

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

Draft Final Report



Submitted by:

Lamoureux & Dickinson Consulting Engineers

In conjunction with

Broadreach Planning & Design

Heritage Landscapes LLC

University of Vermont Consulting Archaeology Program

November 13, 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.

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To be completed when report has been reviewed.

I. INTRODUCTION

A. OVERVIEW

This study is examining the most appropriate ways to increase safety for motorists, 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 supported by funds provided by the Vermont Agency of Transportation (VTrans) and administered 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 reviewed different alternatives and selected a set of preferred alternatives.

B. 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 who travel through the intersection on their way to or from U-32;
- An average speed of motorists passing west through the intersection on Towne Hill Road of 42.5 mph and an 85th percentile speed of 48.9, compared to the posted speed of 40 mph;
- 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 Towne Hill and Gallison Hill Roads as well as by turning buses and trucks at the intersection.

C. REPORT DEVELOPMENT AND ORGANIZATION

This Final Report is the work of the Steering Committee. It focuses on the final recommendations for the intersection, the reasons they were selected, and information that will help the Town implement them. To complete the study, the L&D Team and the Steering Committee:

- Examined the existing conditions,
- Identified as many alternative ways of addressing the purpose and need as possible,
- Examined and analyzed the alternatives, and
- Selected the most appropriate alternatives for future implementation.

They undertook this process with input from the public during public work sessions at three key points during the work:

- During the review of existing conditions on September 11, 2017,
- During the analysis and selection of a preferred alternative on October 16, 2017, and
- Before finalization of the study report on November 20, 2017.

The main text of this report presents the final recommendations of the study and the information used to reach them. Full size **Figures** are located at the end of the text, starting after Page 12.

The main text of the report is organized after this **Introduction** to present a **Summary** of the relevant sections of the Existing Conditions report for the

Towne Hill Road/Gallison Hill Road/Brazier Road Study Area; it presents enough information to make the recommendations understandable. After **Section II. Summary - Existing Conditions**, the report presents the recommendations in **Section III. Recommendations**. After the recommendations, the report presents explanations on the rationale for the recommendations, the issues and impacts associated with the recommendations, and information on implementation of the recommendations.

Readers that would like to fully understand all of the existing conditions in the Study Areas can skip the **Summary - Existing Conditions** and go directly to **Appendix A**, which includes the complete report about the existing conditions near the Towne Hill Road intersection with Gallison Hill and Brazier Roads that were examined during the first portion of the project. **Appendix B** includes a review of the different alternatives that were generated and analyzed during the course of the study. **Appendix B** also includes the reasons why several of the initial alternatives were not developed for public review. **Appendix C** includes a copy of notes from the three public work sessions conducted during the course of the work.

II. SUMMARY - EXISTING CONDITIONS

A. OVERVIEW

The L&D Team did an extensive analysis of the existing conditions in the Study Area and developed the *Existing Conditions* report to describe what they found. Some existing conditions in the Study Area eventually proved not to be important factors in deciding what the preferred recommendations might be. The following text summarizes those aspects of the *Existing Conditions* report in the Study Area that the Steering Committee found to be important in the development of the recommendations. **Figure 2** in this final report provides graphic representations of the relevant existing conditions in the Study Area.

Appendix A contains a complete version of the Existing Conditions Report. It provides information on the other aspects of the existing conditions not summarized here, including:

- Archeological resources;
- Rare, threatened or endangered species;
- Wildlife corridors;
- Hazardous waste sites;
- Waterbodies;

- Open space;
- Municipal, regional, and state plans;
- Completed, approved, or anticipated development plans for adjacent parcels; and
- Previous local transportation studies.

Readers who would like to more fully understand the existing conditions in the Study Area should read **Appendix A** instead of this Summary to avoid reading information twice.

B. LAND USE



Figure 2 shows the land use near the intersection, which is located in a rural portion of East Montpelier. Most of the land near the intersection is in active agricultural use, or is in some stage of returning to a forested condition (called “wood lot” on **Figure 2**). The northeast corner of

the intersection is occupied by a residence. There is also a residence in the southwest corner of the intersection. Both houses are located away from the roads. There is a residence in the southeast corner set very far back from the road, surrounded by a young second growth wood lot.

C. TRANSPORTATION FACILITIES

1. ROADWAYS



Towne Hill Road, TH #2, is a local Class 2 Town Road. **Table 1** presents details about its layout, management, and use. It serves as a primary commuter link into Montpelier.

The L&D Team conducted a speed study on September 1, 2017.

- The average speed westbound was 42.5 mph and eastbound was 40.1 mph.
- The mean speed westbound was 41.7 mph and eastbound was 40.5 mph
- The 85th percentile speed westbound was 48.9 mph and eastbound was 43.6 mph.

Table 1: Roadway Characteristics

	Towne Hill Rd.	Gallison Hill Rd.	Brazier Rd.	Standard/Recommended	
Pavement Width & Type	22 Feet Asphalt	22 Feet Asphalt	18 Feet Gravel		
Paved Shoulder Width	2 feet	1 Foot	none		
Posted Speed Limit	40 MPH	35 MPH	35 MPH		
Stopping Sight Distance		465 Feet EB	460 Feet EB	445 Feet (40 MPH)	
		1,000 Feet WB	500 Feet WB	500 Feet (45 MPH)	
AADT (September 2016)	2,393 Veh. / Day	1,456 Veh./Day			
AM Peak Hour Traffic	353 Veh/Hour	343 Veh/Hour			
PM Peak Hour Traffic	326 Veh/Hour	197 Veh/Hour			
Max. Hour Traffic	368 Veh/Hour	364 Veh/Hour			
State Crash History	3 reported crashes from 7/1/2010 to date at the intersection plus 1 reported crash on Towne Hill Road just west of the intersection. One crash resulted in injury.				

Gallison Hill Road (TH #5) and Brazier Road (TH #50), are Class 2 and 3 town highways, respectively. **Table 1** presents details on their layout, management, and use.

2. INTERSECTION CHARACTERISTICS

VTrans last conducted turning movement counts at the intersection in August of 2013. It shows that most of the turning movements are to or from Gallison Hill Road. There are very few turns to or from Brazier Road. **Attachment C** in **Appendix A** includes details from the traffic count.



3. BICYCLING & WALKING FACILITIES

There are no facilities dedicated to walkers or bicyclists at or near the intersection.

4. TRANSIT

The Green Mountain Transit (GMT) Montpelier Route 2 commuter uses Towne Hill Road to enter and leave Montpelier, and has an on-call stop at the intersection, but there are no bus stop signs or other facilities to note that the bus stops there.

D. NATURAL RESOURCES

1. WETLANDS

There are no state-identified wetlands near the intersection of Towne Hill Road with Gallison Hill and Brazier Roads. There appears to be a grassed wetland that runs diagonally through the field in the northwest corner of the intersection. **Figure 2** shows the location of the non-state-identified wetland area.

2. TOPOGRAPHY

Figure 2 shows the topography for the Study Area. The land in the Study Area forms somewhat of a large saddle; Gallison Hill and Brazier Roads each descend from higher elevations to the intersection, while Towne Hill Road ascends toward the intersection from the east. Close to the intersection itself, the land on the north side of Town Hill Road is generally level, but several feet lower than the road surface. The land on the south side of Towne Hill Road gradually rises to more than ten feet higher than the road surface on the west side of Gallison Hill Road and rises a bit higher than that on the east side of Garrison Hill Road.

E. UTILITIES

Figure 2 shows the general location of the utilities in the Study Area.

Utility poles are maintained by Green Mountain Power for their overhead electrical wires plus communication cables (Fairpoint and Comcast). Overhead wires run along the south side of Towne Hill Road, the west side of Brazier Road and switch from side to side on Gallison Hill Road in the Study Area.

Culverts run under Towne Hill Road east and west of the intersection and under Gallison Hill Road south of the intersection. A catch basin is located in Brazier Road close the intersection. This catch basin drains under Brazier Road and connects with other catch basins located in the northwest, southwest and southeast corners of the intersection. The resulting drainage discharges to the east on the south side of Towne Hill Rd.

Drainage ditches line both sides of Gallison Hill Road, both sides of Towne Hill Road and the west side of Brazier Road. These convey stormwater runoff to the above catch basins.

F. HISTORIC RESOURCES

The house located in the northeast corner of the intersection, as well as the associated barns, are considered to be a historic resources. **Attachment A** in **Appendix A** includes a complete copy of the Historical Resource Review.

II. RECOMMENDED ALTERNATIVES

A. OVERVIEW

The Steering Committee opted to recommend a series of actions and projects to improve conditions for motorist, bicyclists, and walkers at the intersection of Towne Hill Road with Gallison Hill Road and Brazier Road. They divided the recommendations into four categories, organized around the intent of each recommendation. The four categories of improvements are meant to:

- Increase sight distances on Towne Hill Road to the east of the intersection;
- Lower motor vehicle speeds on Town Hill Road;
- Increase driver awareness of other traffic in and near the intersection; and
- Create better conditions for walkers and bicyclists near the intersection.

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

B. RECOMMENDATIONS

1. INCREASE SIGHT DISTANCE

Increase summer and winter roadside maintenance. Recommendation 1 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. The additional maintenance would reduce the

interference to sight lines that tall vegetation or nearby snow mounds might cause.

2. LOWER TRAVEL SPEEDS

a. Construct a raised table intersection. Recommendation 2a would modify the intersection of Towne Hill Road with Gallison Hill and Brazier Roads to raise the entire center square of the intersection by two and three inches. Ramps would allow access to the table from 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 near the intersection. It would be designed to be approachable with little impact to tires at the design speed.

b. 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.

c. Lower the speed limit on Towne Hill Road to 35 MPH. This recommendation would initiate a speed study to evaluate the ability of the Town to reduce the posted speed limit on Towne Hill Road east and west of the Gallison Hill Road/Brazier Road intersection to 35 mph. If the speed limit is able to be reduced, the work would also 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 recommendation 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 recommendation would increase the amount of policing the Town now contracts from the State Police over the existing 40 hours of monthly patrols. The Town would add the extra hours by either contracting for more hours from the State Police, or requesting patrol hours from the Washington County Sheriff's

Department, either of which would, as possible, be focused specifically on Towne Hill Road near the intersection with Gallison Hill Road.

3. HEIGHTEN DRIVER AWARENESS

a. Add curbs on Gallison Hill. Alternative 4d would create the feeling of a narrower road on Gallison Hill Road by the addition of curbs along the edge of the existing pavement close to the intersection. The curbs would keep motorists from unsafely passing vehicles waiting to turn left or right onto Towne Hill Road. The curbs would be positioned so that a sidewalk could be easily added on the east side of Gallison Hill Road behind the curb in the future.

b. Add a blinking “Be Prepared to Stop” warning sign on Gallison Hill Road. This recommendation would add a warning sign on Gallison Hill Road south of the intersection, which would include a flashing blinker activated during the morning and afternoon peak hours as well as potentially at other times automatically by motorists on the road approaching the intersection. The blinker would be a reminder that the drivers are approaching an intersection.

4. IMPROVE BICYCLING AND WALKING CONDITIONS

a. Add properly signed GMT bus stop. Recommendation 4a would add a bus stop sign at a minimum on both the eastbound and westbound departures from the intersection on Towne Hill Road. The specific locations for the signs would be determined with the assistance of Green Mountain Transit.

b. Add a painted crosswalk with RRFB on Towne Hill Road. This recommendation would add a crosswalk on Towne Hill Road. A crosswalks would also be added on Gallison Hill 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. RATIONAL AND CONSIDERATIONS

The Steering Committee, with input from the public at the work sessions, thought that focusing the attention on slowing the speeds of motorists on Towne Hill Road, especially close to the intersection itself, could yield the most results. Accordingly, they recommended actions and modifications to the existing roadway that focused on speed reduction, especially near the intersection. They also tried to include recommendations that might remind young, inexperienced drivers pay more attention at the intersection.

