southbound	**F**	151	495
Westbound	**F**	346	1645
Eastbound	**D**	46	215
Williston Rd. (US2)/Airport Dr.	**LOS**	**Avg. Delay (s)**	**Avg. Queue (ft)**
Overall	**C**	33	N/A
Northbound	**C**	29	160
Southbound	**D**	35	109
Westbound	**D**	35	255
Eastbound	**D**	36	179

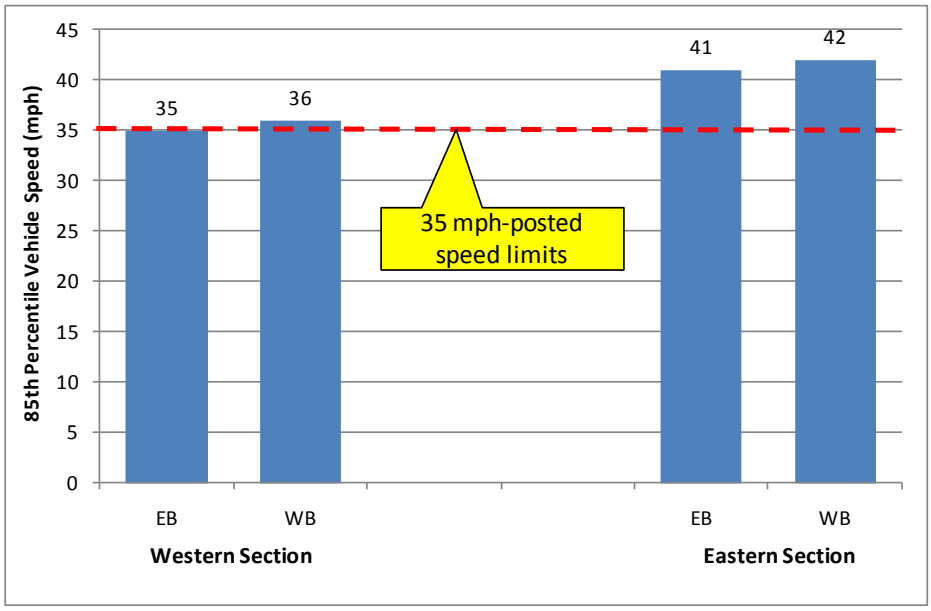
Western segment
Transition
Eastern segment

Under existing conditions, the western section of the study corridor (Dorset St to Hinesburg Rd) exhibits severe congestion at all signalized intersections during the PM Peak hour of travel. Currently, the Williston Road / Airport Drive/Kennedy Drive intersection is less congested and operates at acceptable levels of service.

Speed Survey

In order to better understand the existing operational condition on Williston Road in the study area, Resource Systems Group conducted a speed survey on both western and eastern segments in May, 2011, during off peak[8] periods (see Figure 8).

Figure 8. Speed Survey Result



The survey results show that vehicle speeds along the eastern segment tend to be notably higher than those along the western segment, where speeds are 6-7 mph over the posted speed limit. A likely explanation for lower speeds observed in the western segment is the relative abundance of visual cues for drivers, particularly the higher density of development, driveways, traffic signals and land use activity.

[8] Off-peak conditions are suggested for such surveys as they are more likely to operate under free-flow conditions, when speeds are less likely to be artificially suppressed by congestion. The survey carefully and randomly targeted such vehicles.

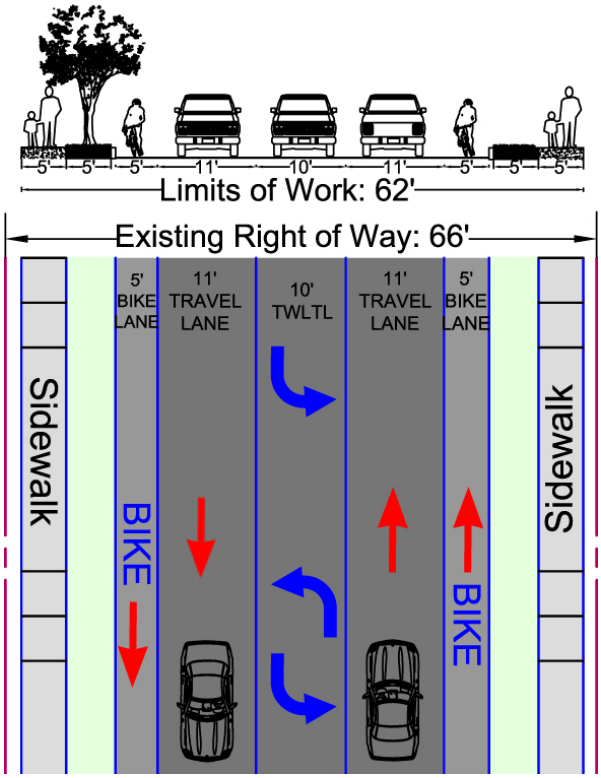
Complete Street Design

As discussed in previous sections, the Complete Streets design includes the reduction of vehicle travel lanes from four to three (one lane in each direction with a center lane that accommodates left turns) and the addition of designated bike lanes within the existing roadway width.

