

**Central Vermont Regional Planning Commission
Town of East Montpelier
Intersection Design Feasibility Study**

Alternatives



Submitted by:

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In conjunction with

Broadreach Planning & Design

Heritage Landscapes LLC

University of Vermont Consulting Archaeology Program

October 10, 2017

This report has been formatted for double-sided printing.
Blank pages are intentional, so that the beginning of the report and the appendices can start on an odd numbered, right-side page.

A. INTRODUCTION

1. OVERVIEW

This study is examining the most appropriate ways to increase safety for motorist, bicyclists, and walkers at the intersection of Gallison Hill Road and Brazier Road with Towne Hill Road in the Town of East Montpelier, Vermont. The project is being funded and supported by the Central Vermont Regional Planning Commission.

To begin the project, the Town of East Montpelier, with assistance from the Central Vermont Regional Planning Commission (CVRPC) created a Steering Committee to guide the development of the project. CVRPC also contracted with the consultant team of Lamoureux & Dickinson, Broadreach Planning & Design, Heritage Landscapes, and the University of Vermont Consulting Archaeology Program (the L&D Team). Together, the Steering Committee and the L&D Team examined the existing conditions around the intersection. The Existing Conditions Summary in the Study Area was the first product of the Steering Committee.

2. PURPOSE AND NEED

The purpose of the intersection improvement project examined in this study is to improve conditions on the roadway that will slow motorists moving through the intersection; create longer sight lines for the north, east and south approaches to the intersection; and provide improved facilities for walkers and bicyclists in and near the intersection.

Needs for the improvements result from:

- High traffic volumes passing through the intersection during peak periods, particularly the morning peak hour;
- Minimal shoulder widths on each roadway approaching the intersection;
- The presence of U-32, a regional middle and high school, on Gallison Hill Rd about ½ mile south of the intersection;
- A high number of young and inexperienced drivers that pass through the intersection on their way to or from U-32;
- The number of unreported crashes and near misses reported by local residents and Town staff that have occurred at the intersection;

- Pedestrians, joggers and athletic teams on training runs coming from nearby residences and U-32 crossing Towne Hill Road at the intersection; and
- Restrictions to sight lines caused by the hills on Town Hill and Gallison Hill Roads as well as by turning buses and trucks at the intersection.

3. ALTERNATIVE DEVELOPMENT

The L&D Team assisted the Steering Committee and the CVRPC in the development of over 30 different alternative actions that might address the purpose and need of this project. To create an organized way to consider and present and compare the alternatives, the Steering Committee initially divided them into four categories:

- Actual improvements to Towne Hill Road that would require some change to the pavement of the roadway itself;
- Enhancements to Towne Hill Road that would add features but not change the roadway itself;
- Improvements or changes to Gallison Hill Road; and
- Other types of improvements that would not create direct, permanent changes to the roads.

Together, they did an initial analysis of the different alternatives and eliminated those that did not have the potential to adequately address the purpose. The L&D Team then conducted additional analysis and refined the alternatives to only those that are included in Section B of this report. They worked with the Steering Committee to expand the analysis and prepare this report to assist the Town and local residents in reviewing the alternatives and selecting those that appear to be most appropriate.

Table B-1 presents all of the alternatives initially developed by the Steering Committee and the disposition of each. **Tables B-2** and **B-3** present the more detailed analysis of the remaining alternatives.

4. USE OF THIS REPORT & NEXT STEPS

This report is meant to serve as a guide to the alternatives under consideration for improving driving, walking, and bicycling conditions at and near the intersection of Towne Hill Road and Gallison Hill and Brazier Roads. It presents this information for public review. **Figure B-1** in this report presents most of the alternatives that are currently under consideration on one map so that they can

be examined and evaluated together. The **Figure** does not imply that all of the alternatives are meant to be developed. None of the alternatives are recommended at this point in the project.

The alternatives will be considered at a public work session on October 16, 2017, during which the attendees will have a chance to express their opinions on which alternative, or group of alternatives, would make the most sense to pursue. By the end of the public work session, the L&D team and Steering Committee hope that consensus on the preferred alternatives will emerge.