Table 2 provides more information on the potential impacts that might result from the implementation of each recommendation and obstacle that must be overcome before they could be completed.

IV. IMPLEMENTATION

A. PHASING

There are numerous ways in which the recommendations could be phased. The Steering Committee has made suggestions on how they could be grouped into groups and then implemented in phases. **Table 3** shows the suggested grouping of the recommendations along with the possible phasing. Other groupings and phasing could also be implemented by the Town, if funding or priorities suggest other arrangements.

B. INITIAL ESTIMATE OF PROBABLE CONSTRUCTION COSTS

The L&D Team has prepared initial estimates of probable construction costs for the recommendations. **Table 2** includes the estimates.

While it is most likely that the Town would not implement all of the recommendations at one time, it is still beneficial to know that the overall cost of the recommended one-time construction solutions would be approximately \$130,000. The initial estimates of probable construction cost presented here include design, construction management, materials, and installation, when appropriate, but do not include potential costs in acquiring construction or permanent easements, although none are anticipated at this time.

Table 3: Suggested Grouping and Phasing

PHASE 1				
Recommendation 1: Increased Summer and Winter Maintenance				
GROUP A				
Recommendation 2c: Reduced Speed Limit of 35 mph on Towne Hill Road				
Recommendation 2d: Radar Speed Feedback Signs on Towne Hill Road				
Recommendation 3b: Flashing Warning Sign on Gallison Hill Road				
Recommendation 4a: GMT Bus Stop Signs on Towne Hill Road				
PHASE 2				
Recommendation 2e: Increase Police Patrols near the Intersection				
PHASE 3				
GROUP B				
Recommendation 2a: Raised Table Intersection				
Recommendation 2b: Intersection Neckdowns on Towne Hill Road				
Recommendation 3a: Curbs Close to the Intersection on Gallison Hill Road				
Recommendation 4b: Crosswalk on with RRFB on Towne Hill Road				
Note: Groups are suggested to be installed as one action. Other elements in each phase might not be installed or instigated at the same time				

The costs for the on-going yearly recommendations is included in **Table 2**.

The L&D Team based the initial estimates on the Illustrations and Figures contained in this report and unit costs in the VTrans Estimator database. The numbers should be considered as guides to how much funding might be needed to construct the preferred alignment. They are in 2017 dollars; costs could increase by up to five to ten percent a year. The initial costs estimates are predicated on having the project constructed completely by an independent contractor rather than through a Force Account as part of the Town's funding match.

C. PERMITS, EASEMENTS & APPROVALS

It does not appear that permits from outside state or federal agencies would be needed for any of the preferred recommendations.

D. TIMELINE

The time line for implementation varies for each recommendation. The following text provides a brief review of the potential time it might take to implement each recommendation.

- Recommendation 1: Increased Summer and Winter Maintenance - This recommendation can be implemented at any time by authorization of the Selectboard. Once it is decided whether it will be additional work for the Town highway crew or reallocation of their existing work, the Town should know if additional preparations would be needed, such as hiring new crew members. If the work will be reallocation of existing work, little to no preceding preparation should be needed to begin implementing the additional maintenance work at the intersection.
- Recommendation 2a: Raised Table Intersection - Once funding has been secured, the implementation of this recommendation will require design work before it can be implemented. The design work would typically take about 4 months for all of the reviews and approvals to be completed. It would take approximately another two months to circulate the design, receive construction bids, and accept one. The actual construction of just the raised table could be accomplished in a week's time at the most. If constructed at the same time as the other recommendations in Group B defined in **Table 3**, the construction time might be up to a week longer. It might also be possible to install a rubber "temporary" elevated intersection table during the summer months to test the recommendation before actually doing the construction work.
- Recommendation 2b: Intersection Neckdowns on Towne Hill Road - This recommendation could be implemented very simply by placing some object in the four corners of the intersection, such as a large half barrel filled with sand or dirt to create the neckdowns. This could also be tried as a test to see whether the recommendation actually has the intended consequences. The specific placement location of the test objects would need to be determined with input from a traffic engineer, the Town Road Foreman, and the school or the bus drivers.

If the Town wants to install a more permanent neckdown, it would first need to secure funding for the design and construction work. Once funding has been secured, the implementation of this recommendation would require design work to determine the specific location of the

elements of the neckdown as well as to design whatever modifications to the stormwater system would be needed. The design work would typically take about 6 months for the reviews and approvals to be completed. It would take approximately another two months to circulate the design, receive construction bids, and accept one. The actual construction of the neckdowns would vary from one to four weeks, depending on the amount and type of stormwater improvements that might be needed. If constructed at the same time as the other recommendations in Group B defined in **Table 3**, the construction time might be up to a week longer.

- Recommendation 2c: Reduced Speed Limit of 35 mph on Towne Hill Road
It could take approximately 2 months for the required speed limit engineering study to be completed, once it is started. The specific amount of time it would require might be shorter if the Town hires a consultant to prepare the study. It would take several more months for the Selectboard to consider the change and allow time for public comments before it is made.
- Recommendation 2d: Radar Speed Feedback Signs on Towne Hill Road -
Once funding has been the implementation of Recommendation 2d, the Town can work with VTrans to order the signs. This could take up to a year to be completed. The actual installation of the sign itself could be accomplished in a day if free standing solar powered signs are used. Providing a traditional electric power service could extend the implementation time, if not installed during the time that the Town is waiting for delivery of the sign.
- Recommendation 2e: Increase Police Patrols near the Intersection - The most significant amount of time associated with this proposal would be the discussion that the Selectboard would need to have before allocating the funds for its implementation. The actually beginning of the additional patrols might need to wait until the Town budget including the extra funds is approved at the next Town Meeting.
- Recommendation 3a: Curbs Close to the Intersection on Gallison Hill Road - This recommendation could be implemented very simply on a temporary basis by placing barriers, such as parking bumpers, along the sides of Gallison Hill Road. This would be a test to see whether the curbs actually have the intended consequences.

- If the Town wants to install more permanent curbs, it would first need to secure funding for the design and construction work. Once funding has been secured, the implementation of this recommendation would require design work to determine the specific construction details needed to make the curbs secure and long lasting, in a location that would allow the future construction of an adjacent sidewalk. The design would also need to consider how to address the change in the stormwater runoff the curbs would make. This would include determining the location and type of stormwater facilities needed. If determined to be required or needed at the time of construction, it would also be necessary to include stormwater treatment in the design. The design work would typically take about 6 months for the reviews and approvals to be completed. It would take approximately another two to three months to circulate the design, receive construction bids, and accept one. The actual construction of the curbs would vary from two to six weeks, depending on the amount and type of stormwater improvements that might be needed. If constructed at the same time as the other recommendations in Group B defined in **Table 3**, the construction time might be up to a week longer.
- Recommendation 3b: Flashing Warning Sign on Gallison Hill Road - The installation of flashing warning sign(s) can be accomplished in a day, if free standing solar powered signs are used. Otherwise, providing a traditional electric power service could take a month or two, when including the initial work or requesting the power source and then waiting for it and a meter to be installed. It might also take several months to obtain the sign with the specific coding, programming, and display requirements requested by the Town. At a minimum, it would probably be six months from the start of the implementation to the time when the sign is installed and running.
 - Recommendation 4a: GMT Bus Stop Signs on Towne Hill Road - The installation of the bus stop signs could be accomplished in a day. The time needed to work with GMT to gain their agreement to install the sign and then deciding specifically where it should go could take from one to 6 months (or even more).
 - Recommendation 4b: Crosswalk on with RRFB on Towne Hill Road - After the Town secures funding for the crosswalk and RRFBs, it should work with as traffic engineer to determine the most appropriate location for the crosswalk and electronic signs on the east side of the intersection, as well as the crosswalk and regular crosswalk signs on Gallison Hill Road.

The installation of the crosswalks should be able to be accomplished in a day, but might take longer if special types of paint or markings are used for the crosswalk. They should not be installed until the RRFBs are ready to be installed as well. The time associated with ordering and receiving the RRFBs is approximately one month. The RRFBs should also be able to be installed within two days, after power has been provided if the signs are not solar powered.

E. FUNDING

Funding for the preferred alignment might be able to be secured from a variety of sources. For most of these potential funding sources, the Town should expect to pay approximately 20 percent of the funding in matching support. Below is a list of various funding sources that might be used to help with the implementation of the recommendations, including:

- VTrans Bicycle and Pedestrian Program: These federal funds managed by the State cover specific bicycle and pedestrian improvement projects and are provided via a competitive grant program. In 2015, VTrans had approximately \$4 million available for these grants, with no specific limit as to how much each grant could be. Each grant required a 20 percent match from the municipality.
- Bonds: The Village could opt to use bonds to generate funds to undertake the project.
- Vermont Infrastructure Bank: The State Infrastructure Bank program, operated by the Vermont Economic Development Authority in conjunction with the Vermont Agency of Transportation and the Federal Highway Administration, is available to assist in the construction or reconstruction of highways, roads and bridges, as well as certain facilities related to rail transit.
- Hazardous Mitigation Grants: These funds are available to correct identified potentially hazardous situations. They typically require a cost/benefit analysis to show that the corrective actions would actually provide a meaningful benefit to the community. These grants are typically a maximum of \$150,000.
- VTrans Transportation Alternatives Program (TA Funds): The VTrans TA funds can be used to increase bicycle and pedestrian mobility. These funds will currently cover a maximum of 80 percent of the project with

the remaining portions most likely coming from the project-sponsoring organization. TA funds are distributed in Vermont through a competitive grant program. The maximum size of a grant under this program is currently \$300,000, which would require a minimum \$75,000 match from the Town. VTrans is limiting these funds to stormwater-related projects for the 2017 and 2018 grant rounds.

- VTrans Class 2 Town Highways and Structures Grants - These grants are provided by VTrans through the management districts to assist with the paving of Class 2 town roads.
- Community Development Block Grants: These grants are administered by the Vermont Agency of Commerce and Community Development and are available to municipalities. The Planning Grants Range from \$3,000 to \$40,000. These funds have been used to conduct feasibility studies and marketing plans, and produce architectural and engineering documents.
- VTrans Better Back Roads Grants: These funds are grants to municipalities for planning road and culvert inventories and implementation projects related to water quality erosion issues (\$40,000 max award).
- Revolving Loan Fund - This fund provides loans to municipalities for planning and project implementation for sewage treatment, drinking water, waste management, and stormwater control.

F. MAINTENANCE

Once the recommendations have been implemented, maintenance of the new features by the Town would vary. **Table 2** includes more information on the potential maintenance that would be needed for each recommendation.