Entire Study Corridor (Western and Eastern Segment)

Figure 9 shows the evaluated complete street cross-section. The primary benefit of this cross-section is the provision for designated bicycle lanes, while a significant secondary benefit would be the creation of an exclusive lane for left turning vehicles accessing the numerous driveways and busy adjacent land uses, particularly in the western segment of the corridor. Note that one of the goals of this study was to work within the confines of the existing roadway width. Widening the roadway would involve drainage, utility or even sidewalk improvements/relocation, with serious right-of-way implications, all of which would preclude any corridor improvements during the paving of Williston Road (by VTrans) in 2012.

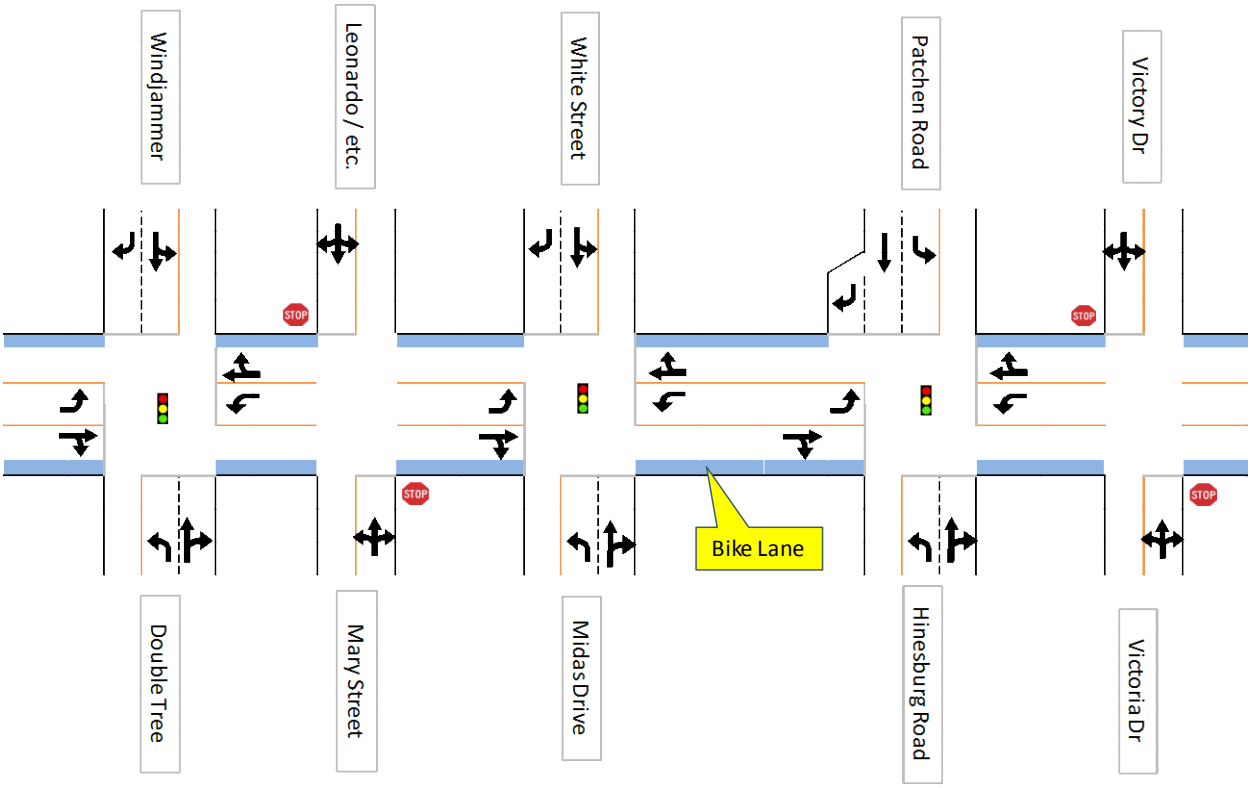
Figure 9. Proposed Complete Street Cross-Section:



Traffic Performance

Early assessment of Williston Road intersections at Dorset Street and Kennedy Drive showed that dropping approach lanes at these locations would have drastic (negative) impacts on the performance of the corridor, therefore these intersections maintained their current lane configuration under the Complete Streets scenario. The Complete Street concept was applied to the rest of the corridor (roadway segments and intersections) as shown in Figure 10.