The Steering Committee will review the results of the public work session and will make a draft set of final recommendations for one final public review before the study is finished. They will prepare a draft final report for the project, which will outline the preferred alternative(s). It will include both the *Existing Conditions* report and this *Alternatives* report.

B. ALTERNATIVES

1. OVERVIEW

After completing the analysis of the alternatives, the Steering Committee found that it would be better to present and compare the alternatives according to the issues they were meant to address. Thus, for this report, the Steering Committee divided the remaining alternatives into four new categories, organized around the intent of the alternative:

- Improvements meant to increase sight distances on Towne Hill Road to the east of the intersection;
- Improvements meant to lower motor vehicle speeds on Town Hill Road;
- Improvements meant to increase driver awareness of potential challenges at the intersection; and
- Improvements meant to create better conditions for walkers and bicyclists near the intersection.

Most of the alternatives that are meant to increase driver awareness of the potential challenges at the intersection would also aid in reducing driving speeds for motorists approaching the intersection.

In addition to these potential improvements identified by the Steering Committee, taking no action also remains as one of the potential alternatives. The NO ACTION alternative is included in each of the alternative analysis tables so that it can be easily compared to the other alternatives.

2. INCREASE SIGHT DISTANCE

- a. Reduce grade on Towne Hill Road east of the intersection to create longer sight distances. This Alternative would regrade approximately 350 linear feet of Towne Hill Road to reduce the crest in the grade east of the intersection. Lowering the crest would increase sight distances to the east on Towne Hill Road from Gallison Hill Road approximately 600 feet.
- b. Increase summer and winter roadside maintenance. Alternative 2b would include more frequent mowing of the vegetation in the right-of-way in the summer and plowing the snow further away from the edges of the pavement in the winter near the intersection.

3. LOWER TRAVEL SPEEDS

- a. Narrow the roadway width on Town Hill Road near the intersection. This alternative would include a slight narrowing of the shoulders either by the installation of curbs, the placement of removable planters along the sides of the road, or some other method acceptable to the Town (a neckdown). It might alternately add center medians created from a different pavement material and just slightly raised over the existing roadway elevation.
- b. Construct a raised table intersection. Alternative 2b would modify the intersection of Towne Hill Road with Gallison Hill and Brazier Roads to raise the entire center square of the intersection by between two and three inches, with ramps on each of the approaches. This feature would heighten motorists' awareness of the intersection each time they pass through it. It would also lower motorists speeds at the intersection

- c. Lower the speed limit on Towne Hill Road to 35 MPH. This alternative would reduce the posted speed limit on Towne Hill Road east and west of the Gallison Hill Road/Brazier Road intersection. It would include the installation of flashing advanced warning signs of the reduced speed limit before the posted change on both the eastbound and westbound sides of the intersection.
 - d. Install Radar Speed Feedback Signs on Town Hill Road. This alternative would add speed feedback signs for both directions of travel on Towne Hill Road east and west of the intersection. The signs would flash either the speed or a slow down warning when a vehicle's speed exceeds the posted speed limit, and would flash a "Thank You" when a vehicle's speed is at or below the posted speed limit.
 - e. Increase police patrols along Towne Hill Road near the intersection. This alternative would have the Town of East Montpelier contract for more than 40 hours of monthly patrols by the State Police in East Montpelier with a focus of the extra hours on Towne Hill Road near the intersection.
4. HEIGHTEN DRIVER AWARENESS
- a. Install rumble strips on Towne Hill Road. The focus of this alternative would be the addition of transverse rumble strips across Towne Hill Road in the westbound lane and possibly the east bound lane on either side of the Gallison Hill Road intersection. The rumble strips would alert motorists to the approaching intersection and would also encourage compliance with the posted speed limit.
 - b. Update existing and/or add additional signage. This alternative would update the regulatory and warning signs along Towne Hill Road, Gallison Hill Road, and Brazier Road to minimize the number of signs and make the remaining signs more effective and code compliant.
 - c. Install new "Be Prepared to Stop" blinker warning signs on Towne Hill Road. This alternative would replace the existing intersection warning