TABLE 2: RECOMMENDATION DETAILS

Town of East Montpelier

Intersection Design Feasibility Study

November 13, 2017

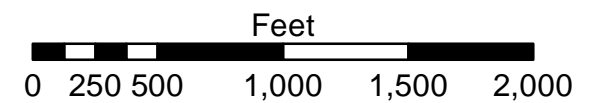
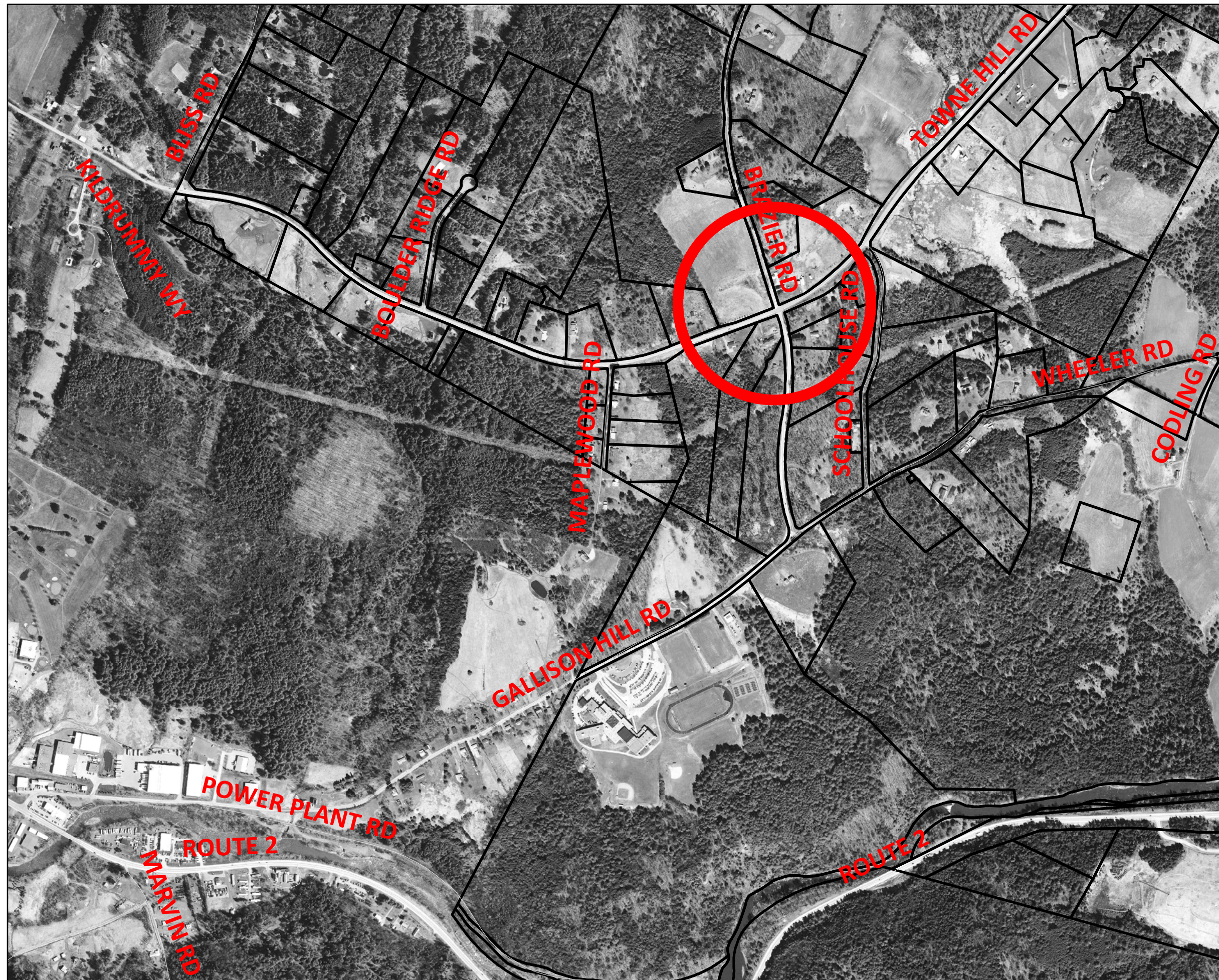
	SIGHT DISTANCE	LOWER TRAVEL SPEEDS					RAISE AWARENESS		IMPROVE BICYCLING AND WALKING	
	1: Increased Summer & Winter Maintenance near Intersection	2a: Raised Table Intersection	2b: Neckdowns at Intersection on Towne Hill Road	2c: Reduced Speed Limit on Towne Hill Road	2d: Radar Speed Feedback Signs on Towne Hill Road	2e: Increased Police Patrols near Intersection	3a: Curbs Close to Intersection on Gallison Hill Road	3b: Flashing Warning Sign on Gallison Hill Road	4a: GMT Bus Stop Signs on Towne Hill Road	4b: Crosswalk with RRFB on Towne Hill Road at Intersection
Project Description										
Additional ROW Needed		No	No	No	No	No	No	No	No	No
Permanant Easements		No	No	No	No	No	No	No	No	No
Construction Easements		Yes	No	No	No	No	Possibly	No	No	No
Number of New Signs		4	2	4 Minimum	0		2	1	2	6 Minimum
Significant Physical Constraints	Side ditches, Space for snow storage	None	Turning radius of buses will need to be accommodated	None	None	Location to pull off police vehicle from road	Side ditches, Space for snow storage	None	None	Side ditches, Storm Drains
Other Constraints	None	None	Turning radius of buses will need to be accommodated	None	None	None	None		None	The VTrans guidelines on pedestrian crossings recommend warrants be met; does not recommend crosswalks without pedestrian facilities on both sides of the crosswalk; and does not encourage the installation of RRFBs at intersections
Environmental/Cultural Constraints										
Tree Disturbance	No	No	Possibly - depending on alignment	No	No	No	Possible	No	No	No
Wetland or Buffer Disturbance	No	No	No	No	No	No	No	No	No	No
Steep Slope Disturbance	No	No	No	No	No	No	Unlikely	No	No	No
Historic Resources Impacts	No	No	No	No	No	No	No	No	No	
Utility Disturbance	No	No	No	No	No	No	No	No	No	No
Storm Sewer Disturbance	No	No	No Change	No	No	No	Unlikely	No	No	No
Stormwater Impacts	No	No	No	No	No	No	Yes, stormwater concentrated in areas with curb, and potential loss of vegetative filtering if culvert is added under sidewalk	No	No	No
Residential Impacts	No	Yes - Increased noise from vehicles entering and exiting raised table	No	No	Yes - Increased light from sign when it illuminates in the dark	No	No	Possible light impacts from blinking like during hours of darkness	No	Yes - Possible night time light impacts if sign activated after dark
Adjacent Roadway Impacts	No	Yes -Possible increase in bypass vehicles on Schoolhouse Road continues	Yes -Possible increase in bypass vehicles on Schoolhouse Road continues	Yes -Possible increase in bypass vehicles on Schoolhouse Road continues	Yes -Possible increase in bypass vehicles on Schoolhouse Road continues	Yes -Possible increase in bypass vehicles on Schoolhouse Road continues	No	No	No	No
Other Impacts			Reduces turning radius for emergency vehicles							
Attributes										
Addresses Purpose and Need	Partially - Helps create better sight distances	Yes - Reduce motorists' speeds and increases motorists' awareness of activity near the intersection	Yes - increases awareness of roadway conditions and contributes to lower motor vehicle speeds at the intersection	Yes - Helps reduce motorists' speeds	Yes - Helps reduce motorists' speeds	Yes - Helps reduce motorists' speeds	Yes - Limits ability of motorists to pass turning vehicles and creates space for walkers	Partially - Helps increase motorists' awareness of intersection	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
Benefits All Users	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
Reduces Crash Potential	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Encourages Higher Speed	Yes	No	No	No	No	No	No	No	No	Yes
Encourages Lower Speed	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Increases Town Maintenance	Yes - Overall roadway maintenance hours would ned to increase, or maintenance would need to be reduces on other Town roads.	Yes - Snow plow operators would need to watch how they plow through the intersection to proect the raised table and ramps from damage from the plows.	Yes - Snow plow operators would need to pull in plows near the intersection to proect the neck downs from damage, if they include curbs. Summer sweeping needed to keep debris from collecting in any corners created by the neck down and any plantings looking good.	No	Yes - Town would need to maintain two more electrical roadway signs.	No	Yes - Snow plow operators would need to modify plows to protect curbs from damage. New stormw water facilities would need to be periodically cleaned.	Yes - Town would need to maintain one more electrical roadway sign.	No	Yes - Town would need to maintain four more electrical roadway signs and periodically repaint the crosswalks.
Annoys Drivers	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No
Order of Magnitude Cost	\$2,000 per year/\$27,200 ^a	\$50,000	\$20,000	\$500	\$10,000	\$6,600 per year/\$90,000 ^{a b}	\$10,000	\$20,000	\$500	\$15,000
Positive Considerations										
Negative Considerations										
Neutral										

^a present worth cost based on 4% annual interest over a 20 year time span.

^b based on 10 hours of additional patrol per month @ \$55 per hour

Intersection Design Feasibility Study

East Montpelier, Vermont

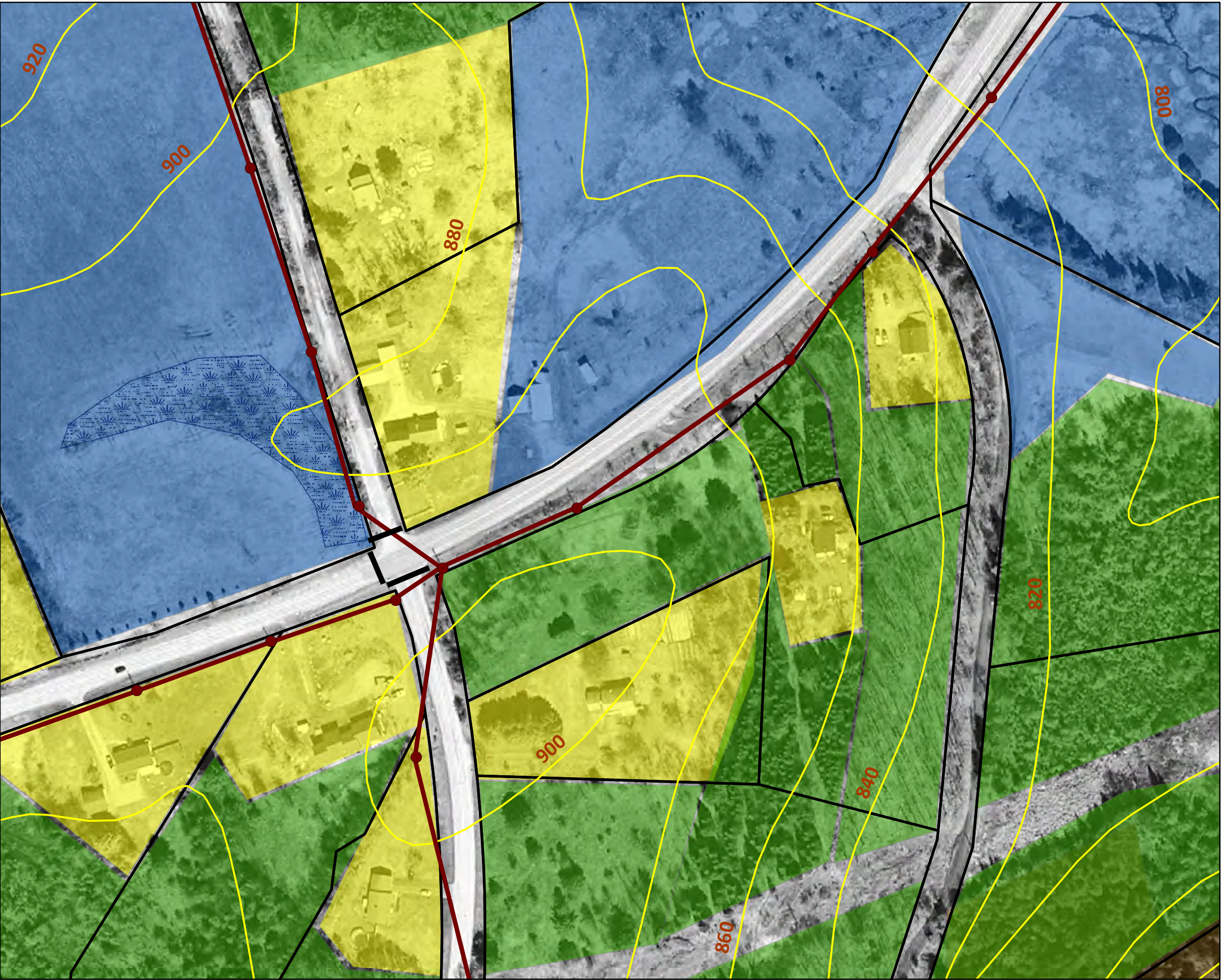


BROADREACH Planning & Design **Study Area**



October 20, 2017

Figure 1



Intersection Design Feasibility Study

East Montpelier, Vermont

Legend

Utility Pole

●

Overhead Utility Line

—

Culvert

—

Twenty Foot Contour

—

Parcel Line

□

Wetland

▨

Wood Lot

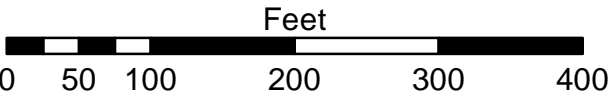
■

Agriculture

■

Residential

■



BROADREACH
Planning & Design



**Existing
Conditions**



**UVM
CAP**

October 20, 2017

Figure 2

Intersection Design Feasibility Study

East Montpelier, Vermont



Legend	
Recommendation 2a	
Recommendation 2b	
Recommendation 2c	
Recommendation 2d	
Recommendation 3a	
Recommendation 3b	
Recommendation 4a	
Recommendation 4b	
Recommendation 4b	
Utility Pole	
Overhead Utility Line	
Parcel Line	
Residential	

Feet
0 20 40 80 120 160

BROADREACH
Planning & Design



**Preferred
Alternatives**

**UVM
CAP**



October 20, 2017

Figure 3

Appendix A

EXISTING CONDITIONS

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

Existing Conditions



Submitted by:

Lamoureux & Dickinson Consulting Engineers

In conjunction with

Broadreach Planning & Design

Heritage Landscapes LLC

University of Vermont Consulting Archaeology Program

November 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.

