RSG INC.
RESOURCE SYSTEMS GROUP, INC.

Town of Hartland

Three Corners Scoping Study

September 2013

Submitted by
Resource Systems Group

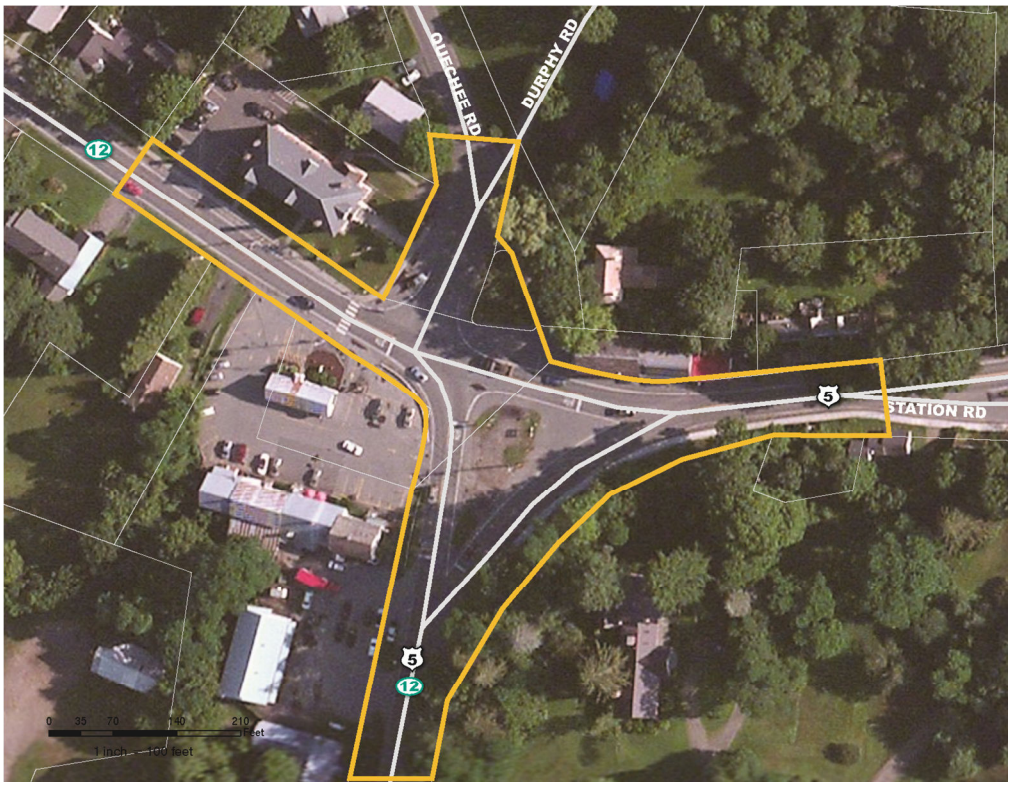
Contents

APPENDICES

1 INTRODUCTION

Located at the intersections of US 5, VT 12, and Quechee Road, Hartland Three Corners serves as a confluence of activity for the surrounding community. It is an area bordered by civic, retail, commercial, and residential uses—all centered in on the three corners area. The project contains an area from Durphey Road on Quechee Road to the back parking lot of Damon Hall on VT 12, to the library access road on US 5 south, to the intersection of Station Road and US 5 north. It is situated at a prime location where transportation improvements could greatly encourage more pedestrian and bicycle travel by fostering a safe and friendly environment for non-motorized modes of mobility.

Figure 1-1: Hartland Three Corners Study Area



1.1 PROJECT BACKGROUND

The Town and community of Hartland have long sought to improve the Hartland Three Corners area, particularly given its central location, as well the complex nature of its existing configuration. In 1994, the Town hired Bruno Associates and The Cavendish Partnership as a civil engineering and landscape architecture team to study the intersection. The 1994 study produced five different concept designs, from which this current study builds upon.

In 2012, the Town of Hartland received funding through the Transportation Enhancement Grant program, which is administered by the Local Transportation Facilities (LTF) section of the Vermont Agency of Transportation (VTrans), to complete a scoping study of the Hartland Three Corners area. The Town hired RSG to provide transportation planning and engineering services to identify issues and propose safety, accessibility, and mobility improvements in the Three Corners area.

1.2 METHODOLOGY

To arrive at the preferred concept alternative, RSG approached the study systematically by first gathering background information on the existing planning, environmental, and traffic conditions and using prior studies as a starting point from which to develop alternative concepts. The consultant team regularly checked back with the Town at Selectboard meetings (the Selectboard served as the project Advisory Committee), in a Local Concerns Meeting, and at the annual Town Meeting to present the findings as well as receive comment and input on the preferred alternative.

2 EXISTING CONDITIONS ANALYSIS

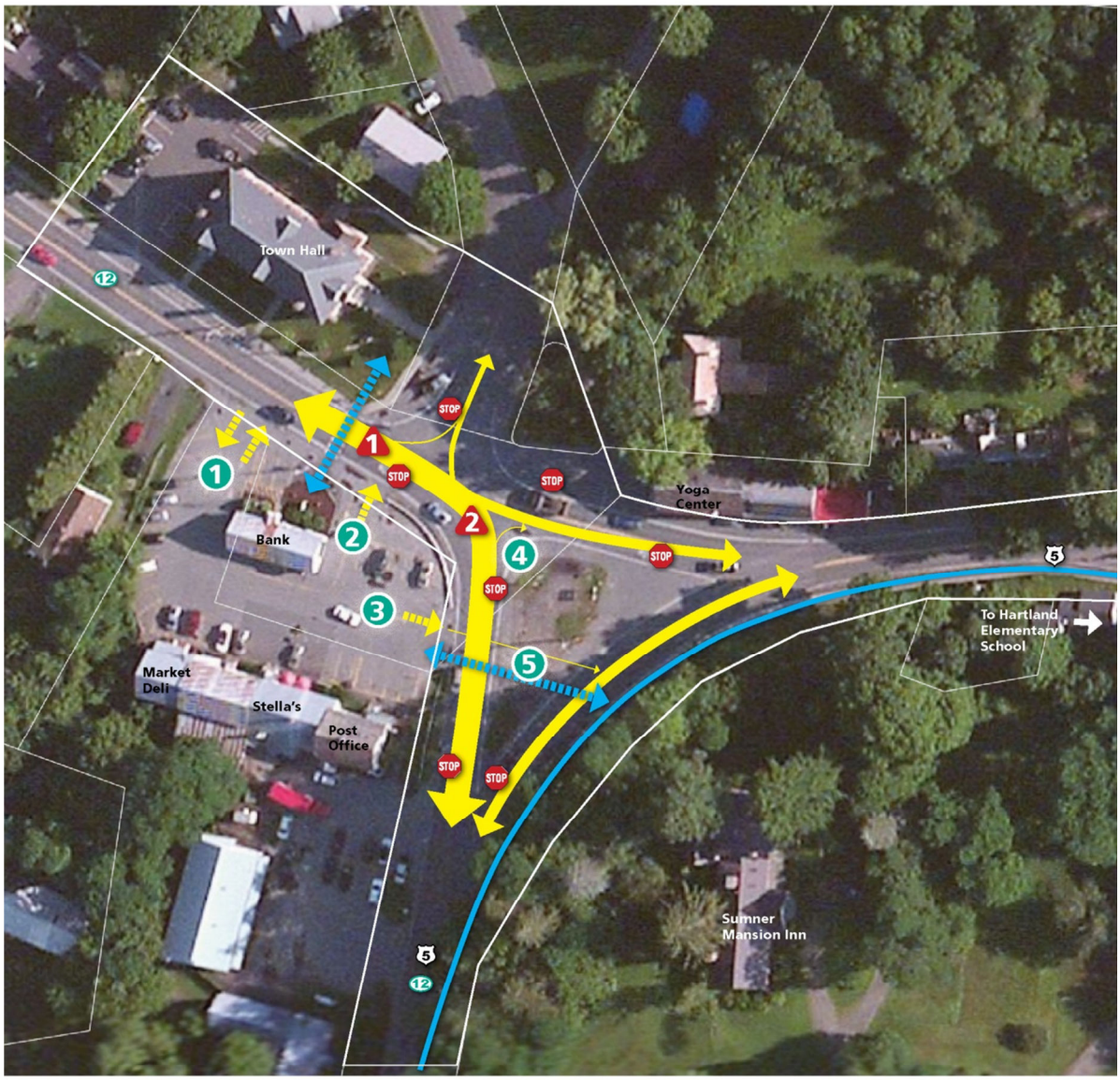
The project study area is located generally within the public right-of-way in the vicinity of US 5, VT 12, and Quechee Road, as shown previously in Figure 1-1. The total paved project area is roughly 0.5 acres with an additional 0.5 acres of open space within the triangle median bounded by US 5 and VT 12. There are currently seven stop signs located within the study area. Drivers from any given direction may encounter anywhere from zero to two stops as they travel through the three intersections.

The predominant vehicle turning movement is between US 5/VT 12 south and VT 12 west. The traffic counts show that in the AM peak period, the majority of vehicles (151) make the eastbound right turn from VT 12 onto US 5/VT 12 southbound. The second highest turning movement during the morning peak hour were cars heading northbound from US 5/VT 12 and continuing onto US 5 heading north/east. The PM peak hour experienced the inverse direction in traffic flow, with the majority of vehicles turning left onto VT 12 from northbound US 5/VT 12.

Based on site observations, stakeholder input, and traffic analysis, RSG identified several specific issues, as depicted in Figure 2-1. They include:

- Jessar's Common is a popular community services corner, containing a bank, a deli, a diner, and the post office. While there are three exit locations, there is only one entrance and it is accessible only from VT 12. The exit-only from Jessar's Common onto Route 5/VT 12 is poorly marked and confusing to those arriving from the south and wishing to turn left into the parking lot.
- There are two exits from Jessar's Common onto VT 12, located in close proximity to each other, creating problems with cars waiting to turn or continue on US 5 or VT 12.
- Since US 5 has a dedicated lane for those wishing to continue from the south and head east, there are very few right turns at the VT 12 and Route 5 intersection. From site observation and traffic counts, the only vehicles who turn right at that intersection are those exiting left from Jessar's Common and heading east on US 5.
- There is a clear cut-through line in the center of the triangle. This path serves vehicles and pedestrians who wish to avoid waiting at the intersection between US 5 and VT 12.
- There is currently a popular pedestrian crossing between Station Road and the Yoga Center to the Recreation Center and the Library.

Figure 2-1: Hartland Three Corners Existing Condition



Vehicular movement*

Parking lot entrance/exit

Sidewalk

Pedestrian crossing movement

Reported Crashes (2007-2011)

1	VT 12, October 2009: Failed to yield right of way. Left turn and thru, angel broadside.
2	US 5, November 2008: Inattention, rear end collision

Observation/Notes

1	The only entrance into Jessar's Common.
2	An additional exit from Jessar's Common onto VT 12, serving drive-thru ATM users
3	Exit-only from Jessar's Common onto Route 5. Poorly marked and potentially confusing for those arriving from the south. Adds to southbound and northbound traffic along US 5/VT 12.
4	Very few right turns at VT 12 and US 5 intersection. Only serves those who exit left from Jessar's Common to head east on US 5.
5	Cut-through path for vehicles and pedestrians accessing Jessar's Commons and US 5/sidewalk.

*Line thickness is proportional to average AM and PM traffic.

2.1 ROADWAY CHARACTERISTICS

The posted speed limit along US 5 is 30 mph and is 35 mph along VT 12 in the study area, although vehicles are likely moving much slower than the posted speed within the study area given the number of stop signs, pedestrian movements, and turning conflicts in the immediate area.

Table 2-1: Road Characteristics in Study Area

	US 5 South	US 5 East	VT 12 West	Quechee Road
Classification	Collector on State Highway	Collector on State Highway	Collector on State Highway	Minor Collector
Primary Jurisdiction	State	State	State	Town
Posted Speed Limit	30	30	35	30

Crash History

There are no identified High Crash Location (HCL) sections or intersections within the study area. However, this area has been a concern in the community due to the existing irregular design of the intersections and many anecdotal stories of near-misses. Two crashes were reported between 2007 and 2011 within the study area (see Figure 2-1). One crash occurred on US 5 in November 2008, where one vehicle rear-ended another vehicle as a result of driver inattention. The second crash occurred on VT 12 in October 2009, where one vehicle failed to yield the right of way to oncoming traffic from US 5, resulting in an angle broadside collision.

2.2 TRAFFIC VOLUMES

The most recent VTrans Automatic Traffic Recorder (ATR) data is presented in Table 2-2, showing that the portion of US 5 between I-91 and VT 12 carries the highest traffic volumes of the roadways within the study area. The second highest traffic is on VT 12, between US 5 and Brownsville Road. These figures are consistent with the turning movement counts and site observations.