- signs on both approaches to the Gallison Hill Road intersection with a “Be Prepared Stop” warning sign and a “When Flashing” plaque, along with vehicle detection on Gallison Hill and Towne Hill Roads. The blinker signs would be activated when traffic would be stopped on Towne Hill Road waiting to turn and/or when there would be a queue on Gallison Hill Road waiting to turn left or right onto Towne Hill Road that exceeds two or three vehicles.
- d. Add curbs on Gallison Hill with a sidewalk. Alternative 4d would create the feeling of a narrower road with minimal shoulders on Gallison Hill Road by the addition of curbs close to the intersection. The curbs would keep motorists from unsafely passing vehicles waiting to turn left or right onto Towne Hill Road. A sidewalk would be added on the east side of Gallison Hill Road behind the curb, either directly adjacent to the curb or separated by a green strip.
 - e. Add a blinking “Be Prepared to Stop” warning sign on Gallison Hill Road. This alternative would add a warning sign on Gallison Hill Road south of the intersection that would include a flashing blinker that would be activated during the morning and afternoon peak hours and potentially activated at other times by motorists on the road approaching the intersection.
5. IMPROVE BICYCLING AND WALKING CONDITIONS
- a. Add properly signed GMT bus stop. Alternative 5a would add a bus stop sign at a minimum on both the eastbound and westbound departures from the intersection on Towne Hill Road.
 - b. Add a painted crosswalk with RRFB on Towne Hill Road. This alternative would add a crosswalk on Towne Hill Road. Crosswalks would also be added on Gallison Hill and Brazier Roads to allow pedestrians to easily access the single crosswalk over Towne Hill Road. Additional protection for pedestrians crossing Towne Hill Road could be provided by installing rectangular rapid flashing beacons (RRFB) to accompany one of the

- crosswalks. The RRFB would provide unique pedestrian activated flashing warning beacons on both sides of the crosswalk. They would heighten motorist awareness that a pedestrian would be present and improve compliance with the required yield to a pedestrian in a designated crosswalk. The beacons would flash for just the amount of time that it would take a typical pedestrian to cross the road and then go dark until they would be activated again.
- c. *Increase shoulder widths on Towne Hill Road.* Alternative 5c would add three-foot wide shoulders on both sides of Towne Hill Road to create a better place for bicyclists and pedestrians using the road.

C. ALTERNATIVE ANALYSIS

1. OVERVIEW

Tables B-2 and **B-3** provide a concise analysis of the alternatives based on the criteria listed in the following sections. Not all of the criteria are listed in each of the tables. Those that showed the same impacts for each of the alternatives were sometimes eliminated to make the **Tables** easier to understand. For instance, if each of the alternatives for enhancements to Towne Hill Road showed that there would be no impacts to adjacent trees, then the line discussing this impact was removed. Similarly, descriptive elements, described in Section 2 below, were also removed if that particular element was not relevant to all of the alternatives being compared in the table.

2. PROJECT DESCRIPTION

- Additional Right-of-Way Needed
- Amount of New Paving Installed
- Number of New Signs Installed
- Number of Permanent Easements Needed
- Number of Construction Easements Needed
- Significant Physical Constraints

3. ATTRIBUTES

- Addresses Purpose and Need
- Creates Longer Sight Distances
- Benefits Motorists, Bicyclists, and Pedestrians
- Reduces Crash Potential
- Induces Higher Travel Speeds
- Encourages Slower Travel Speeds
- Requires Additional Town Maintenance Efforts and/or Costs
- Requires Power
- Creates Angry Drivers
- Is Conducive to Future Growth
- Order of Magnitude Cost (For Comparison Purposes Only)

4. ENVIRONMENTAL AND CULTURAL IMPACTS

- Wetland Impacts
- Wetland Buffer Impacts
- Tree Removal
- Steep Slope Disturbance
- Adverse Historic Resource Impacts
- Utility Pole Disturbance
- Stormwater System Disturbance
- Stormwater Quantity or Quality Impacts
- Residential Impacts
- Traffic Increases on Nearby Roads
- Potential for Future Walking & Bicycling Improvements
- Other Potential Impacts