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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. **Figure A1**, located at the end of the text, shows the location of the Study Area. The project is being funded and supported by the Central Vermont Regional Planning Commission. This project is being done in conjunction with another intersection study in the Town of Orange, Vermont.

To begin the project, the Central Vermont Regional Planning Commission (CVRPC) and the Towns of East Montpelier and Orange jointly issued a request for proposals for a consultant to assist them with the completion of the two intersection design feasibility studies. As a result of that process, CVRPC contracted with Lamoureux & Dickinson, assisted by Broadreach Planning & Design, Heritage Landscapes, and the University of Vermont Consulting Archaeology Program (the L&D Team), to help with the project. The Town of East Montpelier (the Town) organized a Steering Committee consisting of municipal staff members, local residents, and property owners. This summary report of existing conditions in the Study Area is 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 include:

- The high volume of motor vehicles passing through the intersection in the morning peak travel hour.
- The minimal width of the shoulders on each of the approaches to the intersection.
- The presence of a regional middle and high school about 3,250 feet along Gallison Hill Road from the intersection.

- The high percentage of young and inexperienced drivers that pass through the intersection on their way to or from the high school.
- The number of crashes and near misses reported by local residents and Town staff that have occurred at the intersection.
- Pedestrians coming from the neighborhood and runners from the high school crossing Towne Hill Road at the intersection.
- The restrictions to sight lines caused by the hills on Town Hill and Gallison Hill Roads as well as by the numerous busses that go through the intersection.

3. ORIGINS, DESTINATIONS & TRAVEL PATTERNS

Towne Hill Road carried many commuting motorists heading west to Montpelier in the morning and to the east as they head home in the evening. The morning commuter traffic is more concentrated than the afternoon traffic. Gallison Hill Road provides a direct route to U32. The middle and high school is located about 3,250 feet south of the intersection on Gallison Hill Road. The traffic heading to the school is also more concentrated in the morning than the traffic leaving the school in the evening. School bound traffic includes school buses, teachers and staff, and students that are able to drive to school. Some of the school bound traffic, especially student drivers, cross Towne Hill Road as it exits or enters Brazier Road from Gallison Hill Road.

A GMT commuter bus heading into or from Montpelier also travels Towne Hill Road and makes stops at the intersection with Gallison Hill and Brazier Roads.

Pedestrians from the neighborhood and bicyclists cross Towne Hill Road at the intersection between Brazier and Gallison Hill Roads. During the half hour that the L&D Team was gathering information at the intersection after the survey work was completed, three bicyclists passed through the intersection. The high school cross country team also runs north on Gallison Hill Road, crosses Towne Hill Road, and continues north on Brazier Road. They cross Towne Hill Road again on their return run.

B. LAND USE

Figure A2 shows the land use near the intersection, which is located in a rural portion of East Montpelier. Most of the land near the intersection is in active agricultural use, or is in a some state of returning to a forested condition (called “wood lot” on **Figure A2**).

The northeast corner of the intersection is occupied by a residence with an associated horse farm. There is also a residence in the southwest corner of the intersection. Both houses are located far back from the roads. The northwest corner of the intersection is

an open hay field, while the southeast corner is a second young second growth wood lot surrounding a private home set very far back from the road.

Further west on the south side of Towne Hill Road is another residence that also houses a day care. Further north on the east side of Brazier Road is a second residence.

C. TRANSPORTATION FACILITIES

1. TOWNE HILL ROAD

Towne Hill Road, Town Highway 2, is a local Class 2 Town Road. **Table 1** presents details about its layout, management, and use. It serves as a link between Montpelier and US Route 2. The Central Vermont Regional Transportation Plan classifies Towne Hill Road as a minor arterial west of the intersection and a major collector east of the intersection.

The L&D Team conducted a speed study on September 1, 2017. **Table 2** presents the results of the study.

Table 1: Roadway Characteristics

	Towne Hill Rd.	Gallison Hill Rd.	Brazier Rd.	Standard/Recommended
Pavement Width & Type	22 Feet Asphalt	22 Feet Asphalt	18 Feet Gravel	
Paved Shoulder Width	2 feet	1 Foot	none	
Posted Speed Limit	40 MPH	35 MPH	35 MPH	
Stopping Sight Distance		465 Feet EB 1,000 Feet WB	460 Feet EB 500 Feet WB	445 Feet (40 MPH) 500 Feet (45 MPH)
AADT (September 2016)	2,393 Veh. / Day	1,456 Veh./Day		
AM Peak Hour Traffic	353 Veh/Hour	343 Veh/Hour		
PM Peak Hour Traffic	326 Veh/Hour	197 Veh/Hour		
Max. Hour Traffic	368 Veh/Hour	364 Veh/Hour		
State Crash History	3 reported crashes from 7/1/2010 to date at the intersection plus 1 reported crash on Towne Hill Road just west of the intersection. One crash resulted in injury.			

2. GALLISON HILL ROAD

Gallison Hill Road, Town Highway 5, is a local Class 2 Road. **Table 1** presents details on its layout, management, and use. The Central Vermont Regional Transportation Plan identifies Gallison Hill Road as a major collector. It serves as the primary route to U-32 from the north.

Table 2: Towne Hill Road Speed Study

	Westbound		Eastbound	
Vehicle	Time (sec)	Speed (mph)	Time (sec)	Speed (mph)
1	1.88	33.3	1.50	41.7
2	1.91	32.8	1.66	37.7
3	1.97	31.8	1.69	37.0
4	1.91	32.8	1.59	39.4
5	1.50	41.7	1.44	43.5
6	1.22	51.3	1.37	45.7
7	1.38	45.4	1.47	42.6
8	1.34	46.7	1.41	44.4
9	1.22	51.3	1.62	38.6
10	1.50	41.7	1.44	43.5
11	1.31	47.8	1.65	37.9
12	1.44	43.5	1.50	41.7
13	1.28	48.9	1.53	40.9
14	1.50	41.7	1.66	37.7
15	1.53	40.9	1.81	34.6
16	1.57	39.9	1.35	46.4
17	1.37	45.7	2.00	31.3
18	1.37	45.7	1.53	40.9
19	1.25	48.9	1.69	37.0
20	1.53	40.9	1.56	40.1
21	1.59	39.4		
Average Speed		42.5		40.1
Mean Speed		41.7		40.5
85th Percentile Speed		48.9		43.6
Length of Measurement Location = 92 FT				

3. BRAZIER ROAD

Town Road 50, Brazier Road, is a local Class 3 Town Highway. **Table 1** presents information on its characteristics.

4. INTERSECTION CHARACTERISTICS

Turning movement counts were last taken at the intersection in August of 2013. It shows that most of the turning movements are to or from Gallison Hill Road. There are very few turns to or from Brazier Road. **Attachment C** includes details from the traffic count.

5. BICYCLING & WALKING FACILITIES

There are no facilities dedicated to walkers or bicyclist at or near the intersection. There are only minimal shoulders along any of the roads approaching the intersection that might be used by bicyclists or walks. There are no Town trails near the intersection, although there is planned trail that will pass near the intersection on Schoolhouse Road. That trail will cross Towne Hill Road east of the Gallison/Brazier Roads intersection close to the bottom of the hill. A planned bridge across the Winooski River will open the planned trail and other trails north of Towne Hill Road to a larger group of walkers.

6. TRANSIT

The GMT Montpelier Route 2 Commuter Bus uses Towne Hill Road to enter and leave Montpelier, and has an on-call stop at the intersection, but there are no bus stop signs or other facilities to note that the bus stops there.

D. NATURAL RESOURCES

1. WETLANDS

There are no state-identified wetlands near the intersection of Towne Hill Road with Gallison Hill and Brazier Roads. There appears to be a grassed wetland that runs diagonally through the field in the northwest corner of the intersection. **Figure A2** shows the location of the non-state-identified wetland area.

2. WATERBODIES

There are no waterbodies within the Study Area.

3. WATERCOURSES

There are no watercourses within the Study Area.

4. FLOODPLAINS

There are no mapped flood plains within the Study Area.

5. TOPOGRAPHY

Figure A2 shows the topography for the Study Area. The land in the Study Area forms somewhat of a large saddle; Gallison Hill and Brazier road each descend from higher elevations to the intersection, while Towne Hill Road ascend toward the intersection at

least from the east. Close to the intersection itself, the land on the north side of Towne Hill Road is generally level, but approximately five feet lower than the road surface. The land on the south side of Towne Hill Road gradually rises to more than ten feet higher than the road surface on the west side of Gallison Hill Road and rises a bit higher than that on the east side of Garrison Hill Road.

6. FLORA & FAUNA

The State of Vermont has not identified natural areas of special importance or rare, threatened or endangered species within the Study Area, other than the Northern Long-Eared Bat (*Myotis septentrionalis*), which is listed statewide as a federally threatened and State of Vermont endangered species.

In addition to the trees in the southeast corner of the intersection, natural vegetation within the Study Area lines the west side of Brazier Road and on the crest of the cut slope north of Towne Hill Road east of Brazier Road. There is a planted row of spruce trees on the north side of Towne Hill Road west of Brazier Road starting approximately 200 feet west of the intersection. Other smaller clumps of natural or planted trees and shrubs are also located around the intersection. **Figure A-2** shows the location of most of this vegetation.

There is a state-identified deer wintering area approximately 1,000 feet to the southeast of the intersection. Local residents note that deer are more prevalent closer to the intersection now that more trees are there, and that deer tend to cross Towne Hill Road near the Schoolhouse intersection.

E. UTILITIES

Figure A-4 shows the general location of the utilities in the Study Area.

Utility poles are owned by Green Mountain Power. The utility poles run along the south side of Towne Hill Road, the west side of Brazier Road and switch from side to side on Gallison Hill Road in the Study Area. There are no street lights on the utility poles and no free standing lights near the intersection.

Culverts run under Towne Hill Road just west of the intersection and under Gallison Hill Road at the intersection. A catch basin is located on the north side of Brazier Road close the intersection. It drains under Brazier Road via an eighteen inch corrugated metal pipe. There are also catch basins in the southwest and southeast corners of the intersection.

Drainage ditches line both sides of Gallison Hill Road, both sides of Towne Hill Road and the west side of Brazier Road.

F. OTHER STRUCTURES AND CONDITIONS

There are no guardrails along any portions of the roads in the Study Area. There are also numerous signs, both private and public, located within the right-of-way. **Figure A3** also shows the location of these signs.