Table 2-2: Average Annual Daily Traffic (AADT) Volumes

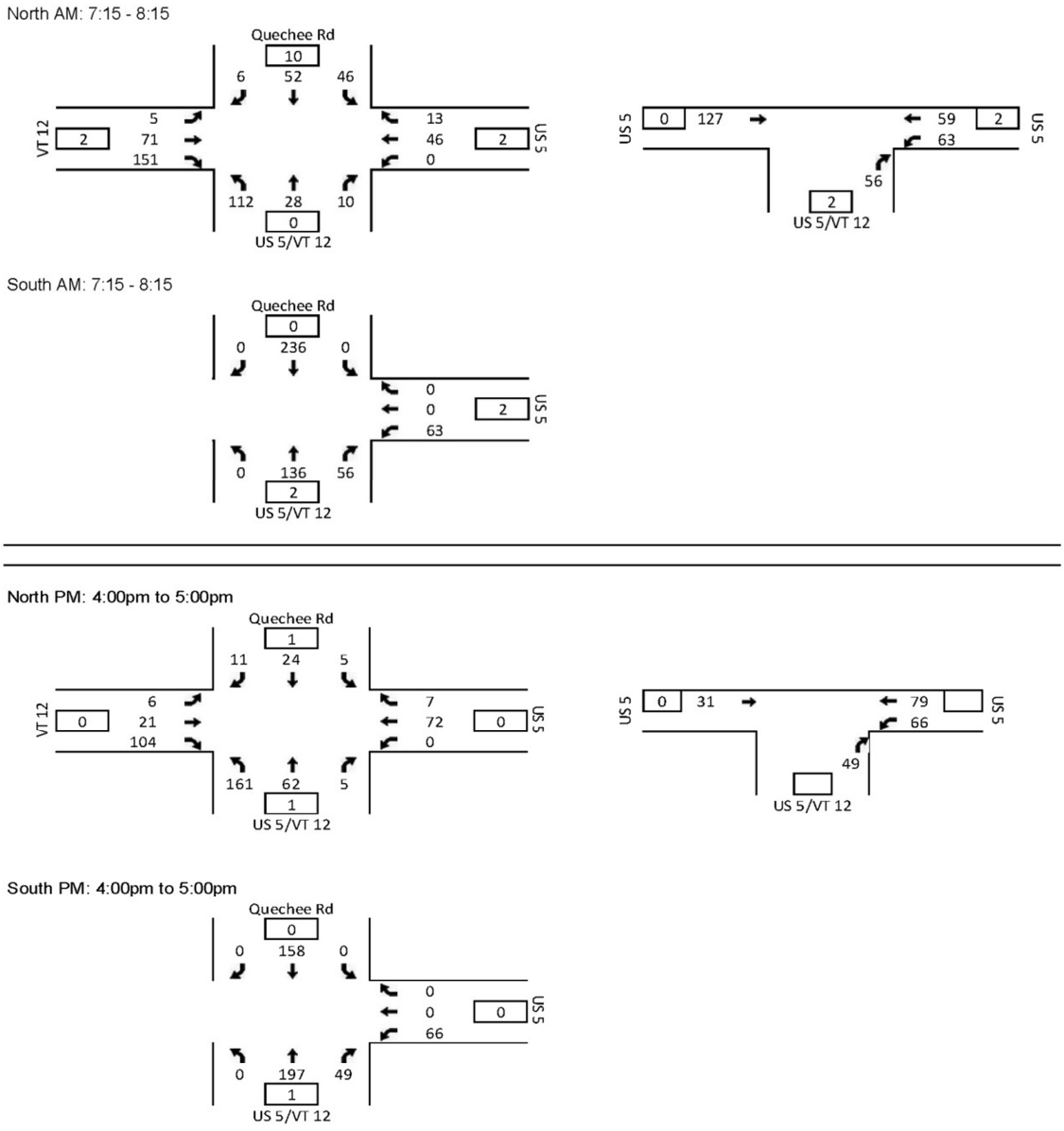
Location	AADT	Count Year	Source
US 5 South	4,500	2012	VTrans ATR
US 5 East	2,100	2012	VTrans ATR
VT 12 West	3,100	2012	VTrans ATR

Turning Movement Counts

The most recent weekday morning and afternoon turning movement count data was compiled for the three study intersections that comprise the Three Corners intersection and summarized in Figure 2-2 below. In examining the historical VTrans turning movement counts, the AM peak hour was identified as between 7:15 AM and 8:15 AM, while the PM peak hour was identified as being between 4:00 PM and 5:00 PM.

RSG staff recorded the turning movements at two intersection locations: US 5 South/North and US 5/VT12/Quechee Rd. The turning movements for the third intersection, US 5/VT12, were inferred from the counts from the other two intersections. RSG counted the turning movements for the AM and PM peak hour between 7:15 AM and 8:15 AM and 4:00 AM and 5:00 PM on October 10, 2012.

Figure 2-2: 2012 AM & PM Peak Hour Turning Movement Counts (pedestrians noted in boxes)



2.3 CONGESTION ASSESSMENT

Level-of-service (LOS) is a qualitative measure describing the operating conditions as perceived by motorists driving in a traffic stream. The LOS is estimated using the procedures outlined in the 2010 Highway Capacity Manual (HCM). In addition to traffic volumes, key inputs include the number of lanes at each intersection and

the traffic control type. The LOS results are based on the existing lane configurations and the unsignalized stop control used at each study intersection.

The 2010 HCM defines six qualitative grades to describe the level of service at an intersection. Level-of-Service is based on the average control delay per vehicle. Since all of the intersections in the study area are controlled by stop signs, Table 2-3 shows the various LOS grades and descriptions for unsignalized intersections.

Table 2-3: Level-of-Service Criteria for Unsignalized Intersections

		Unsignalized Intersection
LOS	Characteristics	Total Delay (sec)
A	Little or no delay	≤ 10.0
B	Short delays	10.1-15.0
C	Average delays	15.1-25.0
D	Long delays	25.1-35.0
E	Very long delays	35.1-50.0
F	Extreme delays	> 50.0

The Highway Capacity Manual (HCM) congestion reports from Synchro (v7), a traffic analysis software package from Trafficware, were used to assess congestion at the study intersections. The traffic model was set up so that in the existing condition, there were three separate intersections: US 5 north/south; US 5 and VT 12 intersection, and VT 12/US 5 and Quechee Road intersection. Both 2012 AM and PM peak traffic conditions, as well as the future forecasted 2022 AM and PM peak conditions were evaluated.

A LOS was calculated for two of the three existing intersections: the US 5/VT 12/Quechee Rd intersection and the US 5 East/West intersection. The third intersection, US 5/VT 12 north/south, was not calculated because the configuration does not follow standard HCM conventions.

Due to the relatively low level of traffic movement through the study area and low 0.5% projected annual growth rate, the study area currently experiences LOS A at both intersections and is projected to continue functioning at LOS A in 2022. The current average delay for traffic moving through both intersections was 16.1 seconds during the AM peak period, and 15.6 seconds during the PM peak period. The 2022 projected average delay is 16.3 seconds during the AM peak period, and 15.8 seconds during the PM peak period.

The detailed congestion analysis results, including intersection LOS, average vehicle delay (in seconds) and the volume to capacity ratio (v/c) are included in Appendix 2.

2.4 LAND USE AND STRUCTURES

The area surrounding the intersection of US 5, VT 12, and Quechee Road is predominantly commercial, with several neighborhood-serving retail stores located at Jessup's Corner and a yoga studio at the northeastern corner. Additionally, Damon Hall fronts directly onto Quechee Road and VT 12 at the northwestern corner of the intersection. The land use pattern turns into a mixed-residential area as one moves away from the Hartland Three Corners intersection. (Figure 2-3) There are no bridges or culverts located within 1000' of the study area.

Public Lands and Recreation

The Hartland Recreation Center is located approximately 1000' from the intersection on the south side of VT 12 and Hartland Elementary School is located nearly half mile (or 10 minutes walking) distance from the center of the project intersection area. There are no Vermont Conserved Lands, or forest management areas within 1000' of the study area.

Access Considerations

Both US 5 and VT 12 are classified as Category 4 Access Management roads within Hartland. These roads are "*highways that have the capacity for moderate travel speeds and moderate traffic volumes over medium and short travel distances providing for inter-city, intra-city, and intra community travel needs*". Category 4 roads are allowed number, spacing, and location driveway controls to limit turning movements since they do provide direct property access.

Access considerations were important in the development of alternatives. Members of the Selectboard pointed out the need to maintain a private access driveway to a residence located adjacent to the parking lot and town monument on the east side of Quechee Road. Additionally, development plans are still in progress for the Mascoma Bank building and ATM drive-thru in Jessup's Corner, which may affect the parking lot configuration and access patterns.

Figure 2-3: Study Area Structures and Type

2.5 NATURAL RESOURCES

The elevation of the study area is at approximately 600' above sea level. The intersection area is relatively flat, with gentle 0 to 8 percent slopes surrounding the Three Corners area. As part of the environmental analysis, RSG investigated the study area for observable rare, threatened or endangered (RTE) species, wetlands, streams, wildlife habitat, agricultural land, and conservation zones. Wetland boundaries under state and federal jurisdiction were determined using the Vermont Significant Wetland Inventory (VSWI), which shows the approximate location and configuration of significant wetlands.

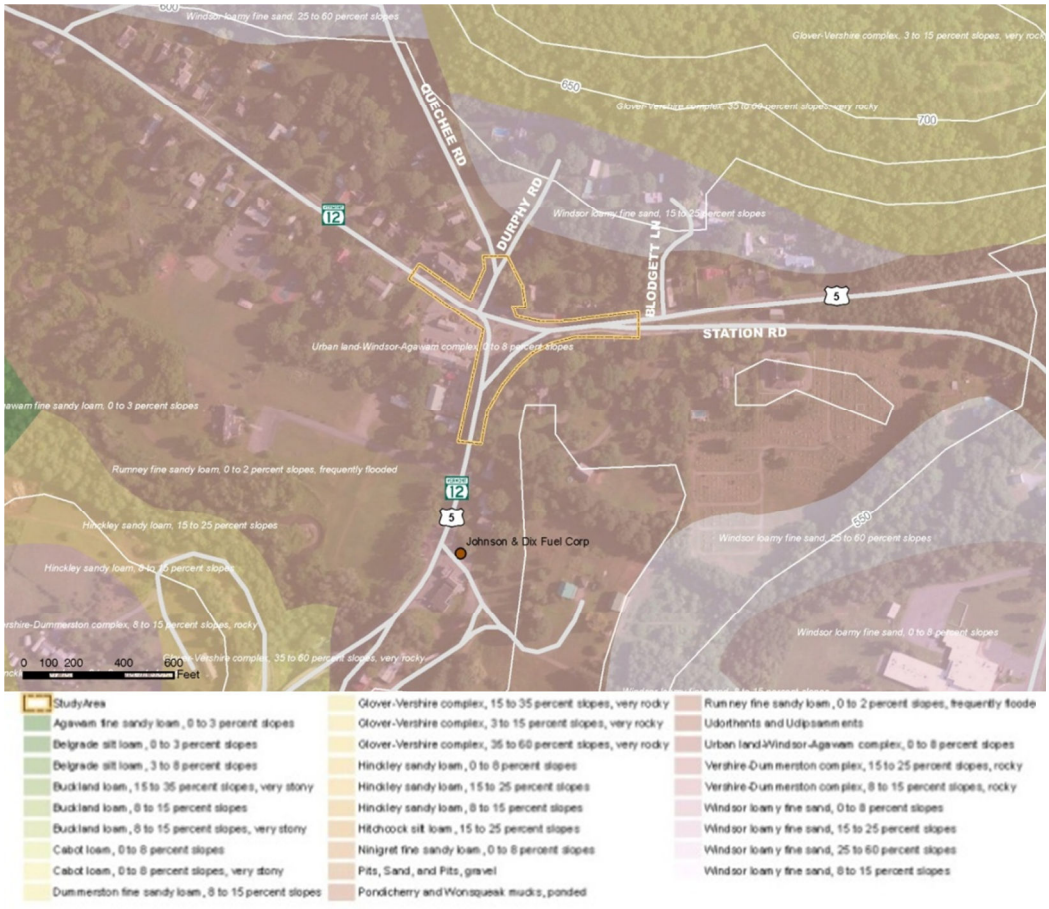
Wetlands and Streams

There are no mapped wetlands in or around the study area. In addition, there are no impaired waters or watersheds in or adjacent to the project area. Due to its distance from any major waterbodies, there are no identified FEMA flood zones within 1,000 feet of the study area.

Soils

According to the Natural Resource Conservation Service (NRCS) Web Soil Survey, this area was last surveyed on April 20, 2007, and all of the study area land falls within the Urban Land-Windsor Agawam Complex classification, which is not a highly erodible soil. None of the soil types are considered agriculturally important within the study area.

Figure 2-4: Soils and Slopes



Rare, Threatened, or Endangered Species

There are no identified Rare, Threatened, or Endangered species and no identified wildlife crossings located either within or immediately adjacent to the study area. Since the study area is largely developed with structures and roadways, there are no deer wintering areas located in or nearby and any redesign that would propose to maintain or narrow the paved roadway would likely not disturb existing wildlife habitat.

Hazardous Waste Sites

There are no hazardous waste sites or generation facilities within 1,000 feet of the study area. The nearest underground storage tank is located at the Mobile Gas Station (Mikes Store), which is located to the south of the study area.

3 PROJECT PURPOSE AND NEED

The definition of Purpose and Need of a project is essential for establishing a basis for the development and screening of alternatives and assists with the identification and eventual selection of a preferred alternative.

3.1 PURPOSE

The purpose of the Hartland Three Corners Improvement Project is to provide infrastructure improvements that enhance safety and mobility for motorists, pedestrians, and bicyclists at a critical juncture—and primary arrival point—into town.