TABLE B-1 Initial Alternatives Analysis

ALTERNATIVE	DESCRIPTION	DISPOSITION	FINAL DESIGNATION
No Action	Continuation of the current arrangement	Kept	
TOWNE HILL ROAD IMPROVEMENTS			
A1: Reduce grade on Towne Hill Road east of the intersection	Regrade the road to reduce the crown in the road and create longer sight distances	Kept	Alt 2a
A2: Add west bound left-turn lane on Towne Hill Road	Create a new lane to allow left turning vehicles to queue outside of the main travel lane	Deleted - Not enough turning movement and it increases chances of crashes as stopped turning vehicles block views of motorists on Gallison Hill Road	
A3: Add east bound right-turn lane on Towne Hill Road	Create a new lane to allow left turning vehicles to queue outside of the main travel lane	Deleted - Not enough turning movement	
A4: Convert the intersection to a roundabout	Create a regular size roundabout	Deleted - Requires much more ROW and is not warranted for the amount of traffic at the intersection	
A5: Increase shoulder widths on Towne Hill Road	Add at least two feet of additional paved shoulders on each side of the road close to the intersection	Kept	Alt 5c
A6: Install rumble strips or speed humps on Towne Hill Road	Add rumble strips across the road that would create noise as motorists approach the intersection from the east	Kept	Alt 4a
A7: Narrow the roadway width on Towne Hill Road near the intersection via center medians and Curb Extensions	Create narrower travel lanes close the intersection to slow traffic	Kept	Alt 3a
A8: Construct a raised table intersection	Raise the surface of the entire center area of the intersection by at least 3 inches	Kept	Alt 3b
A9: Add GMT bus pull off	Create a paved pull off that would allow the GMT bus to pull out of the travel lane	Deleted - insufficient users or road traffic to warrant pull off	
A10: Install raised crosswalks on Towne Hill Road at the intersection	Add a crosswalk on Towne Hill Road that is at least 3 inches higher than the rest of the pavement	Deleted - insufficient users and it would act as a speed hump slowing and potentially damaging emergency vehicles.	
TOWNE HILL ROAD ENHANCEMENTS			
B1: Install a traffic signal	Add a full traffic signal at the intersection, with the time of operation to be determined.	Deleted - Does not meet warrant for traffic signal	
B2: Update existing and/or add additional signage	Consolidate and update signs near the intersection to reduce the overall number of signs.	Kept	Alt 4b
B3: Add a painted crosswalk on Towne Hill Road	Add at least one and preferable two crosswalks on Towne Hill Road	Deleted - Combined with Alternative B4	
B4: Add a crosswalk and Rectangular Rapid Flashing Beacon sign to the intersection	Add a sign that includes flashing lights that are activated by pedestrians when crossing the road	Kept	Alt 5b
B5: Reduce the speed limit on Towne Hill Road	Lower the speed limit to 30 or 35 mph	Kept	Alt 3c
B6: Install vehicle-activated blinker signs	Add signs that would blink when motorists approached	Deleted - considered to be not effective	
B7: Install speed feedback signs on Town Hill Road	Add signs that would flash when motorists exceeded the posted speed limit	Kept	Alt 3d
B8: Install flashing warning beacons	Add flashing beacons to existing signs	Deleted - considered to be not effective	
B9: Install "Be Prepared To Stop When Flashing" warning signs on Towne Hill Road	Add vehicle detection loops on Gallison Hill Road and Towne Hill Road that would activate the sign blinkers when more than a determined number of vehicles stack on Gallison Hill Road or Towne Hill Road at the intersection	Kept	Alt 4c