Mailboxes are located adjacent to the driveways along the south Side of Towne Hill Road

There are no recorded hazardous waste sites within the Study Area.

G. CULTURAL RESOURCES

1. HISTORIC RESOURCES

The Historic Resources Review identified two houses and two barns/sheds in the northeast corner of the intersection as historic resources, but noted that they were not listed on any historic registers. The report also noted that each of the historic resources was located far enough from the intersection that potential improvements should not negatively impact them. **Attachment A-1** includes a full copy of the Historic Resources Review.

2. ARCHEOLOGICAL RESOURCES

The Archeological Resources Assessment found the probability of impacting archeological resources was very low and that no further reviews would be necessary. **Attachment A-2** includes a full copy of the Archeological Resources Assessment.

3. OPEN SPACE AND PUBLIC LANDS

There are no public open spaces or protected land within the Study Area.

H. PLANNING DOCUMENTS

1. MUNICIPAL PLANS

The 2013 East Montpelier Town Plan contains several facts, goals, and actions that are relevant to this study, including:

- Road paving projects undertaken within the town should provide pavement markings or bike lanes for safe sharing of roads by bicycles and automobiles.
- Towne Hill Road is a heavily used cross-over between Montpelier and Route 2 near East Montpelier Village. The intersection at Route 2 is heavily used. The road serves as a collector for the residential area and as a major access route to U-32 High School. There has also been increasing residential development along Towne Hill Road and connecting residential roads feeding into it.
- Gallison Hill Road runs from Towne Hill Road to the Montpelier city line at U-32 High School. The road carries considerable traffic to Montpelier, Route 2 and the Barre-Montpelier Road but serves primarily as access to the high school. The intersection with Towne Hill Road is heavily used. There are several residential properties along Gallison Hill Road
- Enhance opportunities for public transportation.
- Take advantage of a major community and regional focal point [at U-32] by planning for a potential growth area [along Gallison Hill Road] in a manner that is consistent with existing uses and compatible with surrounding residential neighborhoods.

2. REGIONAL TRANSPORTATION PLAN

The Central Vermont Regional Transportation Plan includes a goal and related policies that are relevant to this study.

Goal 6 in the plan is “To make necessary improvements to achieve a transportation system appropriately structured and designed to safely, effectively, and economically move goods and people.

Two of the policies under this goal read:

- Encourage the appropriate scale and design of streets, highways, and other transportation infrastructure to serve local traffic, destination traffic, and promote traffic safety region-wide.
- Promote safety-targeted measures at high or potential accident locations, and promote traffic safety region-wide.

3. OTHER PLANS

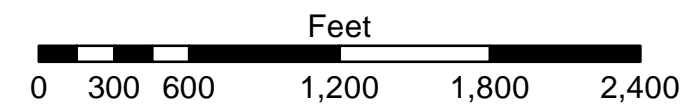
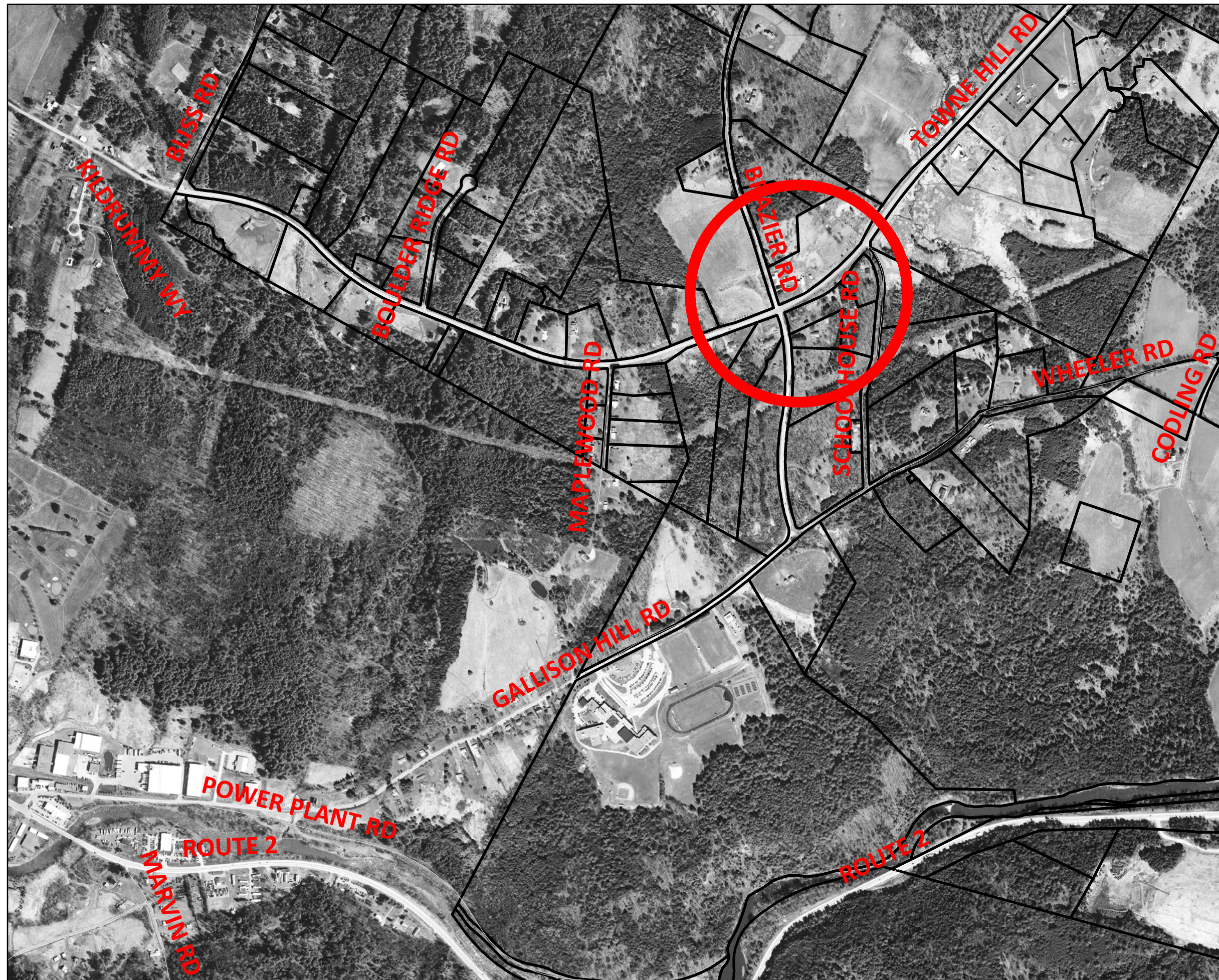
There are no other known local, regional, or state plans that would be relevant to this intersection.

I. DEVELOPMENT

There are currently no approved or proposed development plans or existing permits for development in or close to the Study Area.

Intersection Design Feasibility Study

East Montpelier, Vermont



BROADREACH
Planning & Design

Study Area



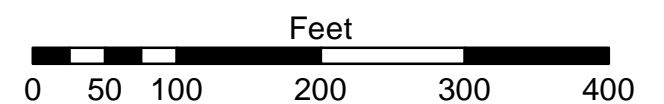
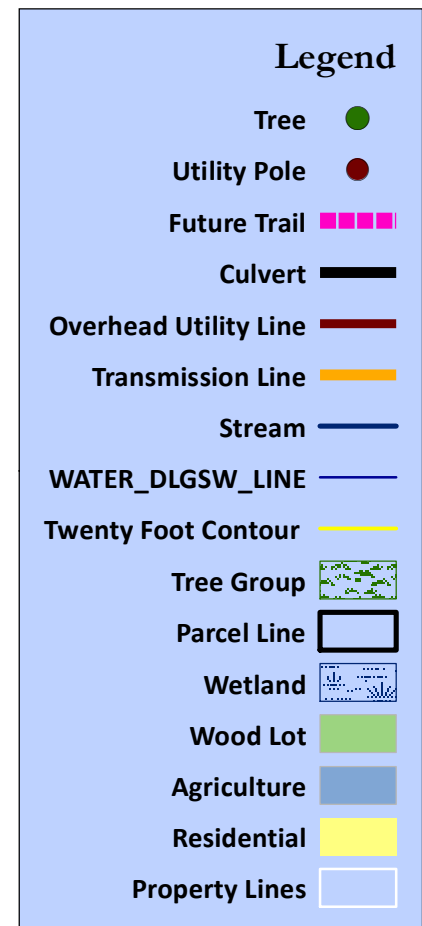
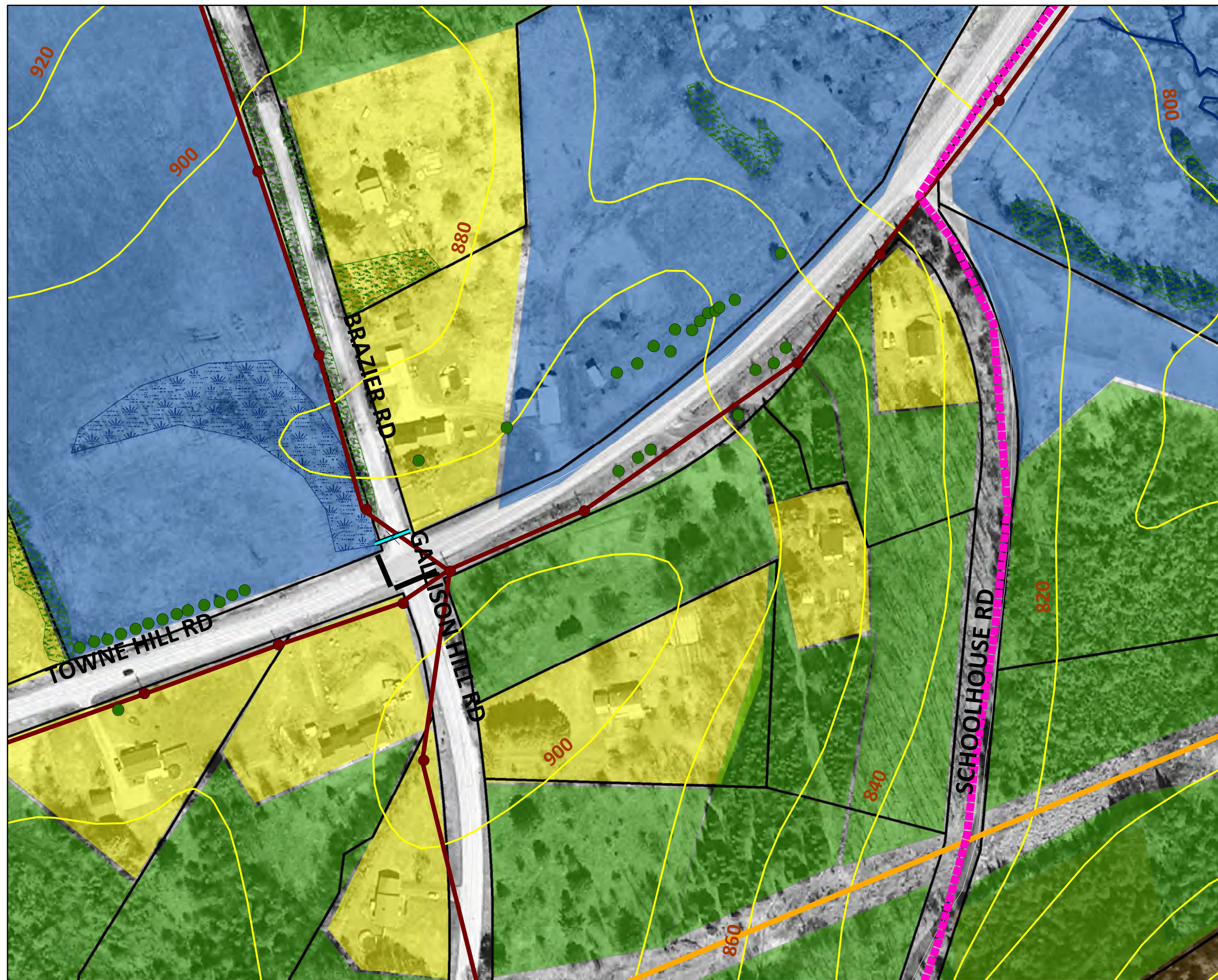
UVM
CAP