3.2 NEEDS

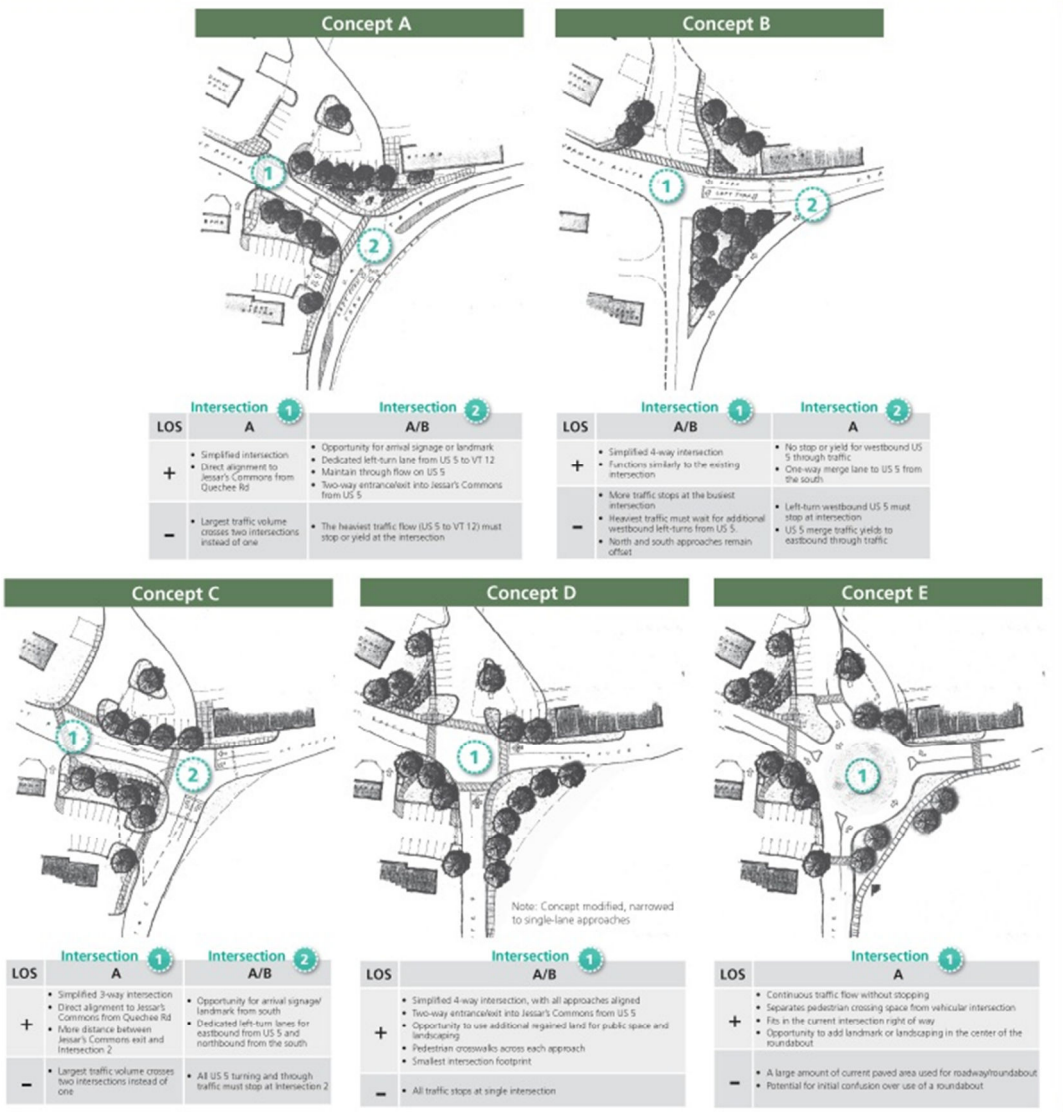
- **Provide a safe, direct, and convenient passageway for pedestrians and bicyclists through the Three Corners area.** Particular attention should be considered for linking the elementary school to Jessar's Common.
- **Add measures to help calm and direct traffic.** Intersection reconfiguration can help to calm traffic speeds and reduce driver confusion through the study area.
- **Enhance the landscaping and streetscaping at this community focal point.** Presently, Hartland Three Corners serves as both the town's center as well as the arrival point for those entering the town from I-91. Consideration should be made for ways to improve the gateway appeal of this key intersection area.
- **Ensure that all infrastructure complies with local, regional, and statewide traffic and planning regulations.** The current configuration of the intersection does not comply with typical intersection and roadway standards. Any redesign of the intersection must comply with current standards, reducing confusion and clarifying how drivers should properly navigate through the intersection area.

4 INTERSECTION ALTERNATIVES

Building upon four of the concepts that Bruno Associates proposed to the Town of Hartland in 1994, RSG presented the findings of the existing conditions along with an assessment of the four concepts plus an additional roundabout option to the Selectboard on October 22, 2013. Using projected 2022 traffic volumes, RSG modeled each concept in Synchro (v7) to evaluate the intersection capacity and LOS of each alternative. The detailed congestion analysis results, including intersection LOS, average vehicle delay (in seconds) and the volume to capacity ratio (v/c) are included in Appendix 3.

From these five concepts, shown in Figure 4-1, the Selectboard voted to focus on three of the alternatives for presentation at the Local Concerns Meeting (Concepts C, D, and E). These three Build alternatives, plus a No Build alternative, were studied in further detail to ensure that they complied with the design criteria and improve traffic operations. Each of the alternatives is described in detail below.

Figure 4-1: Intersection Alternatives

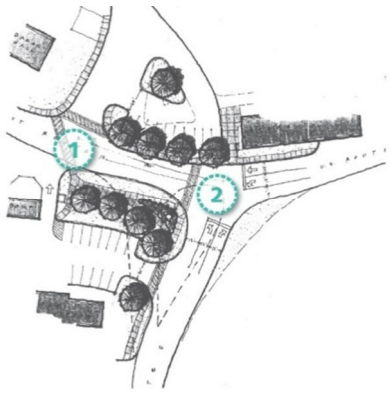


4.1 SELECTED ALTERNATIVES

Split Intersections

The first alternative took the existing configuration and extended the intersection between Quechee Road and US 5 from the US 5 corridor. This concept simplifies the geometry by creating a three-way T-intersection in two locations, with a direct alignment to Jessar's Commons from Quechee Road and a place for arrival signage or a landmark upon entering Hartland from northbound US 5/VT 12. In this concept, there would be dedicated left-turn lanes for westbound traffic coming from US 5, as well as northbound traffic from I-91 towards VT 12. All vehicles moving through and turning from US 5 must stop in this alternative, which generates a LOS B for eastbound traffic that wishes to continue onto US 5 from US 5/VT 12 in the AM peak period.

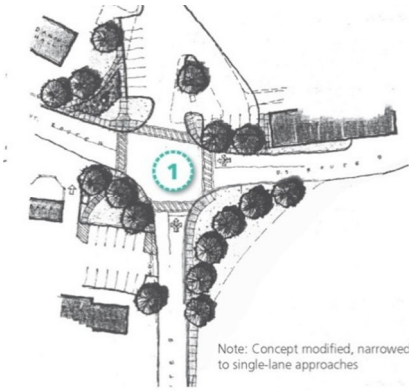
Figure 4-2: Split Intersection



Four-Way Stop

The four-way stop consolidates the existing "three corners" intersection into a simplified four-way intersection by aligning Quechee Road on the north with the US 5 approach from the south. All traffic would stop once, at the single intersection. This alternative would generate an average traffic delay of 9.5 seconds in the AM peak period (overall LOS A) and 9.6 seconds in the PM peak period (overall LOS A). The only movement that would generate a LOS B would be the northbound direction from US 5 south, where the approach delay would be 10.5 seconds during the PM peak period. This alternative includes a 2-way entrance and exit from Jessar's Common onto US 5. Typical pedestrian crosswalks would be added across each approach, and with a smaller intersection footprint, the crosswalks would also run shorter distances than they do currently.

Figure 4-3: Four-Way Stop



Roundabout

The roundabout concept removes all of the stop signs and allows for continuous traffic flow without need for stopping, except when yielding to an oncoming vehicle already in the roundabout. Crosswalks would be separated away from the vehicular intersection, with raised curbed lane splitter medians functioning as pedestrian refuge islands, allowing for a person walking to stop and look around for traffic before finishing crossing a road. While there would be a greater amount of paved area to accommodate the turning radius required for a roundabout, the center island opens up the opportunity to add a landmark or visually appealing landscaping.

Figure 4-4: Roundabout

4.2 ALTERNATIVES EVALUATION

In preparation for the Local Concerns Meeting, RSG evaluated each of the three concept alternatives by developing a comparison matrix to show how the reconfiguration would differ relative to the existing condition. (Figure 4-5) The criteria included:

- Open Space: This measurement considers any area within the intersection that would not be used as a roadway. Note, the triangle median bounded by US 5 and VT 12 in the existing condition is considered "open space"; however it does not currently function as a usable public area.
- Paved Roadway Area: This measurement identified the square footage of the land used for turning movements, as well any paved roadway within the study area.
- Average Delay: The traffic delay in seconds was derived from the average as calculated in the Synchro traffic analysis model.
- Walking Distance from Station Road: In order to encourage use of the existing sidewalk on the southeast corner, this study also measured the walking distance for pedestrians wishing to access Jessup's Corner from Station Road.
- Total Stop or Yield Signs: One measure of reducing the confusion through the existing Hartland Three Corners intersection is to simplify the necessary signage for drivers traveling through the study area.

While the open space decreased in Concept 1 and 2, there were also slight decreases in the amount of paved intersection area and reduced walking distances and crosswalk widths, making for a safer overall pedestrian experience. All three concepts reduced the total number of stop signs and, in many cases, the number of times a vehicle would have to stop to continue in a given direction.

Figure 4-5: Alternatives Comparison Matrix

5 LOCAL CONCERNS MEETING

A Local Concerns Meeting was held on November 19, 2012, to solicit feedback from community residents and stakeholders regarding the existing intersection and three concept alternatives. The meeting was well-attended by approximately 30 residents and, after an introductory presentation by RSG, the attendees were divided into three break-out groups. Each break-out group discussion focused on ways to improve pedestrian and bicyclist safety, traffic circulation, and their vision for enhancing the village streetscape at Hartland Three Corners. The Alternative Comparison Matrix, shown in Figure 4-5, served as the base which participants could discuss and weigh the pros and cons of each concept alternative.

Figure 5-1: Local Concerns Meeting Flyer

Overall, Concept 2 (all-way stop) received the highest number of favorable responses. Two groups voted Concept 2 as their preferred alternative, with one group voting a tie between Concept 2 and Concept 3 (roundabout).

The results of the Local Concerns Meeting were considered in the evaluation of the alternatives. In developing the preferred concept, RSG used the concept identified in the Local Concerns Meeting (Concept 2: Four-Way Stop) as the starting point. A more detailed meeting summary is included in Appendix 1.

6 SELECTION OF PREFERRED ALTERNATIVE

Following the Local Concerns Meeting, RSG met with the Selectboard on December 17, 2012 and again on March 18, 2013 to discuss further refinements to arrive at the preferred alternative. In addition, RSG also presented the projects' progress at the annual Hartland Town Meeting on March 5, 2013.

Figure 12: Preferred Concept Design

Based on the public input, alternatives evaluation, and Selectboard feedback, a modified version of the four-way stop intersection is proposed for Hartland Three Corners. (

Figure 6-3) The preferred alternative established a four-way stop intersection for all approaches (with the exception of northbound right-turning US 5 travelers), thereby maintaining LOS A service for all movements during the AM and PM peak periods.

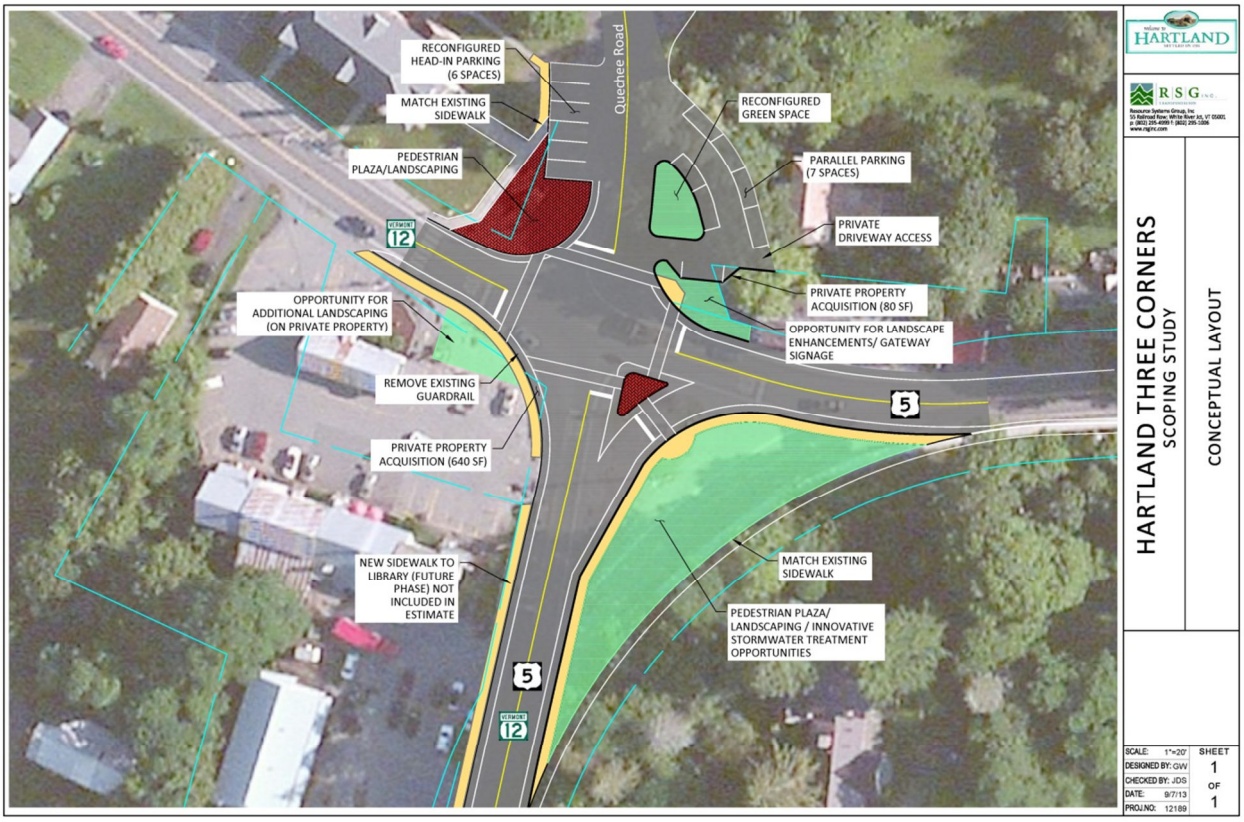
In each corner of this intersection is an opportunity for either usable public space or for additional landscaping or placement of gateway amenities. Landscaping and visual treatment is important to help slow the speed of approaching traffic, and to alert drivers that they are entering a village zone. In addition, the corner treatments provide a welcome landing for pedestrians as they cross from one side to another within the intersection.