Figure 10. Schematics of Complete Street Condition between Dorset Street and Kennedy Drive



The assessment of traffic performance for the Complete Street condition was developed utilizing a SimTraffic simulation model. Table 6 summarizes the traffic performance results for the existing and the Complete Street conditions for the entire study corridor in the PM peak hour.

Table 3. Traffic Performance Results for the Entire Corridor (Existing & Complete Streets)

PM Peak Hour	Existing Condition			Complete Street Condition		
Signalized Intersections	**2011 DHV**			**2011 DHV**		
Williston Rd. (US2)/Dorset St./Holiday Inn	**LOS**	**Avg. Delay (s)**	**Avg. Queue (ft)**	**LOS**	**Avg. Delay (s)**	**Avg. Queue (ft)**
Overall	**F**	186	N/A	**F**	343	N/A
Northbound	**F**	569	2705	**F**	1222	3232
Southbound	**E**	68	19	**E**	58	18
Westbound	**D**	42	569	**D**	38	267
Eastbound	**C**	31	165	**C**	31	166
Williston Rd. (US2)/Windjammer	**LOS**	**Avg. Delay (s)**	**Avg. Queue (ft)**	**LOS**	**Avg. Delay (s)**	**Avg. Queue (ft)**
Overall	**F**	107	N/A	**F**	86	N/A
Northbound	**F**	187	100	**F**	156	51
Southbound	**F**	115	96	**F**	119	57
Westbound	**F**	95	921	**D**	54	676
Eastbound	**F**	121	583	**F**	126	620
Williston Rd. (US2)/White St./Midas Dr.	**LOS**	**Avg. Delay (s)**	**Avg. Queue (ft)**	**LOS**	**Avg. Delay (s)**	**Avg. Queue (ft)**
Overall	**F**	88	N/A	**F**	139	N/A
Northbound	**F**	188	182	**F**	1041	553
Southbound	**F**	392	312	**F**	141	244
Westbound	**C**	25	218	**B**	14	182
Eastbound	**F**	81	408	**F**	169	1033
Williston Rd. (US2)/Hinesburg Rd.	**LOS**	**Avg. Delay (s)**	**Avg. Queue (ft)**	**LOS**	**Avg. Delay (s)**	**Avg. Queue (ft)**
Overall	**F**	190	N/A	**F**	495	N/A
Northbound	**E**	67	298	**F**	254	1049
Southbound	**F**	151	495	**F**	428	1185
Westbound	**F**	346	1645	**F**	939	3916
Eastbound	**D**	46	215	**F**	114	477
Williston Rd. (US2)/Airport Dr.	**LOS**	**Avg. Delay (s)**	**Avg. Queue (ft)**	**LOS**	**Avg. Delay (s)**	**Avg. Queue (ft)**
Overall	**C**	33	N/A	**F**	151	N/A
Northbound	**C**	29	160	**F**	156	857
Southbound	**D**	35	109	**F**	93	281
Westbound	**D**	35	255	**F**	254	1509
Eastbound	**D**	36	179	**C**	25	122

Results indicate that the Complete Streets configuration produces significantly more congestion (increased delays and long queues) throughout the study corridor when compared to existing conditions. It should be noted that even though LOS results for the Complete Streets scenario might appear better for some approaches this is due to the excessive number of vehicles that are denied entry[9] in the corridor for this scenario—772 vehicles are denied entry for the complete street configuration compared to 368 vehicles for existing conditions. The high number of cars that are denied entry to the corridor indicates that queues at the approaches to the corridor were growing progressively worse (through the PM Peak analysis hour) for the Complete Street scenario and that results presented in Table 6 may represent artificially optimistic conditions.

[9] Denied Entry is a count of vehicles that are unable to enter the system in the analysis period due to congestion. Denied entry includes external links and mid-block vehicle sources. This is useful to see if congestion is getting worse or better. Modeled vehicles that are denied entry are not included in the calculation of delay, thus delay results are somewhat underestimated.