August 31, 2017

Figure A1

Intersection Design Feasibility Study

East Montpelier, Vermont



BROADREACH
Planning & Design



**Existing
Conditions**



**UVM
CAP**

September 6, 2017

Figure A2

Attachment A-1
HISTORIC RESOURCES REVIEW
Heritage Landscapes LLC



Historic Aboveground Resources Assessment

East Montpelier Intersection Upgrade

East Montpelier, VT

October 19, 2017

Submitted to:

Jim Donovan, FASLA, AICP
Broadreach Planning & Design
Charlotte, VT 05445

Prepared by:

Rebecca Reese, MHP, Project Leader
Patricia M. O'Donnell, FASLA, AICP Principal
Heritage Landscapes, LLC

INTRODUCTION

The goal of this review is to identify existing historic resources in the project area that are listed on or eligible for the Nation Register of Historic Places and could potentially be affected by the upgrade and widening of the Towne Hill Road and Brazier Road/Gallison Hill Road intersection in East Montpelier and to address the potential effects from the proposed additions. Review of the possible historic resources and effects complies with Section 106 of the National Historic Preservation Act of 1966 and Section 4(f) of the US Department of Transportation Act of 1966. This effort is a reconnaissance-level survey of historic aboveground resources, rather than a detailed inventory of National Register eligible properties. In order to determine National Register eligibility, further study would be required.

The work by team leader, Broadreach Planning & Design, indicates several alternatives for the intersection upgrade along Towne Hill Road, Brazier Road and Gallison Hill Road. Few potentially historic resources lie adjacent to the right-of-ways causing no impact to historic or potentially historic resources in the project area. A further assessment will be required if the proposed transportation improvements layout and details should change.

Baseline research provided information about historic resources within the project area. Research through the Vermont Agency of Commerce and Community Development Online Research Center considered national, state and local documentation. The following details all documentary sources studied to gain an understanding of the area within the project boundaries:

Heritage Landscapes LLC

Preservation Planners & Landscape Architects

501 Lake Road Charlotte, VT 05445 802.425.4330 34 Wall Street Norwalk, CT 06850 203.852.9966

- *F.W. Beers Atlas of Washington County, Vermont, (1873).*

SUMMARY OF FINDINGS

The Towne Hill Road and Brazier Road/Gallison Hill Road intersection upgrade proposes the widening of the intersection for safety purposes. The project, as-anticipated with various alternatives considered, will not negatively affect or impact the few potentially historic resources identified within the project study area. As noted previously, historic maps served as important research resources. State surveys were consulted but no resources were listed within the project area.

Information is organized by address, with current addresses used. No properties within the project area are known to be listed on the state survey or national register. If the listing is not indicated, the property may or may not be registered. The two properties included are potentially eligible for listing on the state or national register. The record is not exhaustive and further research would be required to ensure all resources and properties were included. All properties that are 50 years or older are eligible for NRHP listing if the resources are of historic value.

- **100 Brazier Road:** Two-story eaves-front dwelling faces west toward Brazier Road. A metal roof caps the three-bay building, with posted-hood covering the front door and stoop. The large set-back of the dwelling protects the potential resource from any adverse or negative effects from the intersection project.
- **2021 Towne Hill Road:** The two-story gable-front dwelling faces west toward Brazier Road. A shed dormer rises from the one-story ell at the rear of the house. Shown on Beer's Atlas, T. Chase once resided at this property. A one-and-a-half story barn stands to the north of the home. The set-back of the dwelling from Brazier Road and Towne Hill Road provide enough space for a redesign of the intersection have no negative effects on the potential resource. A set-back removes the barn from Braizer Road also allowing for the intersection redesign.
 - **Dunroven Stables:** The one-story gable front barn fronts Towne Hill Road. The ample set-back offers space for the intersection redesign without impacting the barn. Much of the historic character of the barn has been lost.

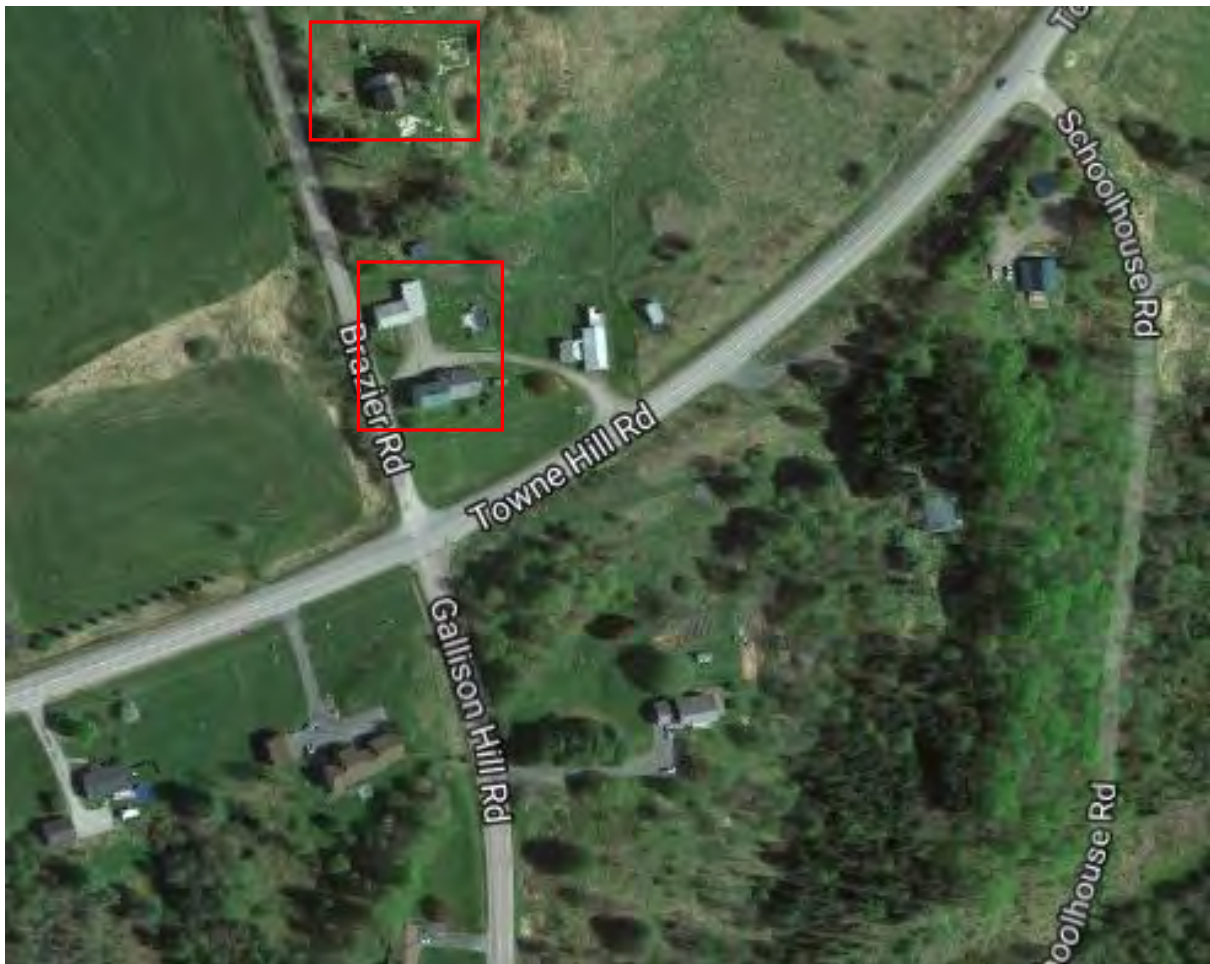


Figure 1.1 This contemporary aerial image shows the intersection at Towne Hill Road and Brazier Road/Gallison Hill Road. The red boxes indicate where potentially historic resources are located. Google Maps. (EastMontpelier_Google Map_HL_18Oct2017)

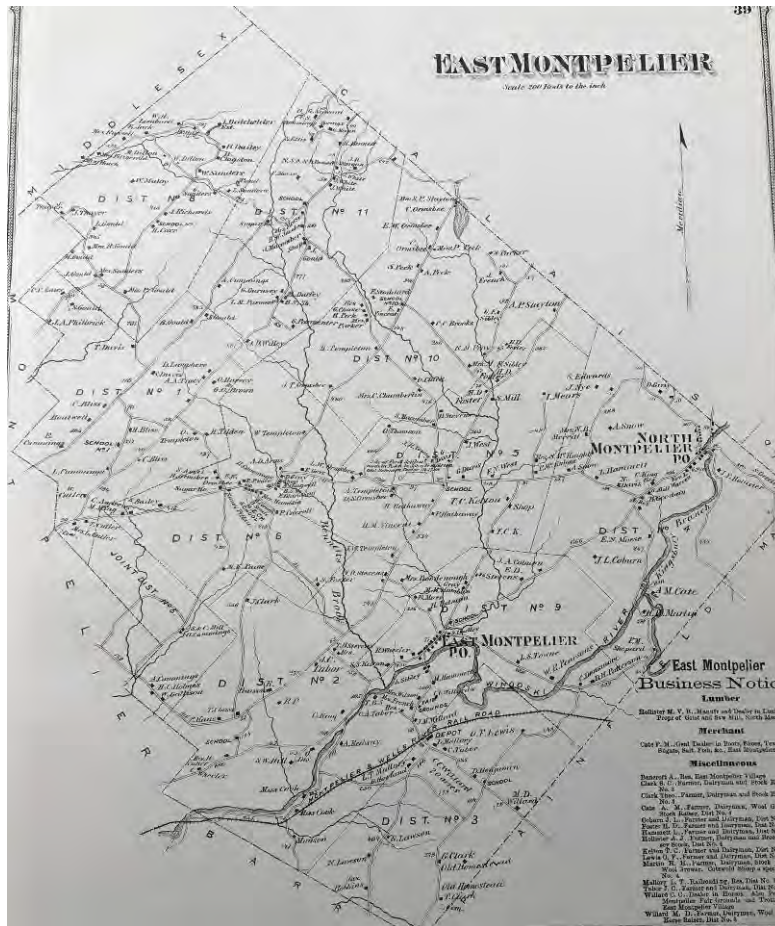


Figure 1.2 This image displays the town of East Montpelier on the 1873 Beer's Atlas. Courtesy University of Vermont Special Collections. (EastMontpelier_Beers Atlas_HL_3Sept2017)



Figure 1.3 The detail of the 1873 Beer's Atlas of East Montpelier shows the intersection and the location of the T. Chase dwelling, today 2021 Towne Hill Road – boxed in red. Courtesy University of Vermont Special Collections. (EastMontpelier_Beers Atlas Detail_HL_3Sept2017)



Figure 1.4 The ample set-back of 100 Brazier Road allows intersection upgrades to occur without negatively impacting the potentially historic resource. (EastMontpelier_100BrazierRd_HL_1Sept2017)



Figure 1.5 2021 Towne Hill Road stands at the northeast corner of the project intersection. The above image illustrates the generous set-back from both Brazier Road to the west (image left) and Towne Hill Road to the south (foreground). (EastMontpelier_2021 Towne Hill_HL_1Sept2017)



Figure 1.6 The barn north of 2021 Towne Hill Road stands closer to Brazier Road, although the set-back provides space for intersection improvements. The project intersection lies in the background of the image. (EastMontpelier_Barn2021Towne Hill_HL_1Sept2017)



Figure 1.7 Dunroven Stables lies east of 2021 Towne Hill Road. Intersection improvements will not affect the structure due to the significant set-back. The structure has also lost much of the historic character. (EastMontpelier_Dunroven_HL_1Sept2017)

Attachment A-2
ARCHEOLOGICAL RESOURCES ANALYSIS
Consulting Archaeological Program
University of Vermont

**Archaeological Resources Assessment for the proposed East Montpelier Intersection
Upgrade, East Montpelier, Washington County, Vermont**

Submitted to:

**Roger Dickinson, PE, PTOE
Lamoureux & Dickinson Consulting Engineers, Inc.
14 Morse Drive
Essex, VT 05452**

Submitted by:

**Charles Knight, Ph.D.
University of Vermont
Consulting Archaeology Program
111 Delehanty Hall
180 Colchester Ave.
Burlington, VT 05405**

Report No. 1089

September 11, 2017

Archaeological Resources Assessment for the proposed East Montpelier Intersection Upgrade, East Montpelier, Washington County, Vermont

Project Description

The Central Vermont Regional Planning Commission (CVRPC), with assistance from Lamoureux & Dickinson Consulting Engineers, Inc. proposes the East Montpelier Intersection Upgrade Project, East Montpelier, Washington County, Vermont (Figure 1). The proposed upgrade will occur at the intersection of Towne Hill Road and Gillison Hill Road in East Montpelier, Vermont. Potential upgrades to the intersection may include, but are not limited to, the addition of turn lane(s), improved signage, realignment and/or the installation of a traffic signal or roundabout.