Maintaining the existing parking on both sides of Quechee Road was an important design consideration. The preferred alternative proposes striping 6 head-in spaces in front of Damon Hall and designating 7 spaces around the town monument on the east side of Quechee Road. This configuration allows for a maximum of 13 parking spaces while maintain a green space and an open access to the private driveway next to the yoga studio.

In the preferred concept, a new sidewalk connection would stem from the recently constructed sidewalk on the southeast corner, winding through a landscaped pedestrian plaza and bringing people closer in to the intersection crosswalk area. On the southwest corner where Jessup's Common lies, a sidewalk will follow the curved edge of the road, with a potential for a sidewalk linking Jessup's Common south towards the library in a future phase.

Figure 13: Birds Eye View of the Preferred Improvement Concept

Figure 6-3: Preferred Improvement Concept



6.1 DESIGN CRITERIA

To ensure that the preferred alternative conforms with Federal and State design and construction standards (i.e. Vermont State Design Standards, AASHTO Policy on Geometric Design of Highways and Streets, and the FHWA Manual on Uniform Traffic Control Devices (MUTCD), the following design standards were employed:

- **Turning radius**: The curb radius for all movements between US 5 and VT 12 were sized to accommodate a WB-62 design vehicle. The curb radius for movements onto and from Quechee Road were sized to accommodate a WB-40 design vehicle.
- **Lane widths:** All lanes were laid out 12 feet in width, with 4 foot shoulders. These dimensions provide an acceptable 16 foot offset from centerline to curb as well as a 4 foot shoulder for bicycle access.
- **Parking spaces**: The parking areas along Quechee Road, north of VT 12, were reconfigured to allow for a realigned intersection. Each space is 10'x20' in order to comfortable accommodate head-in or parallel parking vehicles. Smaller spaces may be considered during the final design phase to reduce overall impacts/costs or to fit additional spaces in the project area.

6.2 CONCEPTUAL COST ESTIMATE

The conceptual cost estimate shown in Table 6-1 was developed based on the preferred improvement plan shown above. The conceptual cost estimate utilizes recent average unit bid prices and includes a 25% construction contingency as well as allowances for final design, municipal project management, and construction engineering services. Right-of-way costs are not included in the project cost estimate as the ROW impacts are relatively small and will vary based on the final intersection configuration. It should be noted that if the Town elects to fund this intersection project with local funds, the allowance for the municipal project manager would not be needed, which would reduce the overall project cost.

Table 6-1: Conceptual Cost Estimate

Conceptual Cost Estimate			4-Way Intersection		
	Unit	Price	Quantity	Total	Comments
1 Common Excavation	CY	$ 9	1859	$ 16,733	2' for islands, slip lane, etc
2 Solid Rock Excavation	CY	$ 30	100	$ 3,000	Estimated quantity
3 Trench Excavation	CY	$ 14	476	$ 6,658	6' x 2' trench for stormwater
4 Subbase of DGCS	CY	$ 32	729	$ 23,313	1.5' for additonal paved areas, 6" for sidewalks
5 Bituminous Concrete	TON	$ 110	450	$ 49,500	6" new pavement; 1" overlay existing pavement
6 Granite Curb	LF	$ 30	805	$ 24,150	Assumes all new curb
7 5" Concrete Sidewalk	SY	$ 70	171	$ 11,978	Concrete surface
8 New Catch Basin	EA	$ 3,500	8	$ 28,000	Preliminary estimate
9 Storm Drain	LF	$ 35	800	$ 28,000	Preliminary estimate
10 Remove Guardrail	LF	$ 2	100	$ 200	Southwest corner
11 Landscaping Allowance	LU	$ 25,000	1	$ 25,000	Preliminary estimate
12 Mobilization/Demobilization	LS	8%	1	$ 18,930	Typical percentage
13 Traffic Control	LS	VAR	1	$ 20,000	Preliminary estimate
			Subtotal	$ 255,500	
			Contingency (25%)	$ 63,900	
			Total Estimated Construction Cost	**$ 319,400**	
			Engineering (20%)	$ 63,880	
			Municipal Project Management (10%)	$ 31,940	
			Construction Inspection (15%)	$ 9,585	
			Total Cost for Design & Construction	**$ 425,000**	

6.3 PROJECT IMPLEMENTATION

The Hartland Town Selectboard members met on Tuesday, September 3, 2013 and decided to bring forth the preferred alternative intersection design for discussion and a vote at the 2014 Town Meeting. The Board proposes to borrow from the Town's Capital Reserve Fund, with possible supplement from Restricted Highway Funds, in order to pay for the full project over the course of five years.

Appendix A

Summary of Public Outreach

PUBLIC MEETING

Hartland 3 Corners **Pedestrian Safe Route Study**

Come join us!

We'll discuss ways to **improve pedestrian and bicyclist safety**, **traffic circulation**, and **enhance the village streetscape** at the center of Hartland Three Corners.

6PM at Damon Hall

1 Quechee Road
Hartland, VT 05048

Monday, November 19, 2012

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	

For more information, contact:
Bob Stacey, Hartland Town Manager • (802) 436-2119 • hartlandtm@hotmail.com

PRESS RELEASE

FOR IMMEDIATE RELEASE

Contact:
Bob Stacey
Hartland Town Manager
PO Box 349
Hartland, VT 05048
Tel: (802) 436-2119
E-Mail: hartlandtm@hotmail.com

Kick-off local concerns meeting to focus on improving pedestrian and bicyclist safety, traffic circulation, and the village streetscape at the center of Hartland Three Corners.

Hartland, VT – Residents, business owners and local stakeholders of the Town of Hartland are invited to attend an upcoming public meeting to discuss potential traffic and streetscape improvements to the intersections of US 5, VT 12 and Quechee Road at the center of Hartland's Three Corners. The purpose of this first public meeting is to collect thoughts, issues and recommendations for the configuration of this critical town intersection.

The project area encompasses Durphey Road on Hartland Quechee Road to the back parking lot of Damon Hall on Route 12, to the library access road on Route 5 south, to the intersection of Station Road and Route 5. A study currently being conducted by RSG, Inc. for the Town of Hartland is looking at the existing road conditions, the opportunities and constraints of the immediate surroundings, and four alternative concepts to improve traffic circulation, safety, and enhance the streetscape.

The public meeting will be held on Monday, November 19 at 6:00 PM at Damon Hall, located at 1 Quechee Road, Hartland, VT 05048.

The presentation portion of the meeting will include an overview of the project area, a summary of existing conditions, preliminary project goals, and four concepts developed to improve the conditions at the intersection. An interactive discussion session will follow the presentation where interested parties can voice their thoughts about bicycle, pedestrian, traffic and streetscape conditions in the study area.

The meeting will include representatives from the Town of Hartland, as well as the project consultants, RSG, Inc.

# # #

Hartland Three Corners

Pedestrian Safe Route Study

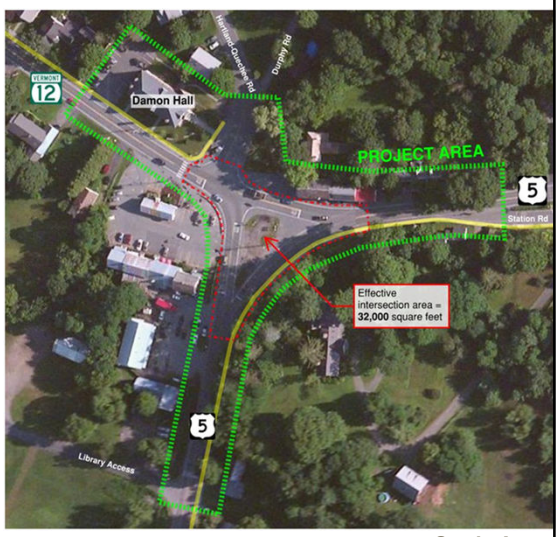
November 19, 2012

RSG INC. RESOURCE SYSTEMS GROUP, INC.

Project Background & Goals

PROJECT GOALS

- Provide safe, direct, and convenient access for pedestrians and bicyclists through the Three Corners area.
- Add measures to improve intersection alignment and safety for motorists
- Enhance the functional streetscape of the intersection area
- Ensure that all infrastructure complies with local, regional, and statewide traffic and planning regulations



Study Area

2

Project Timeline

- **Project Kick-off Meeting:** September 17th
- **Preliminary Alternatives Review:** October 22nd
- **Public Input on Alternatives:** **TONIGHT**
- **Selection of Preferred Alternative:** December
- **Refine Preferred Alternative:** January – February
- **Presentation to VTrans:** March
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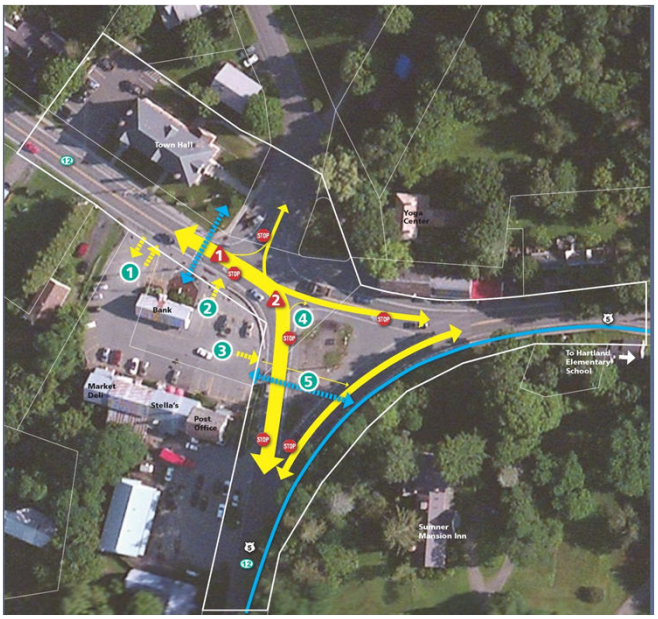
- **Final Report:** June

3

Existing Conditions



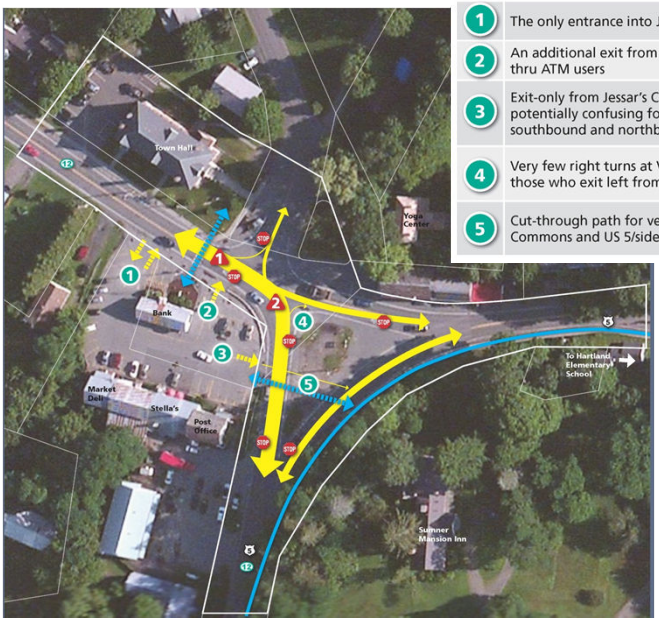
Vehicular movement*
Parking lot entrance/exit
Sidewalk
Pedestrian crossing movement

Reported Crashes (2007-2011)

1. VT 12, October 2009: Failed to yield right of way. Left turn and thru, angel broadside.
2. US 5, November 2008: Inattention, rear end collision

4

Existing Conditions



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4. Very few right turns at VT 12 and US 5 intersection. Only serves those who exit left from Jessar's Common to head east on US 5.
5. Cut-through path for vehicles and pedestrians accessing Jessar's Commons and US 5/sidewalk.