B10: Install multi-way stop signs	Create a four way stop at the intersection	Deleted - Warrants for stop signs not met	
B11: Add properly signed GMT bus stop	Add signs noting the presence of a GMT bus stop at or near the intersection	Kept	Alt 5a
B12: Narrow lane widths on Towne Hill Road to nine-foot wide	Reduce the overall width of the travel lanes	Deleted - Travel lanes are at the minimum (10 ft) recommended by State Standards	
B13: Install intersection street lights	Add street lights to existing utility poles	Deleted - Determined not to readily address the purpose or need of the project	
GALLISON HILL ROAD IMPROVEMENTS & ENHANCEMENTS			
C1: Install exclusive right-turn lane on Gallison Hill Road	Add a separate lane that would allow motorists turning right to queue in their own lane	Deleted - Increases the chances of crashes as turning vehicles block views to the east for vehicles traveling straight or turning left at the intersection	
C2: Increase shoulder width on Gallison Hill Road	Add at least two feet of additional paved shoulders on each side of the road close to the intersection to provide room for pedestrians	Deleted - Benefits walkers and bicyclists but increases risks of illegal passing of turning vehicles at the intersection	
C3: Add curbs and sidewalk on Gallison Hill Road near the intersection	Reduce the travel lane width or total pavement width close to the intersection to eliminate the potential to pass turning vehicles and add a sidewalk on the east side	Kept	Alt 4d
C4: Intall an "Intersection Ahead" sign with flashing beacon on Gallison Hill Road	Add a warning sign on Gallison Hill Road south of the intersection that would flash continually during morning and peak traffic hours.	Kept	Alt 4e
OTHER IMPROVEMENT OR ENHANCEMENT ALTERNATIVES			
D1: Create a paired one-way road system between Gallison Hill Road and Schoolhouse Road	Create a one way loop between the two roads	Deleted - does not readily address purpose and need of project	
D2: Make Schoolhouse Road one-way north	Make School House Road one way north	Deleted - does not readily address purpose and need of project	
D3: Work with U-32 to get more students to car pool	Create more car pools to reduce the number of vehicles going through the intersection	Deleted - Requires the cooperation of U32 but with no guarantee of long term continuation of the initiative	
D4: Increase summer and winter roadside maintenance	Cut vegetation along the side of the road more often and push the snow further away from the edge of the pavement	Kept	Alt 2b
D5: Work with U-32 to get more students to use the bus to reduce the number of students driving through the intersection	Increase bus usage to reduce the number of vehicles moving through the intersection	Deleted - Requires the cooperation of U32 but with no guarantee of long term continuation of the initiative	
D6: Increase police patrols along Towne Hill Road near the intersection	Increase the number of contracted hours of State Police time per month and devote more time to patrols on Towne Hill Road	Kept	Alt 3e
D7: Add sidewalks near the intersection	Add sidewalks for pedestrians near the intersection	Deleted - Does not directly address purpose and need of project on its own. Incorporated into Alternative 4b.	
D8: Work with U-32 to let the busses leave five minutes earlier than student-driven cars	Separate the peak time for buses and student-driven vehicles at the intersection	Deleted - Requires the cooperation of U32 but with no guarantee of long term continuation of the initiative	