The University of Vermont Consulting Archaeology Program conducted an Archaeological Resources Assessment (ARA) as part of the Section 106 permitting process and no areas of archaeological sensitivity were identified.

Study Goal

The goal of an ARA (or “review”) is to identify portions of a specific project’s Area of Potential Effects (APE) that have the potential for containing pre-Contact and/or historic sites. An ARA is to be accomplished through a “background search” and a “field inspection” of the project area. For this study, reference materials were reviewed following established guidelines. Resources examined included the National Register of Historic Places (NRHP) files; the Historic Sites and Structures Survey; and the USGS master archaeological maps that accompany the Vermont Archaeological Inventory (VAI). Relevant town histories and nineteenth-century maps also were consulted. Based on the background research, general contexts were derived for pre-Contact and historic resources in the study area.

Archaeological Site Potential

No known archaeological sites exist within the limits of the proposed intersection upgrade area. The closest known site, VT-WA-125, is the historic period foundation remains of the Packard Industrial Park, located 2 km m to the southeast. Beyond this, no known sites exist within the general area. On the historic period 1858 Wallings map a structure belonging to R. Wheeler exists in the northeast corner of the intersection (Figure 3). This same structure appears on the 1878 Beers map as belonging to T. Chase (Figure 4). This structure still actively inhabited today and therefore, no buried historic period sites in this location are expected. The portion of Gallison Hill Road to the south of this intersection did not exist as recently as 1922, as indicated on the historic maps, and so no historic period sites are expected there.

Desk Review

As part of the desk review, the UVM CAP utilized the Vermont Division of Historic Preservation’s (VDHP) predictive model for identifying pre-Contact Native American

archaeological sites. The East Montpelier Intersection Upgrade Project area scores 8 on the Predictive Model, due to its location within 90 m of a head-of-draw (8). In addition to the paper-based predictive model, the desk review uses a Geographical Information System (GIS) developed jointly by the UVM CAP, and its consultant Earth Analytic, Inc., which operationalizes the paper-based model. It does this by applying the VDHP's sensitivity criteria to all lands within the State of Vermont. In these maps, archaeological sensitivity is depicted by the presence of one or more overlapping factors, or types of archaeological sensitivity (i.e. proximity to water, etc.). The East Montpelier Intersection Upgrade Project is located in an area that contains three sensitivity factors, which are: Wetland and Level Terrain (see Figure 1).

Field Inspection

A field inspection of the project area was carried out on September 7, 2017 by Charles Knight, Assistant Director of the UVM CAP. Both Towne Hill Road and Gallison Hill Road at the point of intersection are built upon significant road prisms (Figure 5). Gallison Hill Road in the south, also contains a sizeable ditch on either side, since it slopes down to the intersection (Figure 6). No portion of the intersection was archaeologically sensitive, or was immediately adjacent to any landform that was archaeologically sensitive (Figure 7). The southeast corner appears to have been cut out of a small knoll, and thus the southwest corner is on the lower reaches of that knoll, and thus built on fill. The northeast corner contains the historic period farmstead and the northwest corner is open field. No areas of archaeological sensitivity were identified.

Conclusions

The Central Vermont Regional Planning Commission (CVRPC) proposes the East Montpelier Intersection Upgrade Project, East Montpelier, Washington County, Vermont. The UVM CAP conducted an Archaeological Resources Assessment of the proposed project intersection and no areas of archaeological sensitivity were identified. A historic farmhouse is inhabited in the northeast corner of the intersection, dating back to at least 1858. Beyond this the roads at the intersection are built upon large road prisms, and Gillison Hill Road slopes down into the intersection. The proposed project will not impact the historic farmstead or any sensitive landforms. As a result, no additional archaeological work is recommended for all other project elements.

Thank you for working with us on this project. Please let me know if you have any questions or comments.

Charles Knight, Ph.D.
Assistant Director

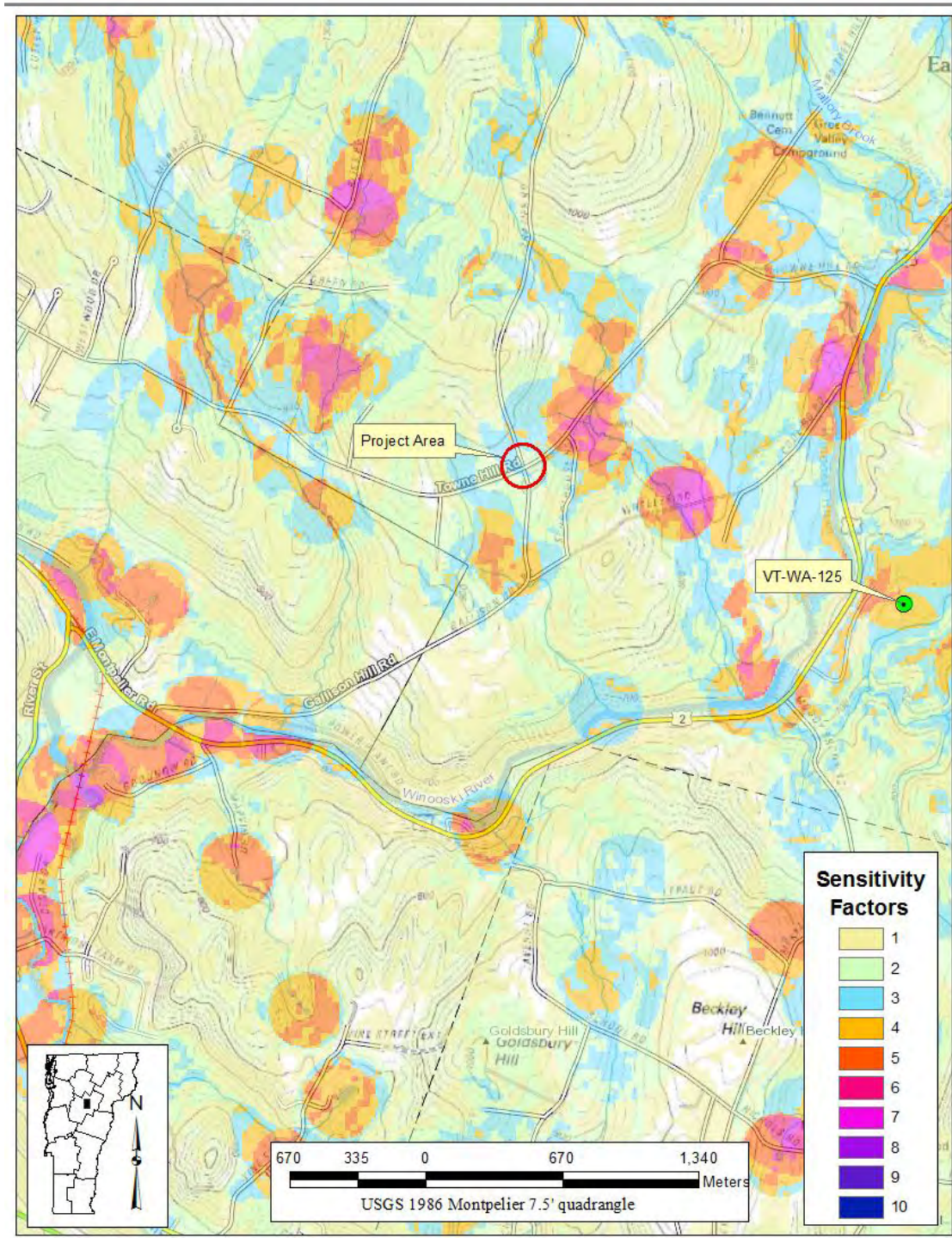


Figure 1. Project map showing the location of the proposed East Montpelier Intersection Upgrade Project, East Montpelier, Washington County, Vermont.

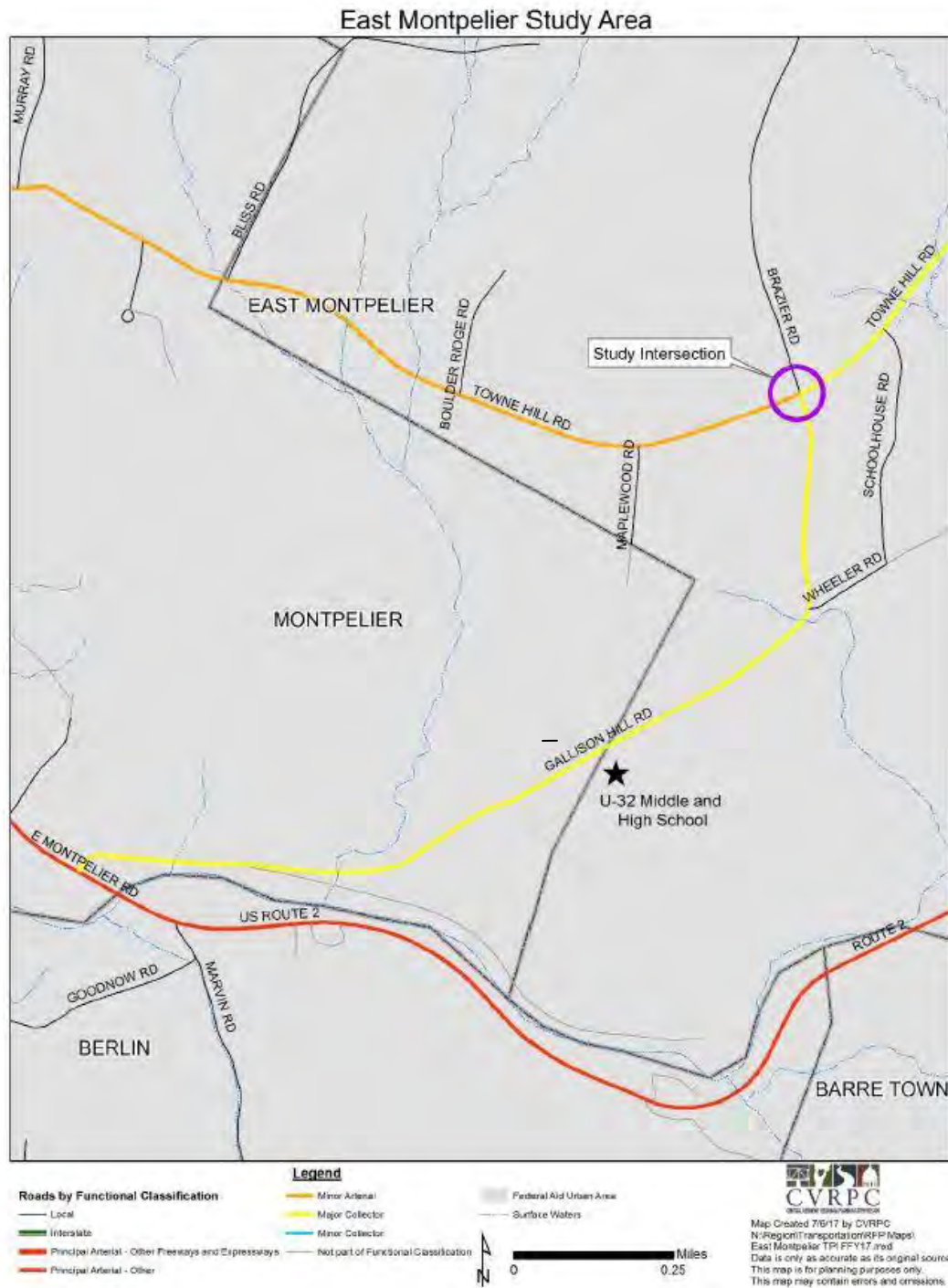


Figure 2. Map showing the locations of the sign pots locations for the proposed East Montpelier Intersection Upgrade Project, East Montpelier, Washington County, Vermont.