5

Existing Conditions – Pedestrian Safety

6

Existing Conditions – Underutilized Spaces

7

Existing Conditions – Traffic Circulation

8

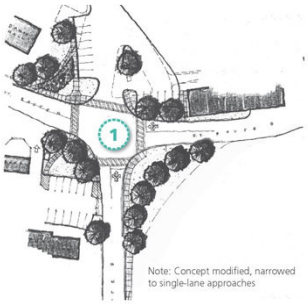
Existing Conditions – Sense of Arrival

9

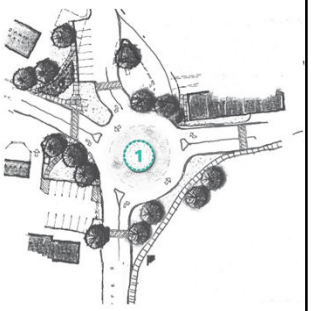
3 Corners: 3 Alternatives

1) Split Intersections

2) Four-Way Stop



3) Roundabout



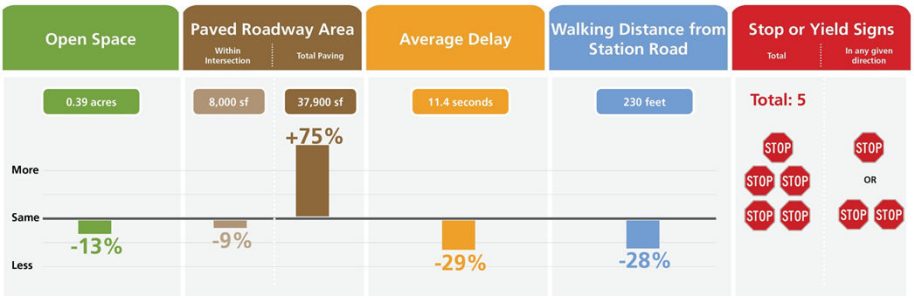
10

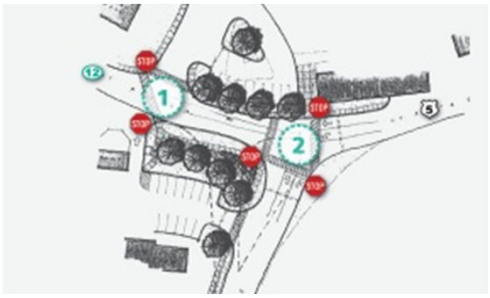
Concept 1: Split Intersections

LOS	Intersection 1 A	Intersection 2 A/B
+	• Simplified 3-way intersection • Direct alignment to Jessar's Commons from Quechee Rd • More distance between Jessar's Commons exit and Intersection 2	• Opportunity for arrival signage/ landmark from south • Dedicated left-turn lanes for eastbound from US 5 and northbound from the south
–	• Largest traffic volume crosses two intersections instead of one	• All US 5 turning and through traffic must stop at Intersection 2

11

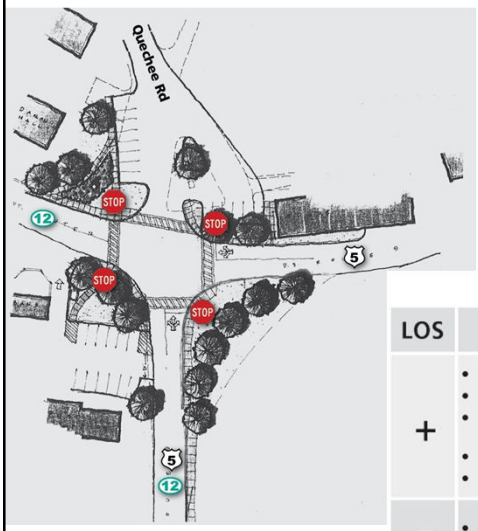
Concept 1 *(compared to Existing Condition)*





12

Concept 2: Four-Way Stop

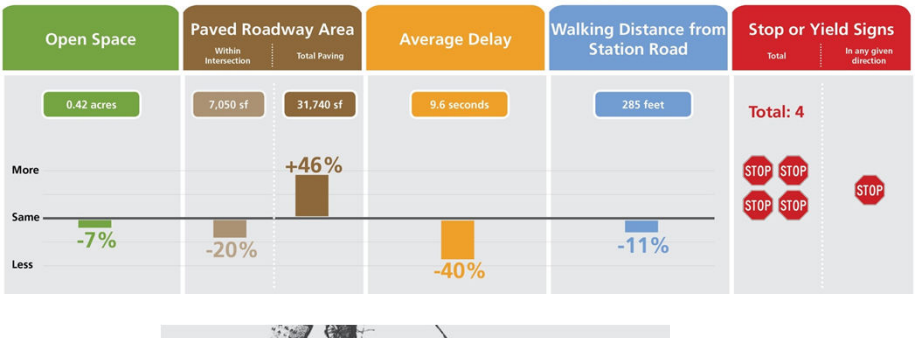


Intersection 1

LOS	A/B
+	• Simplified 4-way intersection, with all approaches aligned • Two-way entrance/exit into Jessar's Commons from US 5 • Opportunity to use additional regained land for public space and landscaping • Pedestrian crosswalks across each approach • Smallest intersection footprint
–	• All traffic stops at single intersection

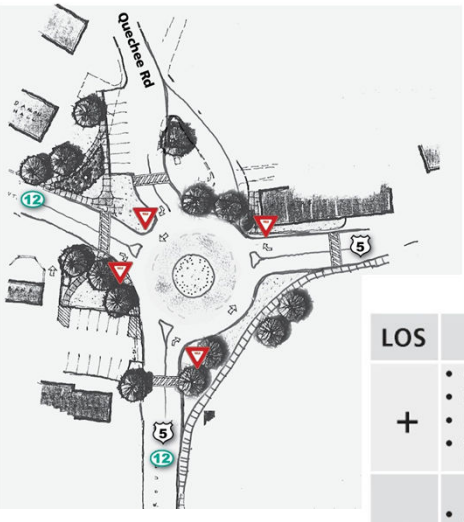
13

Concept 2 *(compared to existing condition)*



14

Concept 3: Single Lane Roundabout



Intersection 1

LOS	A
+	• Continuous traffic flow without stopping • Separates pedestrian crossing space from vehicular intersection • Fits in the current intersection right of way • Opportunity to add landmark or landscaping in the center of the roundabout
−	• A large amount of current paved area used for roadway/roundabout • Potential for initial confusion over use of a roundabout

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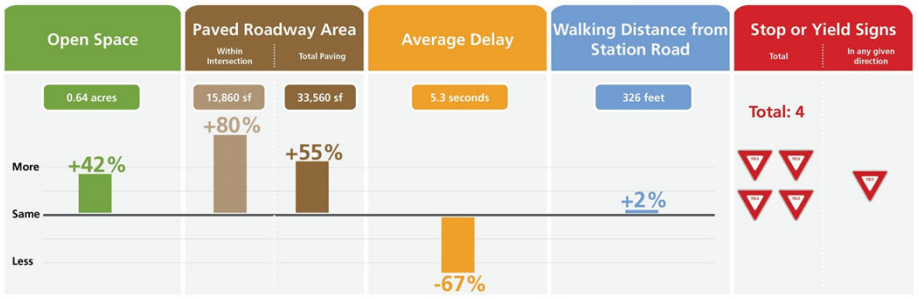
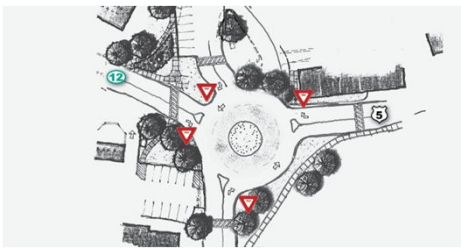
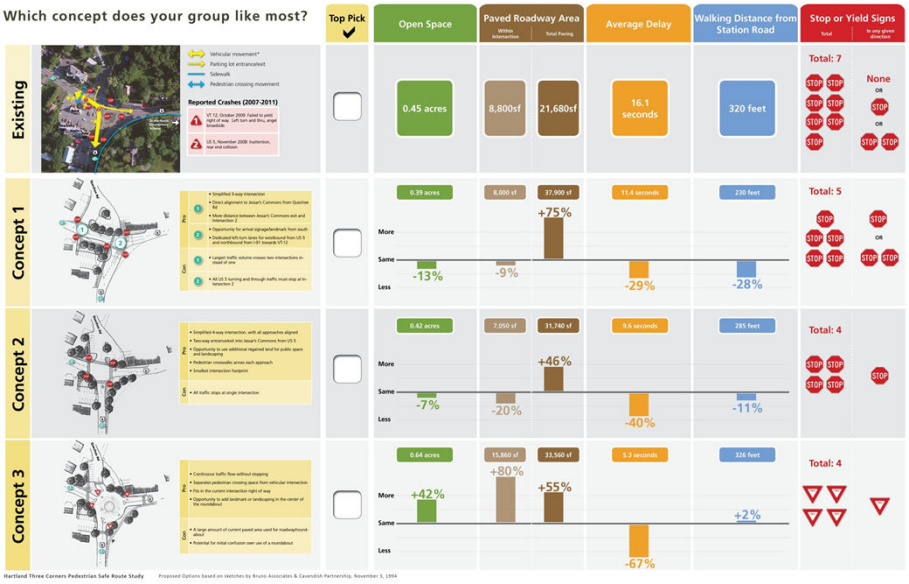
Concept 3 *(compared to existing condition)*





16

Breakout Group Discussion



17

Next Steps

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18

RSG INC.
TRANSPORTATION

MEMORANDUM

To: Bob Stacey
From: Grace Wu and David Saladino
Cc: Rita Seto
Subject: Hartland Three Corners Public Meeting (11/19/12) – Summary of Input

GENERAL COMMENTS

- Consider the possibility that the Post Office may close; re-visit closing access onto Route 5
- Consider the possibility that Mascoma Bank may move and potential to close ATM drive-thru exit on to VT 12
- Consider what the directional signage would look like for each concept.
- Recommend low shrubs and flower beds for any proposed landscaping to prevent blocking views
- Address popular pedestrian crossing between Station Road and Yoga Center and to the Rec Center and Library
- Extend study area to Station Road to the East
- Add cross-walk medians in the appropriate location and configuration for the roundabout
- Suggestion of adding post-office drop-off box accessible by vehicle on Rte 5 heading south, closing the existing exit from Jessar's Common/Post Office onto Rte 5.

Results from the Local Concerns Meeting

	Concept 1	Concept 2	Concept 3
Group 1	#3	#1	#2
Group 2	#3	#1	#2
Group 3	#3	Tie for #1	Tie for #1

Concept 1: Split Intersections

- Group 1: One person ranked it number one, while five ranked Concept 1 as their second favorite. Liked that there was **opportunity to create a landscaped arrival point** into town and the two intersections **created more of a small town feel**. Unsure about taking away parking from in front of Damon Hall.

55 Railroad Row, White River Junction, Vermont 05001
TEL 802.295.4999 ▪ FAX 802.295.1006 ▪ www.rsginc.com

- Group 2: Group ranked this concept third. Felt it was **too complicated, convoluted**. Two intersections are **too close**, but any landscaping is good. Move statue to in front of Damon Hall and increase parking. Time savings is not a big factor and more walking distance is ok if safer and more logical for drivers. **Reduction of stop signs** is also a plus.
- Group 3: One person ranked it number one. Did not speak much about Concept 1, favoring the other two options.

Concept 2: Four-Way Stop

- Group 1: Received the most votes. Four people ranked it number one, while two ranked it as their second favorite. Liked that it was a **straight-forward, logical** single intersection. However, concerns about **drivers having to look out for pedestrians in two separate crossings** while driving through. Liked having **less paving**, liked that it would **address the drainage issue** currently happening on the southeast corner next to the sidewalk.
- Group 2: Received the most votes in the group. Favored this concept because it was **less expensive and less confusing**, although need to make sure there is adequate room for trucks to turn. Liked that it **realigns Quechee Road with VT 12 and Route 5** south, and **picked up green space in front of Damon Hall**. Suggest moving the statue and getting rid of the triangle island across the street from Damon Hall. Consensus that a sidewalk should be added along the southwest corner (Jessar's Common). Walking distance was not an issue and liked that the **intersection was simple, standard, and familiar to drivers and pedestrians**. Concerns about **parking in front of Damon Hall might be dangerous** as cars back up into traffic on Quechee Road. Fewer trees to preserve sight lines.
- Group 3: Tie between Concept 2 and 3. Would like to see a version of this concept that is more fleshed out and extended out to Station Rd.

Concept 3: Roundabout

- Group 1: Had the second highest number of top votes, with 3 people ranking it number one, but none ranking it as their second favorite. The experienced bicyclist in the group was the biggest advocate for the roundabout, citing the **safety of having traffic all moving in one direction**, rather than two. **Concerns for amount of paving and salt needed**, **usability of the circle in the center**, and **drainage towards the existing sidewalk**. The **emissions** and **not having to fully stop** were pluses.
- Group 2: Ranked this concept second, with concerns about its **pedestrian-friendliness** given the awkward configuration. The **island in the center** presents an opportunity for landscaping, but unsure about the usefulness. Roundabout **looks less welcoming** into the town center and **concerns about high cost**, **more signs required, and more snow removal** for more paving. More **efficient for drivers** (not having to stop), but **makes it difficult to leave Jessar's** Common.
- Group 3: Tied for favorite between Concept 2 and 3. Added **pedestrian-safety because of crosswalk medians** and having to worry about traffic coming from one direction at a time. Concern about **where the snow pile will go**.

Hartland Three Corners

Pedestrian Safe Route Study

March 5, 2013

RSG INC. RESOURCE SYSTEMS GROUP, INC.