TABLE B-1 Initial Alternatives Analysis
Intersection Design Feasibility Study
 Town of East Montpelier
 October 10, 2017

TABLE B-2 Sight Distance / Bicycling & Walking Improvements

Town of East Montpelier

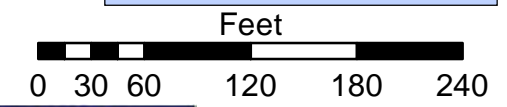
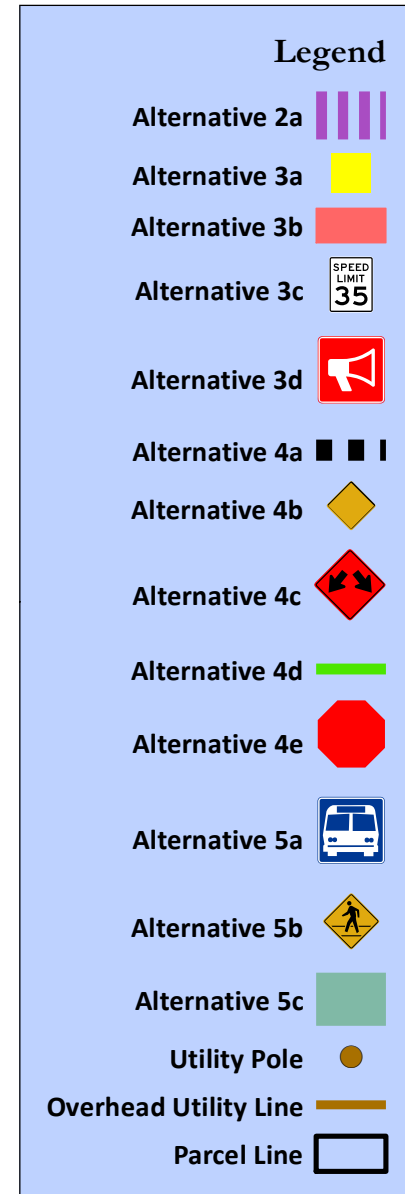
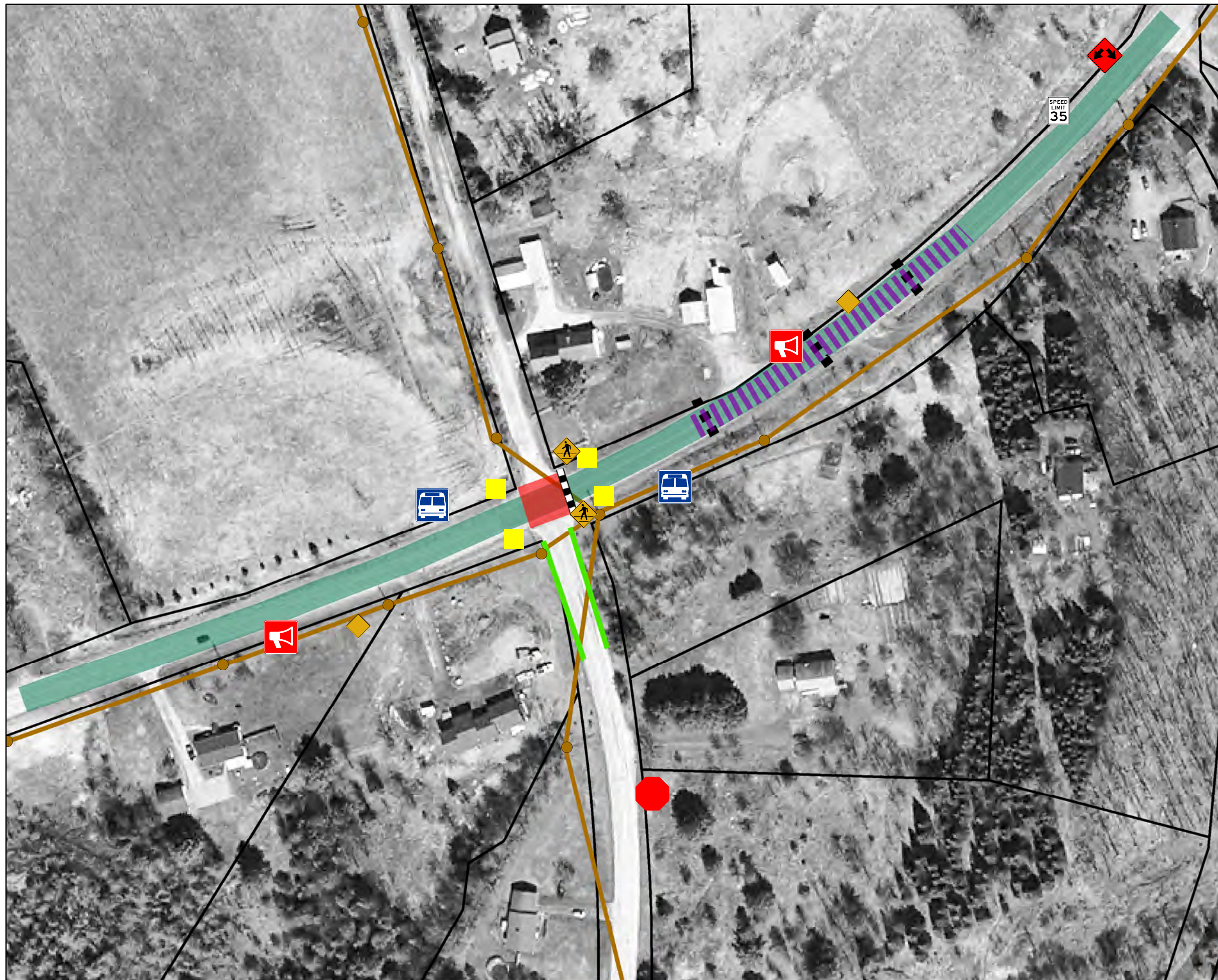
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	NO ACTION	INCREASE SIGHT DISTANCE		NO ACTION	IMPROVE BICYCLING AND WALKING CONDITIONS		
	No Action	2a: Reduced High Point on Towne Hill Road	2b: Increased Summer & Winter Maintenance near Intersection	No Action	5a: GMT Bus Stop Signs on Towne Hill Road	5b: Crosswalk with RRFB on Towne Hill Road at Intersection	5c: Wider Shoulders on Towne Hill Road
Project Description							
Amount of New or Replacement Paving	0	12,000 SF		0	0	0	7,500 SF
Additional ROW Needed	No	No		No			No
Permanent Easements	No	No		No			No
Construction Easements	No	No		No			No
Number of New Signs	0	0		0	2	6 Minimum	0
Significant Physical Constraints	None		Side ditches, Space for snow storage	None	None	None	
Other Constraints	None	None	None	None	None	The VTrans guidelines on pedestrian crossings recommend warrants be met and does not recommend the installation of RRFBs at intersections	None
Environmental/Cultural Constraints							
Tree Disturbance	No	Unknown	Possible	No	No	No	Yes
Wetland or Buffer Disturbance	No	No	No	No	No	No	No
Steep Slope Disturbance	No	Yes - Steep side slope would need to be cut	No	No	No	No	Yes - Steep side slope would need to be cut
Historic Resources Impacts	No	No	No	No	No		No
Utility Disturbance	No	No	No	No	No	No	Possible relocation of one utility pole