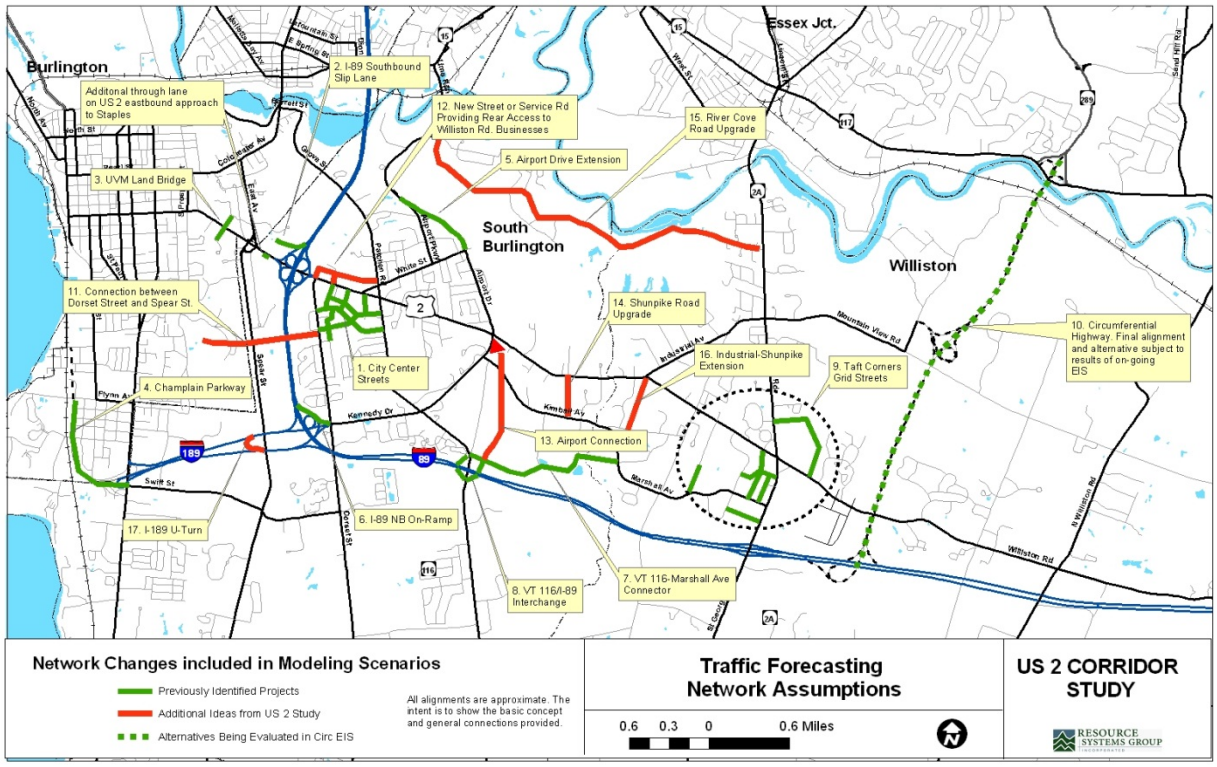
In summary, implementing the Complete Street concept for the entire study corridor under existing traffic conditions will significantly increase congestion with longer delays and vehicle queues. The intersection of Williston Road and Hinesburg Road will experience the worst congestion among all study intersections.

Potential Traffic Mitigation

To address the question of how can traffic on Williston Road be reduced to allow for possible lane changes, the US 2 Corridor Transportation Plan[10] (2007) was reviewed and potential Williston Road traffic impacts from planned network improvements where identified.

In particular, the US 2 Corridor Plan identified a list of Previously Identified Projects (PIPs) and Additional Concepts (ACs) that have the potential to significantly reduce traffic on Williston Road—see Figure 11.

Figure 11. Previously Identified Projects & Additional Concepts



Traffic modeling results from that US 2 Corridor Plan show that the PIPs have the potential to reduce traffic on Williston Road by 24% on average, and when the ACs are included by 31%. Even though these percentages are encouraging, traffic analyses indicate that an estimated 39% reduction in traffic is needed for a Complete Street concept to succeed (overall intersection LOS D or better) in the Williston

[10] *US2 Corridor Management Plan*; 10 August 2007, Final Report

Road corridor (eastern and western segments). Also note that the intersection of Williston Road and Hinesburg Road is the limiting factor as the lack of turning lanes combined with heavy side street traffic constrains this intersection more than others in the corridor.

Eastern Corridor Segment

On June 7th, 2011, initial results for the entire study corridor were presented to the project Steering Committee. At this meeting, the committee members agreed on two scenarios for further evaluation:

1. The Complete Street concept implemented only for the eastern section of Williston Road (Hinesburg Road to Kennedy Drive) while maintaining intersection capacity at either end.
2. At the intersection of Williston Road and Dorset Street evaluate the following:
   a. Whether a new lane assignment at the Williston Road westbound approach—eliminate one exclusive left-turn lane and convert it to a 3rd though lane—would improve traffic conditions.
   b. Whether a multilane roundabout would improve conditions at this location.

Schematics representing the Complete Street lane configuration from Hinesburg Road to Kennedy Drive are shown in Figures 12-14. As noted above, the Williston Road intersections at Hinesburg Road and Kennedy Drive remain in the existing condition, except that left-turns would not be allowed from the eastbound Williston Road approach onto Patchen Road.