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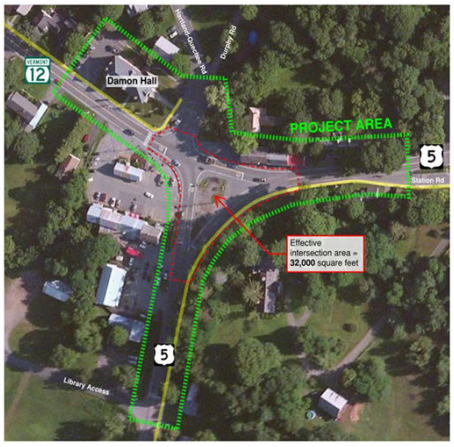

Study Area

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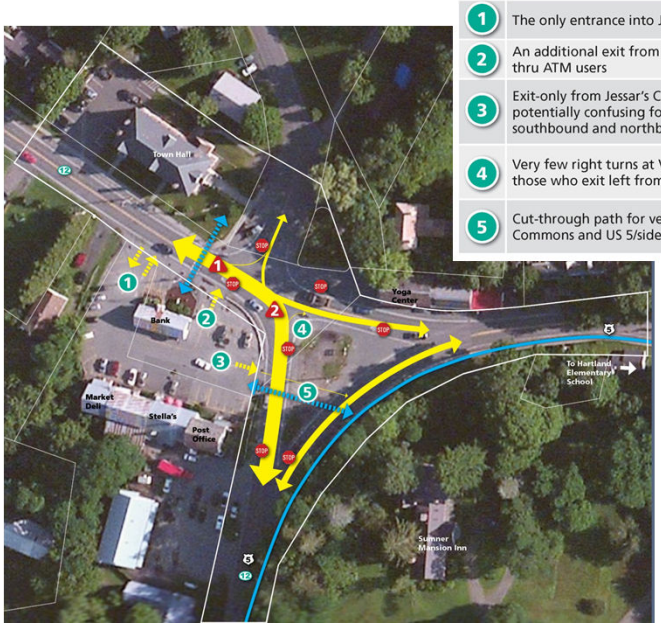

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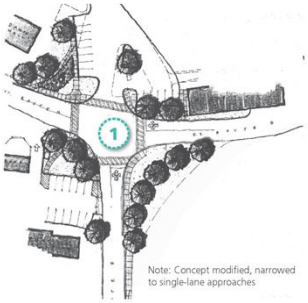

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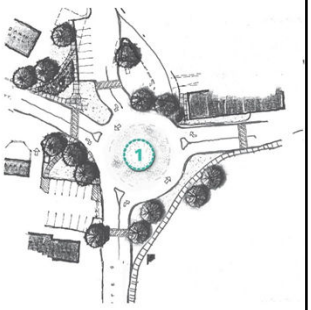

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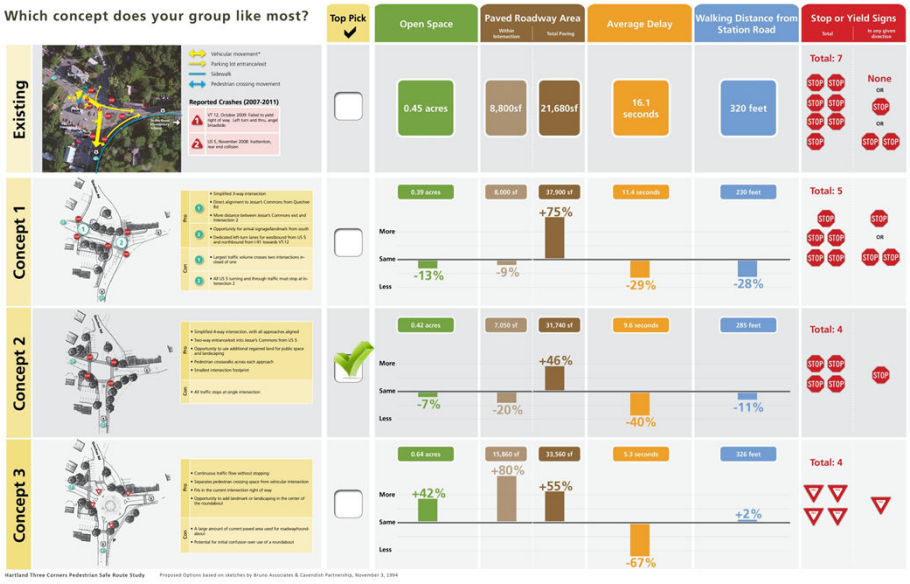


10

Preferred Concept – 4 Way Stop

Concept Highlights

- Simplified design
- Reduce intersection pavement from 32,000 sf to 6800 sf (nearly 80% reduction!)
- Shorter and safer pedestrian crossings
- Fits entirely within existing right of way
- Level of service “A” for traffic in all directions
- Opens up opportunities for functional landscape/gateway treatment

11

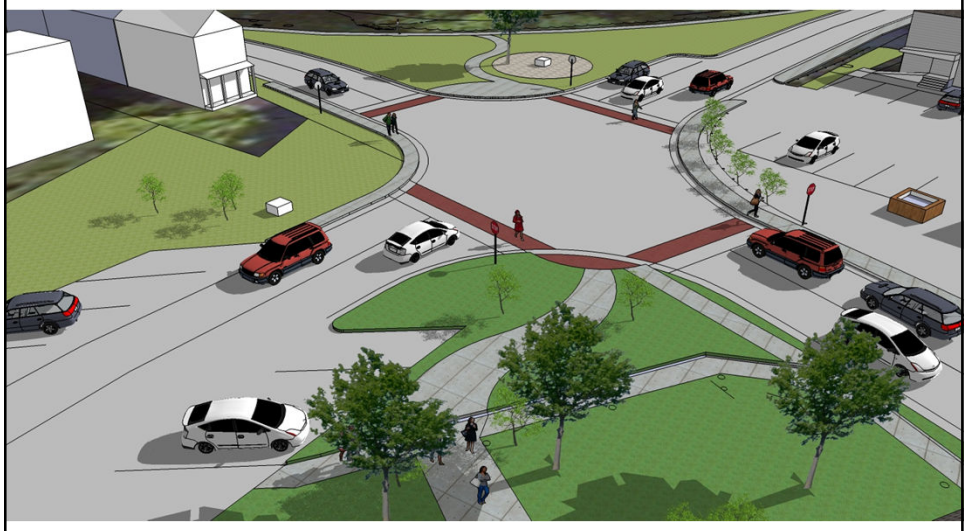
4-Way Stop: How it might look

12

4-Way Stop: How it might look

13

4-Way Stop: How it might look



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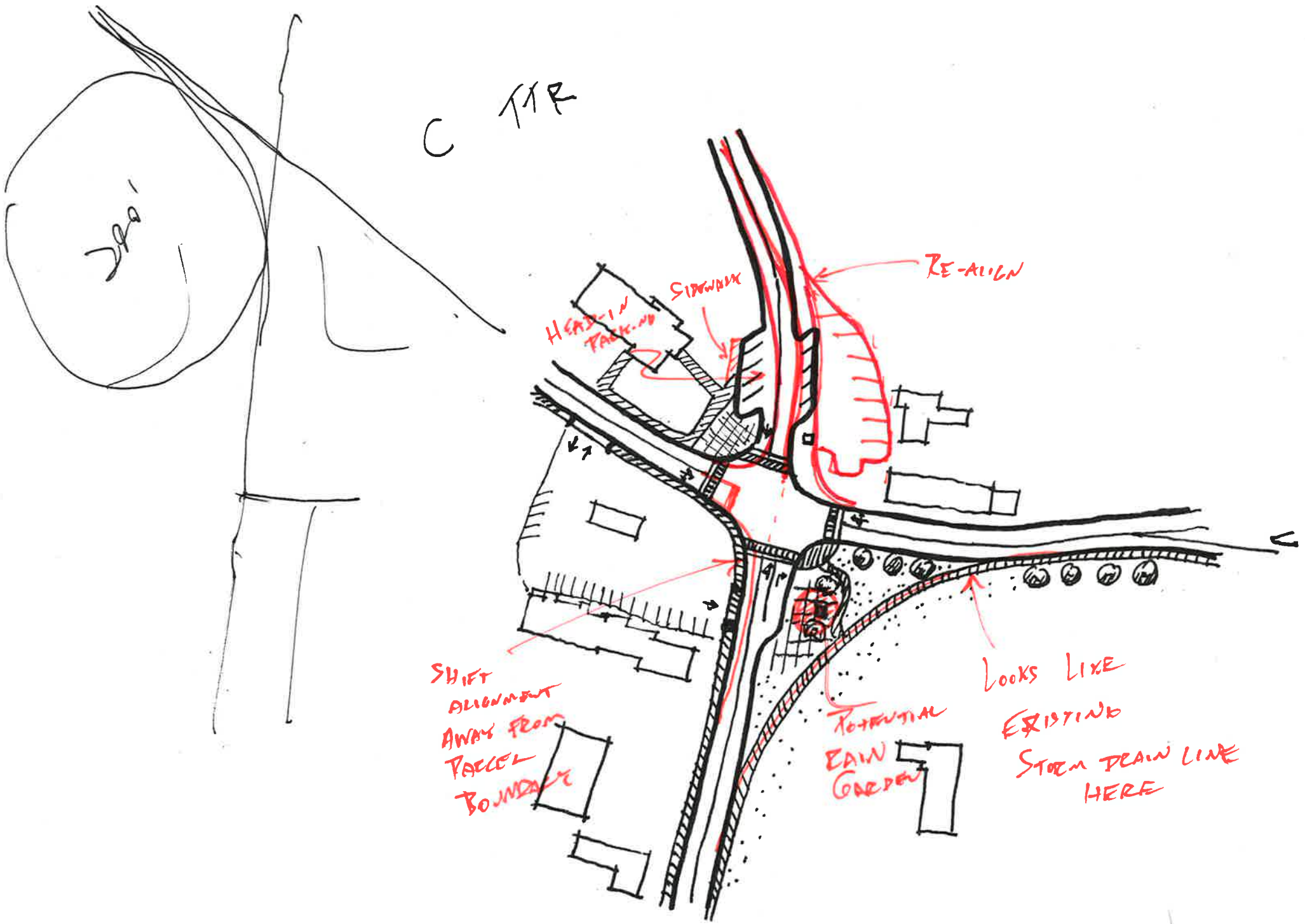
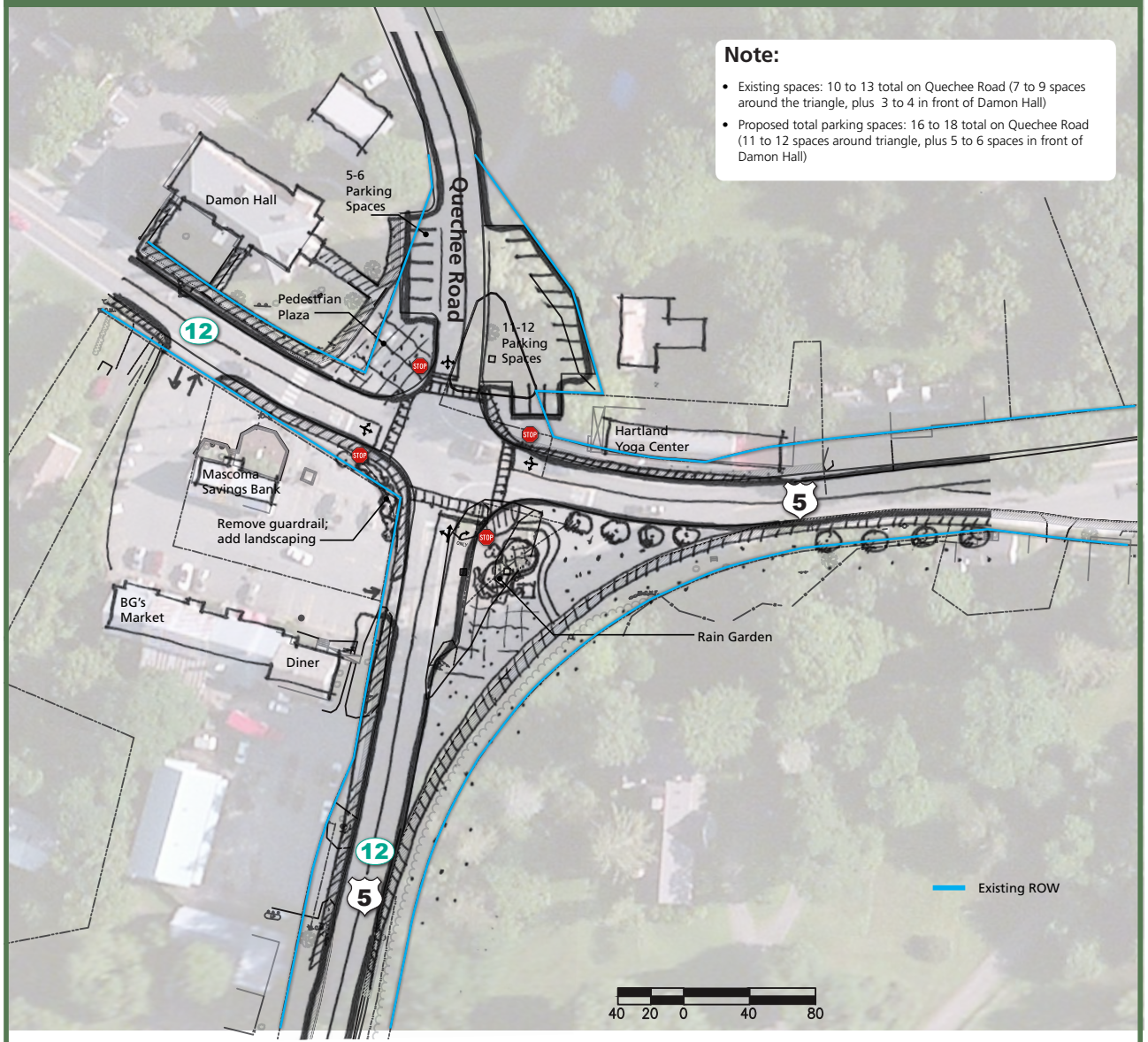

C TIR
RE-ALIGN
SIDEWALK
HEAT-IN TANK-NO
SHIFT ALIGNMENT AWAY FROM PARCEL BOUNDARY
POTENTIAL RAIN GARDEN
LOOKS LIKE EXISTING STORM DRAIN LINE HERE