Storm Sewer Disturbance	No	Modification to drainage ditches	No	No	No	No	Modification to drainage ditches
Stormwater Impacts	No	No	No	No	No	No	Increased impervious surface - treatment probably needed
Residential Impacts	Yes - Continued problems	No	No	Yes - Continued problems	No	Yes - Possible night time light impacts if sign activated after dark	Yes - Reduced area to orient vehicle perpendicular to road for driveway east on south side
Adjacent Roadway Impacts	Yes - Continued bypass vehicles on Schoolhouse Road continues	No	No	Yes - Continued bypass vehicles on Schoolhouse Road continues	No	No	No
Other Impacts	No			No			
Attributes							
Addresses Purpose and Need	No	Yes - Increase sight distance to the east on Towne Hill Road	Partially - Helps create better sight distances	No	Yes - Alerts motorists to the potential for pedestrians to be on or near the edge of the road	Yes - Alerts motorists to potential issues at the intersection	Yes - Provides more opportunities for bicyclist and walkers
Creates Longer Sight Distances	No	Yes	Yes	No	No	No	No
Benefits All Users	No	Yes	Yes	No	Yes	Yes	Yes
Reduces Crash Potential	No	Yes	Yes	No	No	Yes	Yes
Encourages Higher Speed	No	Yes	Yes	No	No	No	Yes
Encourages Lower Speed	No	No	No	No	No	Yes	No
Increases Town Maintenance	No	No	Yes	No	No	Yes	Yes
Annoys Drivers	No	No	No	No	No	No	No
Order of Magnitude Cost	\$0			\$0			
Positive Considerations							
Negative Considerations							
Neutral							

Intersection Design Feasibility Study

East Montpelier, Vermont



BROADREACH
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Alternatives



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October 10, 2017

Figure B1