Figure 12. Transition from Hinesburg Road to the Complete Street Condition

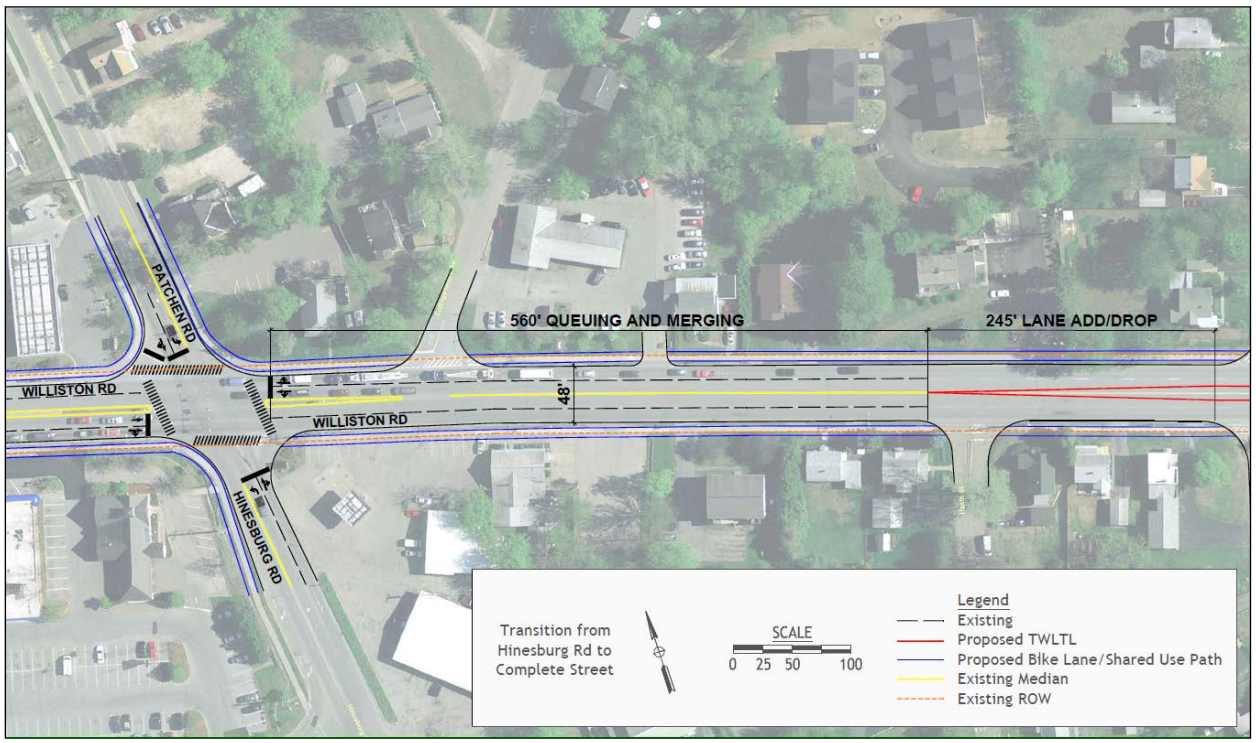


Figure 13. Complete Street Condition between Hinesburg Road and Kennedy Drive

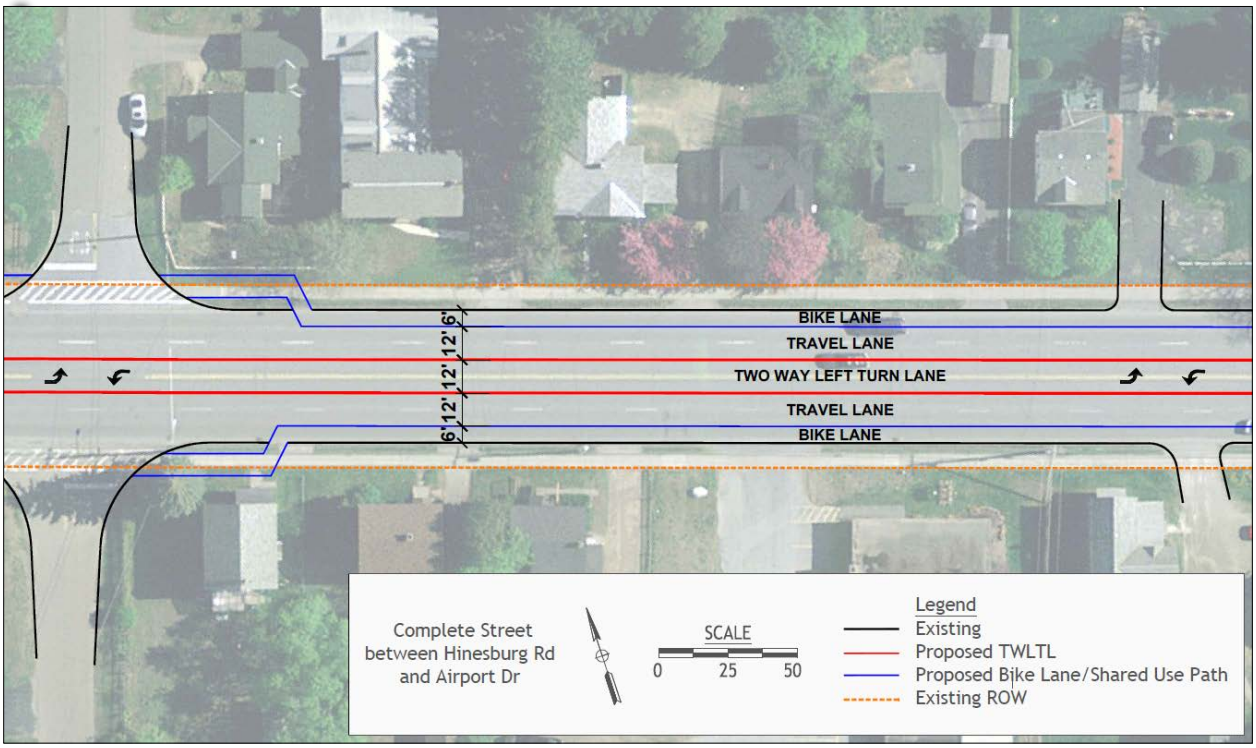
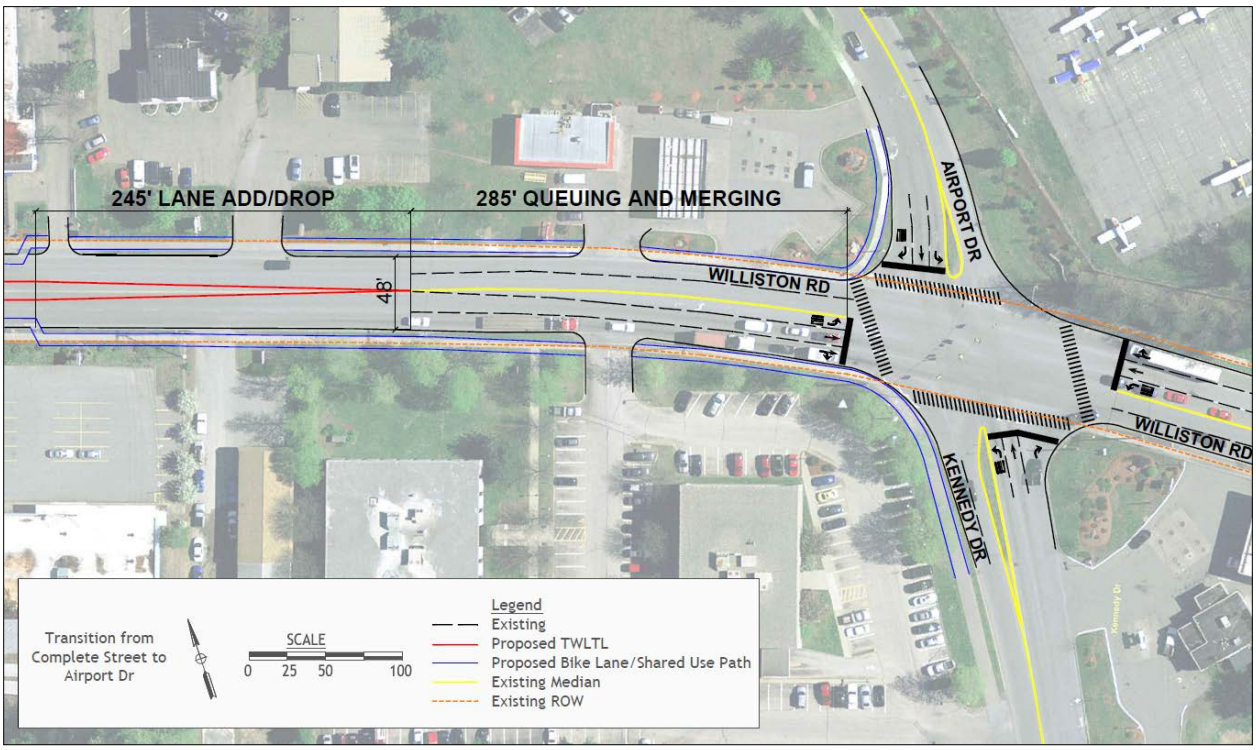


Figure 14. Transition from the Complete Street Condition to Kennedy Drive



Traffic Performance

Traffic analyses for the PM peak hour of the eastern corridor section (Hinesburg Road to Kennedy Drive) was performed using a SimTraffic microsimulation model, in order to best capture the effect and interaction of vehicle queues.