Proposed Four-way Intersection



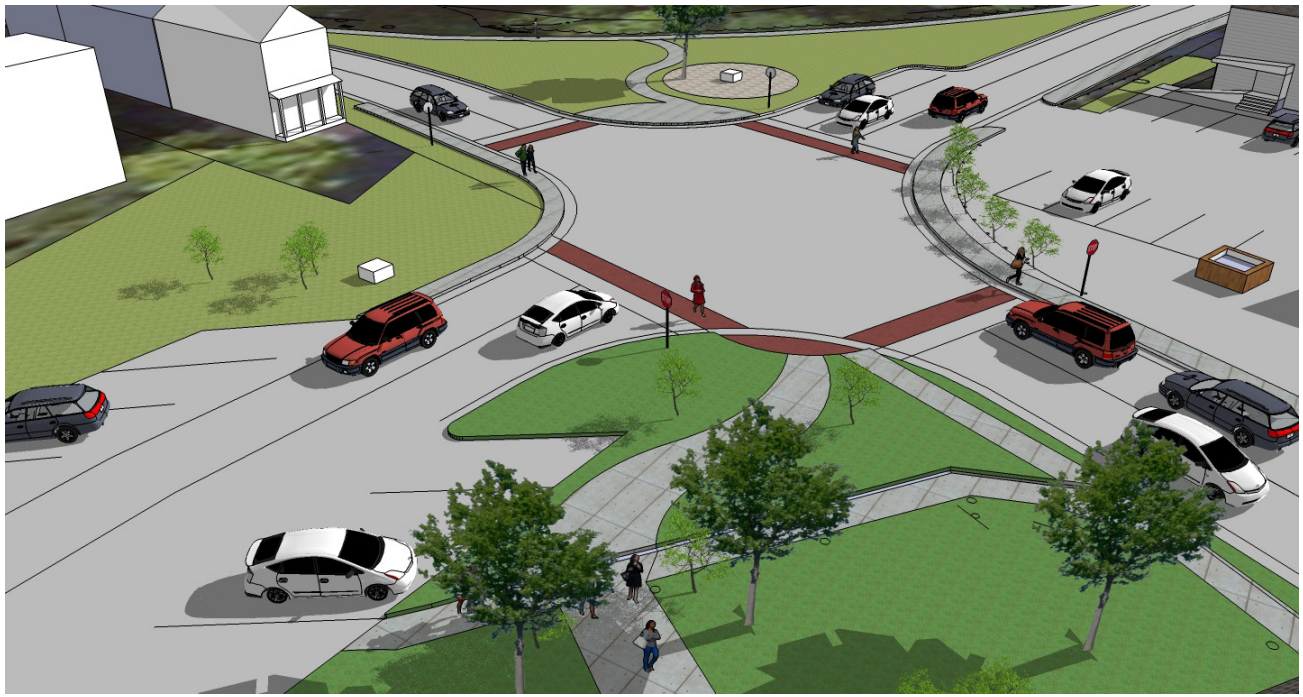
Hartland Three Corners Pedestrian Safe Route Study

Proposed 4-Way Intersection

Plan Sketch

March 2013

Proposed Four-way Intersection

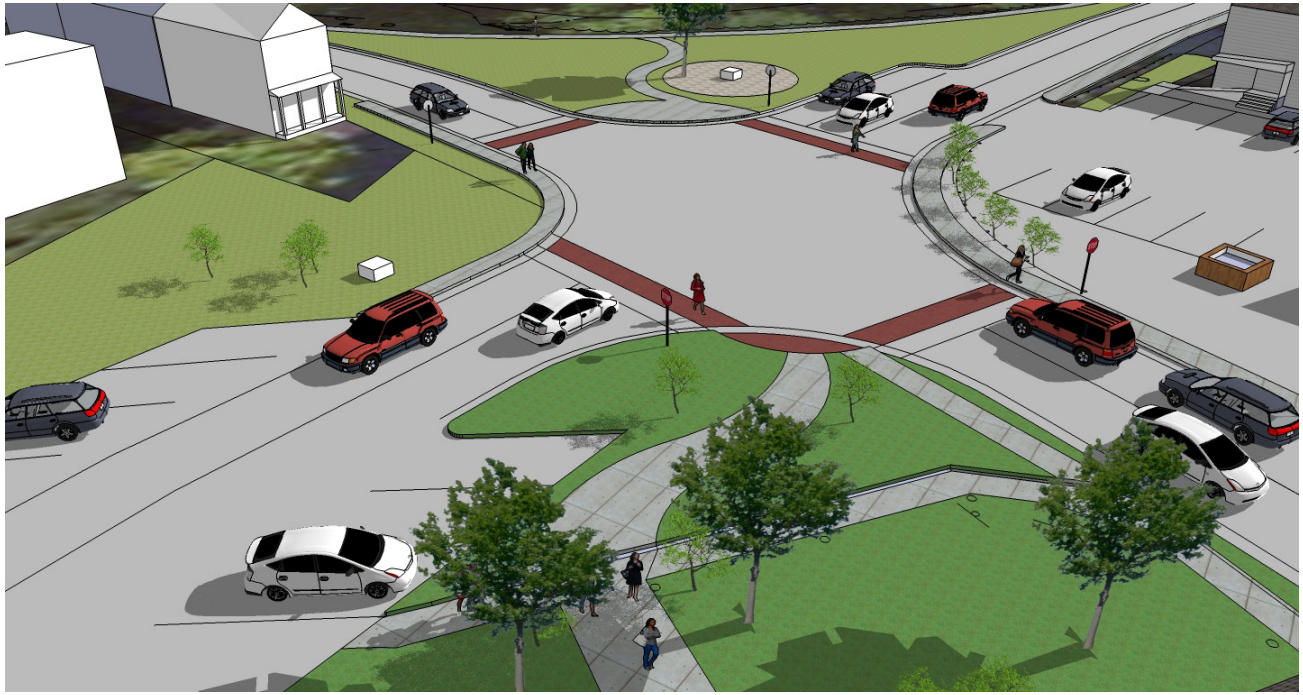


Birds eye view, looking from above Damon Hall towards the southeastern corner

On Route 5, looking directly west at VT 12

From the rain garden, looking towards Damon Hall

Proposed Four-way Intersection



Birds eye view, looking from above Damon Hall towards the southeastern corner

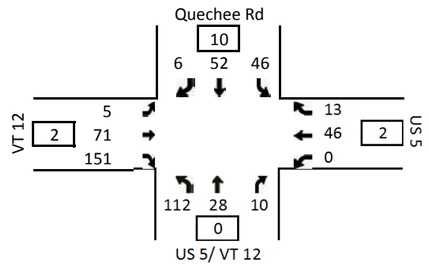
On Route 5, looking directly west at VT 12

From the rain garden, looking towards Damon Hall

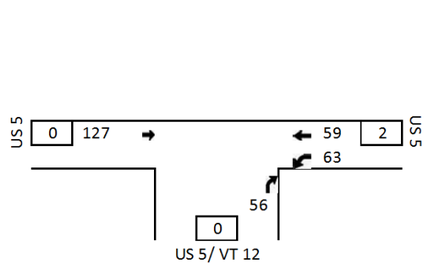
Appendix B

Traffic Congestion Analysis

North AM: 7:15 - 8:00

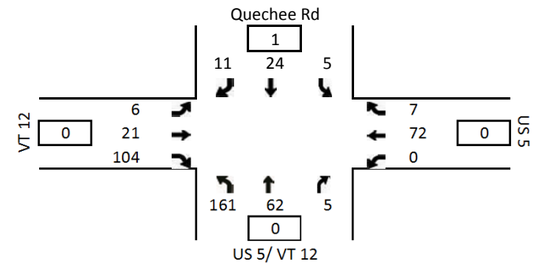


East AM: 7:15 - 8:00



Intersection		
1	North	540
2	South	491
3	East	305

North PM: 4:00 - 5:00



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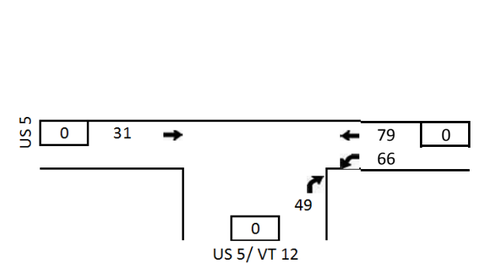
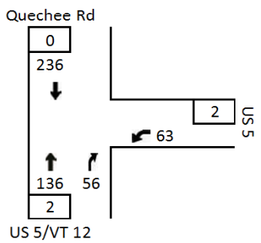
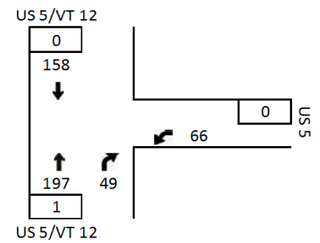


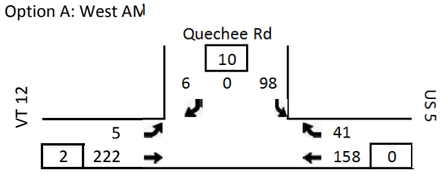
South AM: 7:15 - 8:00



South PM: 4:00 - 5:00



Option A: West AM



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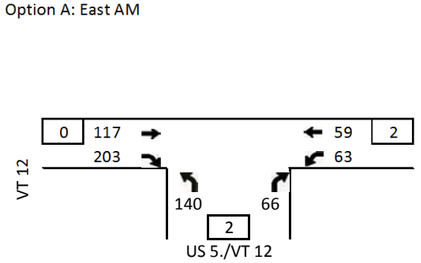

Intersection		
1	West	530
2	East	648

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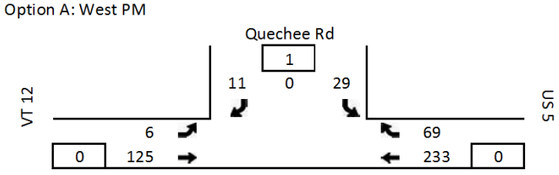

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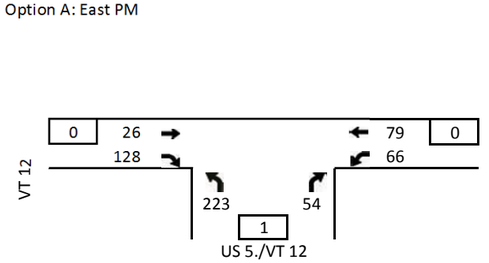
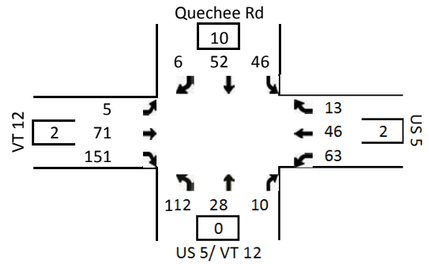


Option B: North AM



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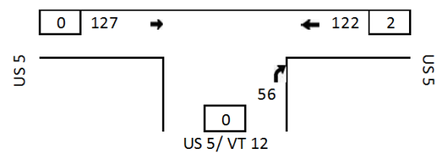

Intersection		
1	North	603
2	South	491
3	East	305

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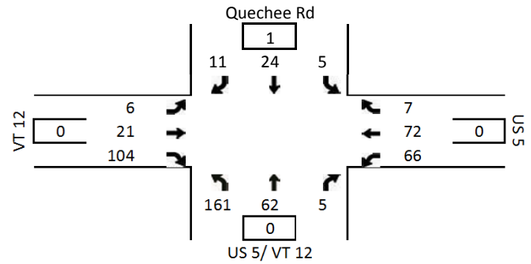
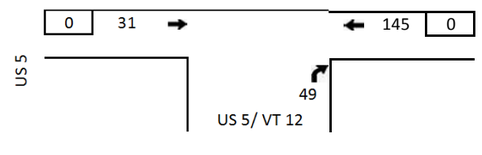
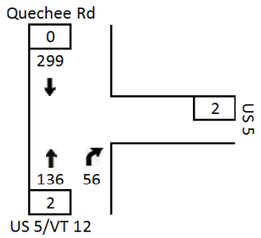