LOS and queue results presented in Table 7 indicate that the elimination of a travel lane at the eastern section increases congestion in the corridor (lower LOS and generally increased vehicle queues). Analyses indicated that even though the lane configuration (thus capacity) of the Hinesburg Road and Kennedy Drive intersections was preserved for this complete street scenario, the congestion increased due to diminished capacity downstream of the signalized intersections, where two lanes merge into one.

Table 4. Traffic Performance Results for Eastern Section (Existing & Complete Streets)

Williston Rd. Eastern Section	Existing Condition			Complete Street Condition		
	2011 DHV (PM Peak)			2011 DHV (PM Peak)		
Williston Rd. (US2)/Hinesburg Rd.	**LOS**	**Avg. Delay (s)**	**Avg. Queue (ft)**	**LOS**	**Avg. Delay (s)**	**Avg. Queue (ft)**
Overall	**F**	190	N/A	**F**	252	N/A
Northbound	**E**	67	298	**F**	96	429
Southbound	**F**	151	495	**F**	279	849
Westbound	**F**	346	1645	**F**	85	425
Eastbound	**D**	46	215	**F**	634	1843
Williston Rd. (US2)/Airport Dr.	**LOS**	**Avg. Delay (s)**	**Avg. Queue (ft)**	**LOS**	**Avg. Delay (s)**	**Avg. Queue (ft)**
Overall	**C**	33	N/A	**E**	73	N/A
Northbound	**C**	29	160	**C**	32	184
Southbound	**D**	35	109	**D**	35	112
Westbound	**D**	35	255	**F**	154	1030
Eastbound	**D**	36	179	**C**	26	156

Williston Road/Dorset Street Intersection Improvements

Lane Changes

As indicated in Figure 15, the proposed reconfiguration of the Williston Road westbound approach at this intersection converts one of the two existing left-turn lanes into a third through lane. The far right lane would exclusively serve the Holiday Inn and I-89 northbound on-ramp.

Figure 15. Proposed Lane Changes of Westbound Approach at Williston Road and Dorset Street

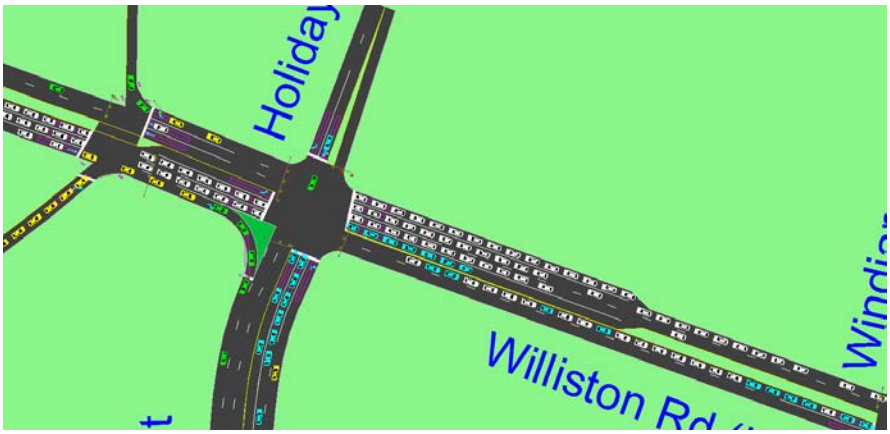


Table 8 shows the Synchro (v7 by Trafficware) HCM results under both existing and proposed conditions in the PM peak hour.

Table 5. LOS Results of the Existing and Proposed Conditions at Williston Road and Dorset Street

	2011 DHV (PM Peak)					
	Existing (LT+LT+TH+TH/RT)			Proposed (LT+TH+TH+TH/RT)		
Williston Rd. (US2)/Dorset St./Holiday Inn	LOS	Avg. Delay (s)	Q Length (ft)	LOS	Avg. Delay (s)	Q Length (ft)
Overall	E	59	N/A	D	51	N/A
NB Left, Dorset St.	F	124	#731	F	95	#696
NB Left and Thru, Dorset St.	F	125	#735	F	97	#701
NB Right, Dorset St.	D	47	104	D	41	79
SB left and Thru, Holiday Inn	E	71	37	E	71	37
SB Right, Holiday Inn	E	67	20	E	67	20
WB Left, Williston Rd.	E	60	201	E	67	#452
WB Thru and Right, Williston Rd.	D	55	#1068	D	36	604
EB Left, Williston Rd.	F	98	m42	F	98	m42
EB Thru, Williston Rd.	D	51	481	E	69	#524
EB Right, Williston Rd.	A	2	244	A	2	244

- 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m - Volume for 95th percentile queue is metered by upstream signal.

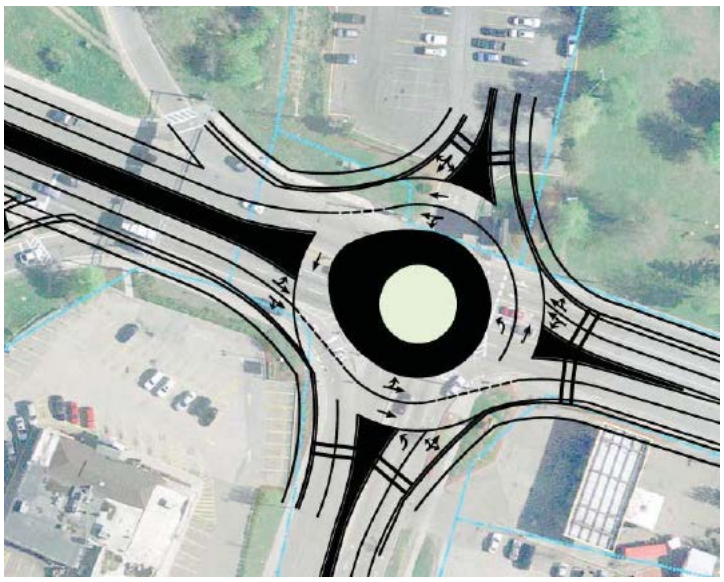
Results indicate that the overall intersection LOS and delays for some of the approaches are improved under the proposed lane configuration changes. The tradeoff in reduced capacity for left turning

vehicles, by dropping one left turn lane, while increasing capacity for the westbound through movement, proves to be beneficial overall since the through movement has significantly higher volume.

Roundabout

The proposed roundabout layout at this intersection is shown in Figure 16.

Figure 16. Proposed Roundabout Layout at Williston Road and Dorset Street



The roundabout analysis was conducted using SIDRA (v5, by Akcelik & Associates). Results are presented in Table 9.

Table 6. LOS Results - Existing Condition & Proposed Roundabout at Williston Road and Dorset Street

	2011 DHV (PM Peak)					
	Existing Condition			Proposed Roundabout		
Williston Rd. (US2)/Dorset St./Holiday Inn	LOS	Avg. Delay (s)	Q Length (ft)	LOS	Avg. Delay (s)	Q Length (ft)
Overall	F	198	N/A	F	168	2773
Northbound	F	559	2681	F	250	2046
Southbound	E	74	20	B	20	14
Westbound	D	42	527	F	262	2773
Eastbound	D	39	166	B	19	627

Although delays for many of the intersection approaches improve in the roundabout configuration, the westbound approach experiences much longer delay and queues, and the overall condition is still LOS F.

Study Conclusions and Recommendations

Traffic analyses conducted to evaluate the feasibility of a complete street design for Williston Road (Dorset Street to Kennedy Drive) indicate that congestion will increase significantly (excessive delays and queues) under the complete streets scenario for 2011 traffic conditions. Results indicate that an estimated 39% reduction in traffic is needed for a Complete Street concept to succeed (overall intersection LOS D or better) as far as traffic performance is concerned.

Complete Street lane configuration for the eastern segment only (Hinesburg Road to Kennedy Drive) also creates excessive delays and queues under 2011 traffic conditions.

The Williston Road / Hinesburg Road intersection is the most constrained intersection in the corridor, with significant side road traffic, but lacking any auxiliary turning lanes on Williston Road.

The study recommends the following improvements that have the potential to increase traffic and pedestrian safety and ease traffic congestion (over time) in the Williston Road study corridor:

- Pave Market Street to provide a viable alternative route to Williston Road for vehicles traveling between Hinesburg Road and Dorset Street. These types of local roadway connections are crucial to reducing traffic on Williston Road.
- Continue to plan for frontage roads (or private connections) that would allow access between adjacent properties and reduce trips turning onto and off Williston Road.
- Prohibit eastbound left turns from Williston Road onto Patchen Road.
- Pursue a lane designation change for the westbound traffic at Dorset Street:
    - Existing lanes: 2 Left, 1 Through, 1 Through/Right
    - Proposed lanes: 1 Left, 2 Through, 1 Through/Right
- Develop a comprehensive access management plan for the western segment with participation of all area businesses and property owners. Consolidation of driveways together with improved connectivity of adjacent properties/businesses could significantly improve safety for pedestrians, bicyclists and vehicles in the corridor as well as provide better access for area businesses.