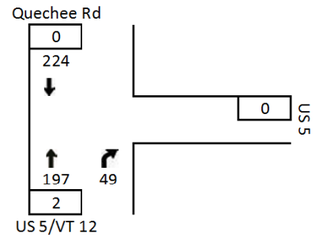
Option B: East PM



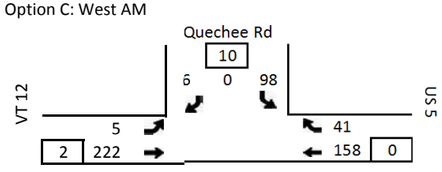
Option B: South AM



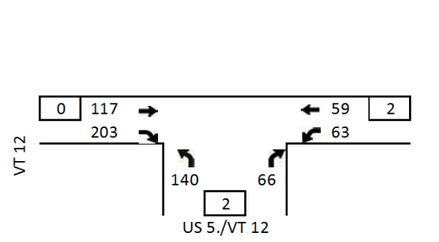
Option B: South PM



Option C: West AM

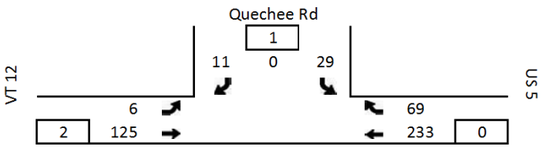


Option C: East AM

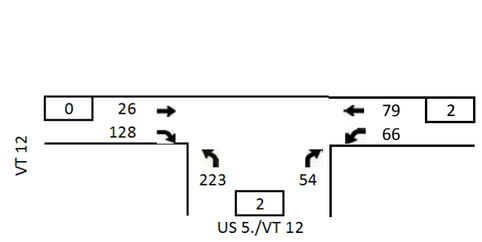


Intersection		
1	West	530
2	East	648

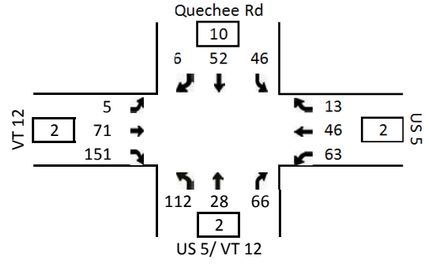
Option C: West PM



Option C: East PM

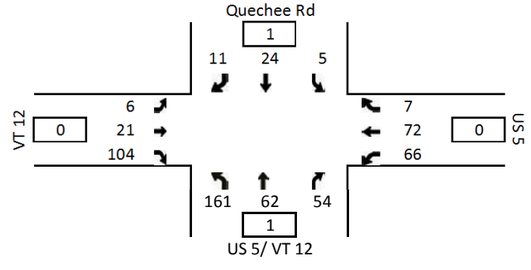


Option D: Single Intersection AM



Intersection		
1	Single	659

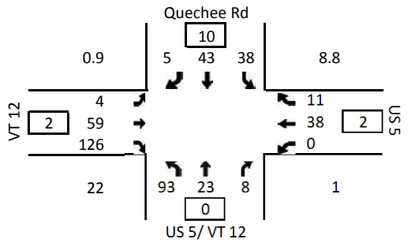
Option D: Single Intersection PM



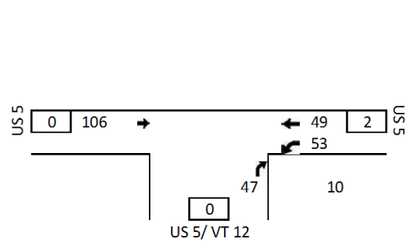
2022 Traffic Volumes

EXISTING CONDITION

North AM: 7:15 - 8:00

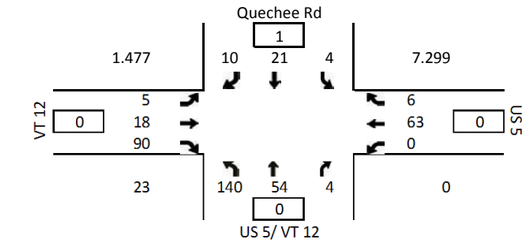


East AM: 7:15 - 8:00

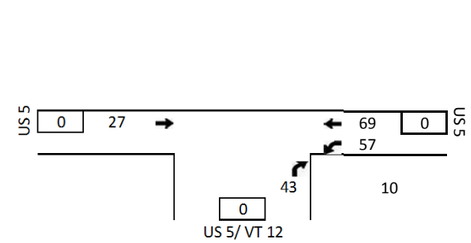


Intersection		
1	North	482
2	South	409
3	East	264

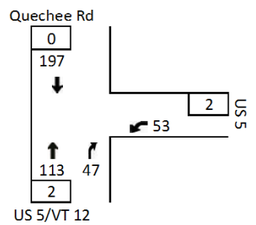
North PM: 4:00 - 5:00



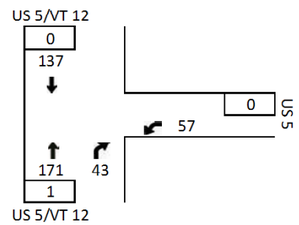
East PM: 4:00 - 5:00



South AM: 7:15 - 8:00

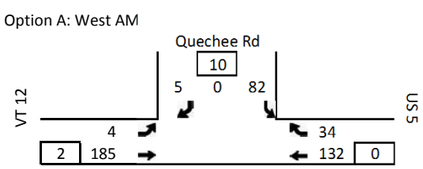


South PM: 4:00 - 5:00

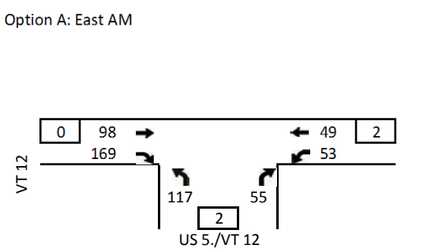


OPTION A

Option A: West AM

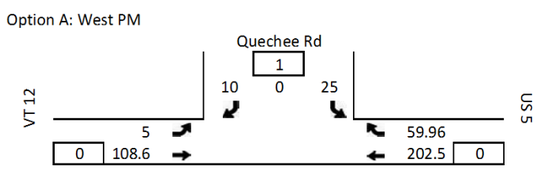


Option A: East AM

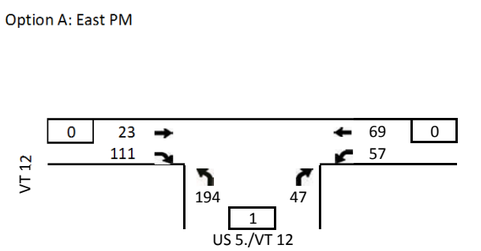


Intersection		
1	West	442
2	East	540

Option A: West PM

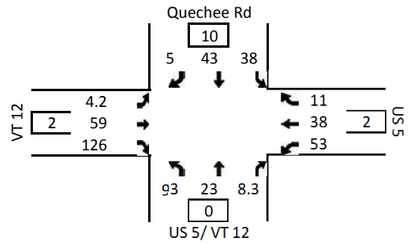


Option A: East PM

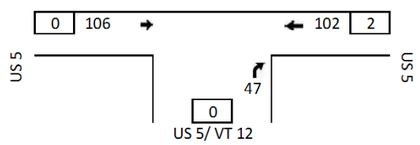


OPTION B

Option B: North AM

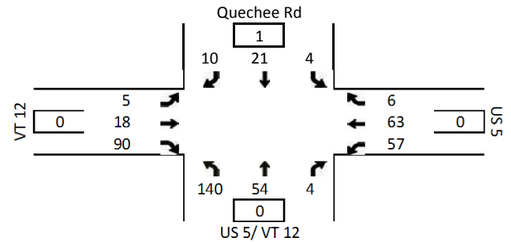


Option B: East AM

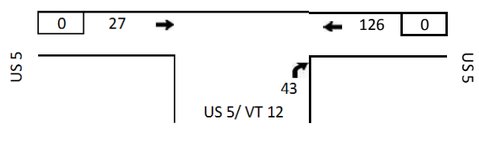


Intersection		
1	North	503
2	South	409
3	East	254

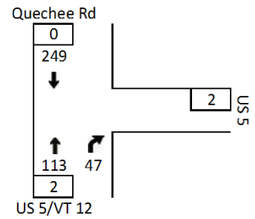
Option B: North PM



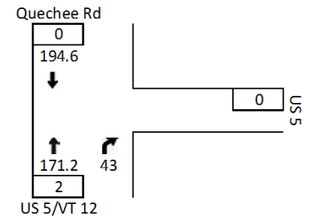
Option B: East PM



Option B: South AM

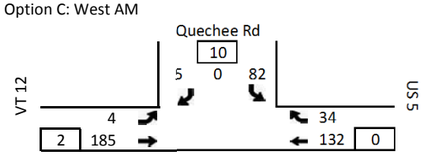


Option B: South PM

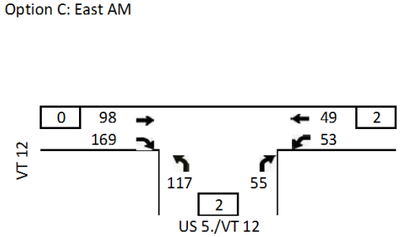


OPTION C

Option C: West AM

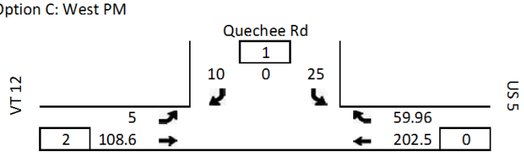


Option C: East AM

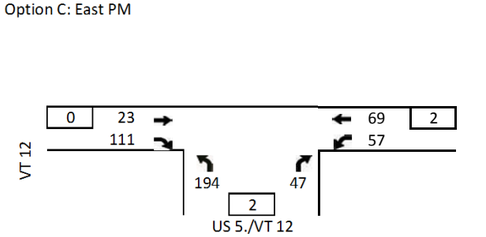


Intersection		
1	West	442
2	East	540

Option C: West PM

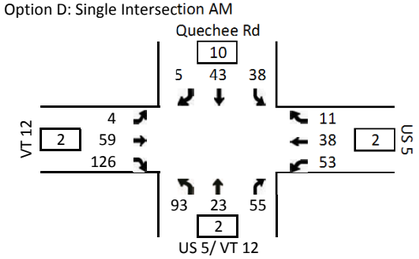


Option C: East PM



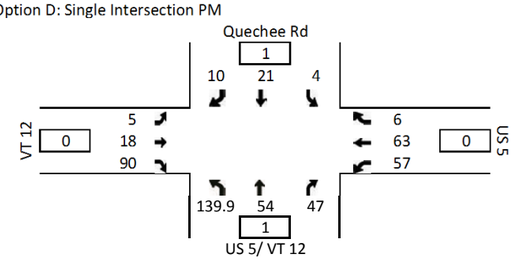
OPTION D

Option D: Single Intersection AM



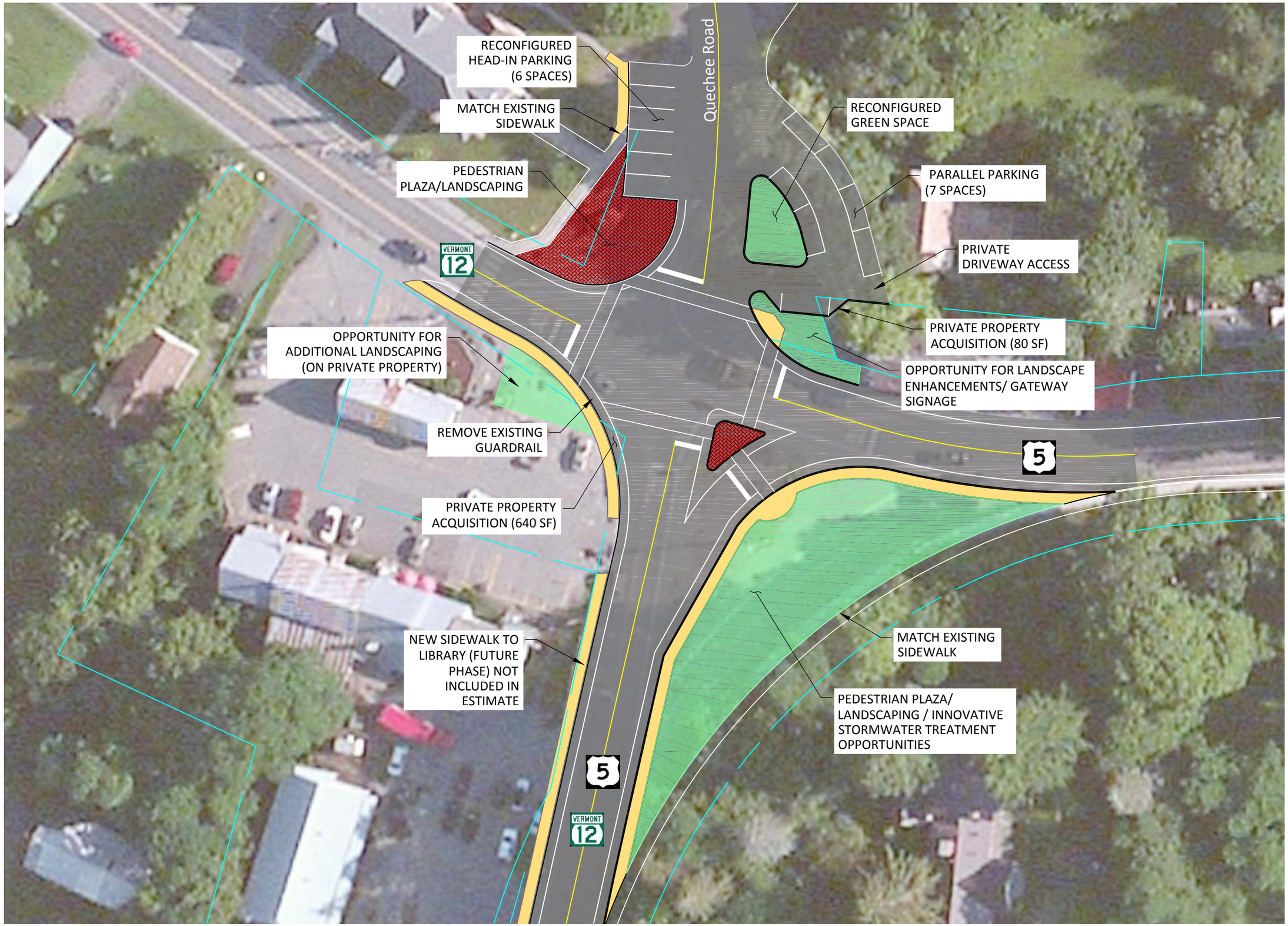
Intersection		
1	Single	549

Option D: Single Intersection PM



Appendix C

Final Conceptual Plans



Welcome to HARTLAND SETTLED IN 1761

RSG INC. TRANSPORTATION
Resource Systems Group, Inc
55 Railroad Row; White River Jct, VT 05001
p: (802) 295-4999 f: (802) 295-1006
www.rsginc.com

HARTLAND THREE CORNERS
SCOPING STUDY

CONCEPTUAL LAYOUT

SCALE:	1"=20'
DESIGNED BY:	GW
CHECKED BY:	JDS
DATE:	9/7/13
PROJ.NO:	12189

SHEET 1 OF 1

Q:\Projects\VT\Hartland-VT\12189-Hartland Three Corners Pedestrian Safe Route Study\CAD\Hartland Three Corners - FINAL Conceptual Intersection Plan.dwg