Figure 3. Historic 1858 Wallings map showing the boat access locations for the proposed East Montpelier Intersection Upgrade Project, East Montpelier, Washington County, Vermont.

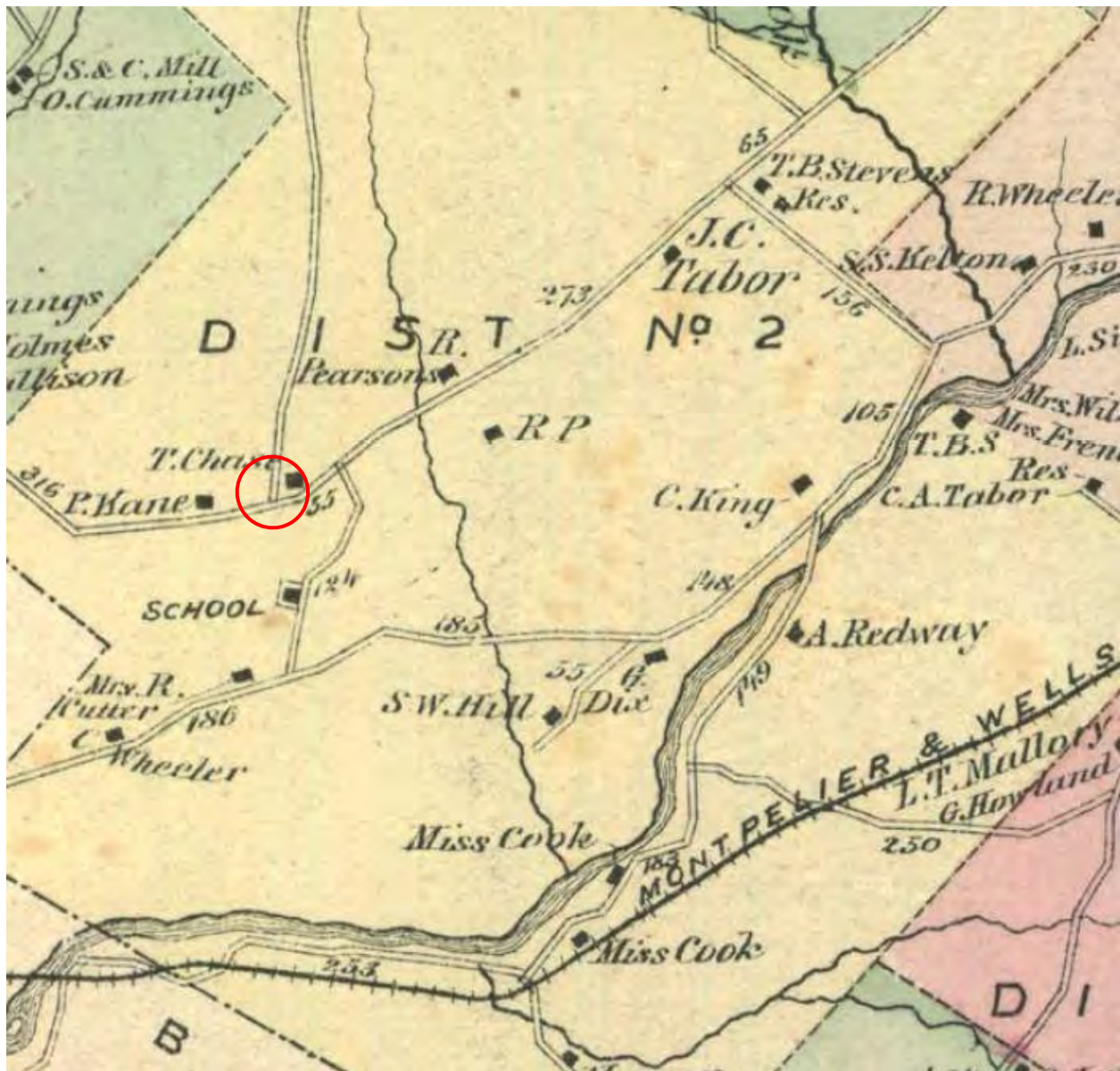


Figure 4. Historic 1873 Beer's atlas showing the boat access locations for the proposed East Montpelier Intersection Upgrade Project, East Montpelier, Washington County, Vermont.



a



b

Figure 5. Photos looking southeast (a) and northwest (b) at the northern end of the existing intersection at the location of the East Montpelier Intersection Upgrade Project, East Montpelier, Washington County, Vermont.



a



b

Figure 6. Photos looking southeast (a) and north (b) at the existing intersection of the East Montpelier Intersection Upgrade Project, East Montpelier, Washington County, Vermont.



Figure 7. Photos looking south along Brazier Road towards the existing intersection of the proposed East Montpelier Intersection Upgrade Project, East Montpelier, Washington County, Vermont.

Attachment A-3
INTERSECTION TURNING MOVEMENT COUNTS
VTrans

Peak Hour Data for Intersection

Int ID:	31207110	Corridor:	NA
Community:	EAST MONTEPELIER	Road 3:	GALLISON HILL RD
Road 1:	BRAZIER RD	Road 4:	TOWNE HILL RD
Road 2:	TOWNE HILL RD		

|<<

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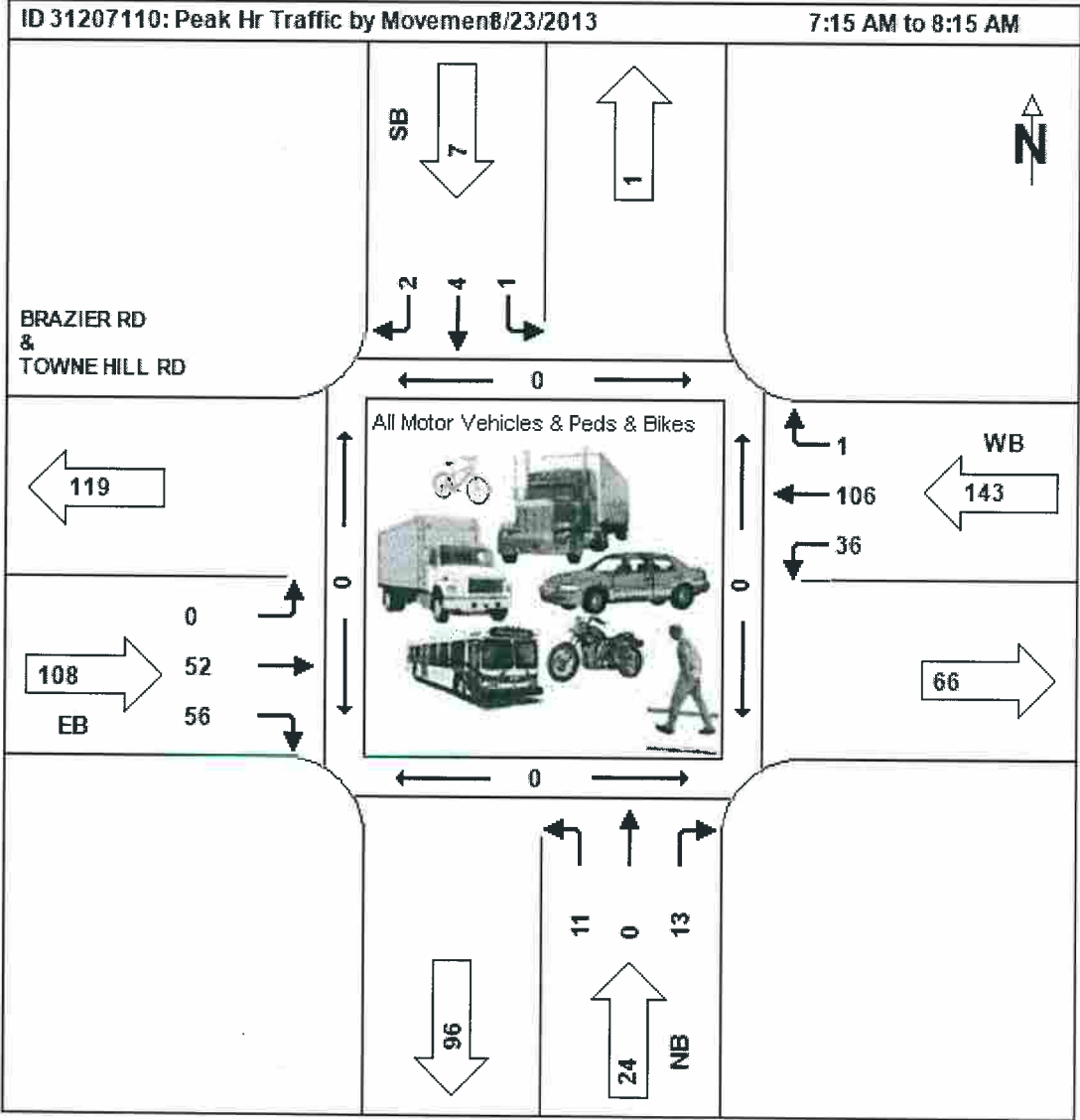
>>|

1-3 of 3

AM Peak Hour
08/23/2013

NB						EB						SB						WB					
Start	App					Start	App					Start	App					Start	App				
Time	Left	Thru	Right	Ped	Total	Time	Left	Thru	Right	Ped	Total	Time	Left	Thru	Right	Ped	Total	Time	Left	Thru	Right	Ped	Total
7:15 AM	2	0	3	0	5	7:15 AM	0	11	16	0	27	7:15 AM	1	1	1	0	3	7:15 AM	6	28	0	0	34
7:30 AM	3	0	7	0	10	7:30 AM	0	14	19	0	33	7:30 AM	0	1	1	0	2	7:30 AM	13	23	0	0	36
7:45 AM	3	0	0	0	3	7:45 AM	0	14	13	0	27	7:45 AM	0	1	0	0	1	7:45 AM	11	31	0	0	42
8:00 AM	3	0	3	0	6	8:00 AM	0	13	8	0	21	8:00 AM	0	1	0	0	1	8:00 AM	6	24	1	0	31
Total	11	0	13	0	24	Total	0	52	56	0	108	Total	1	4	2	0	7	Total	36	106	1	0	143
PHF	0.92	0.46	0.60	0.93	0.74	PHF	0.82	0.25	1.00	0.50	0.58	0.69	0.85	0.25	0.85								
HV %	0	8	4	0		HV %	0	0	0		0	0	0		0	1	0						

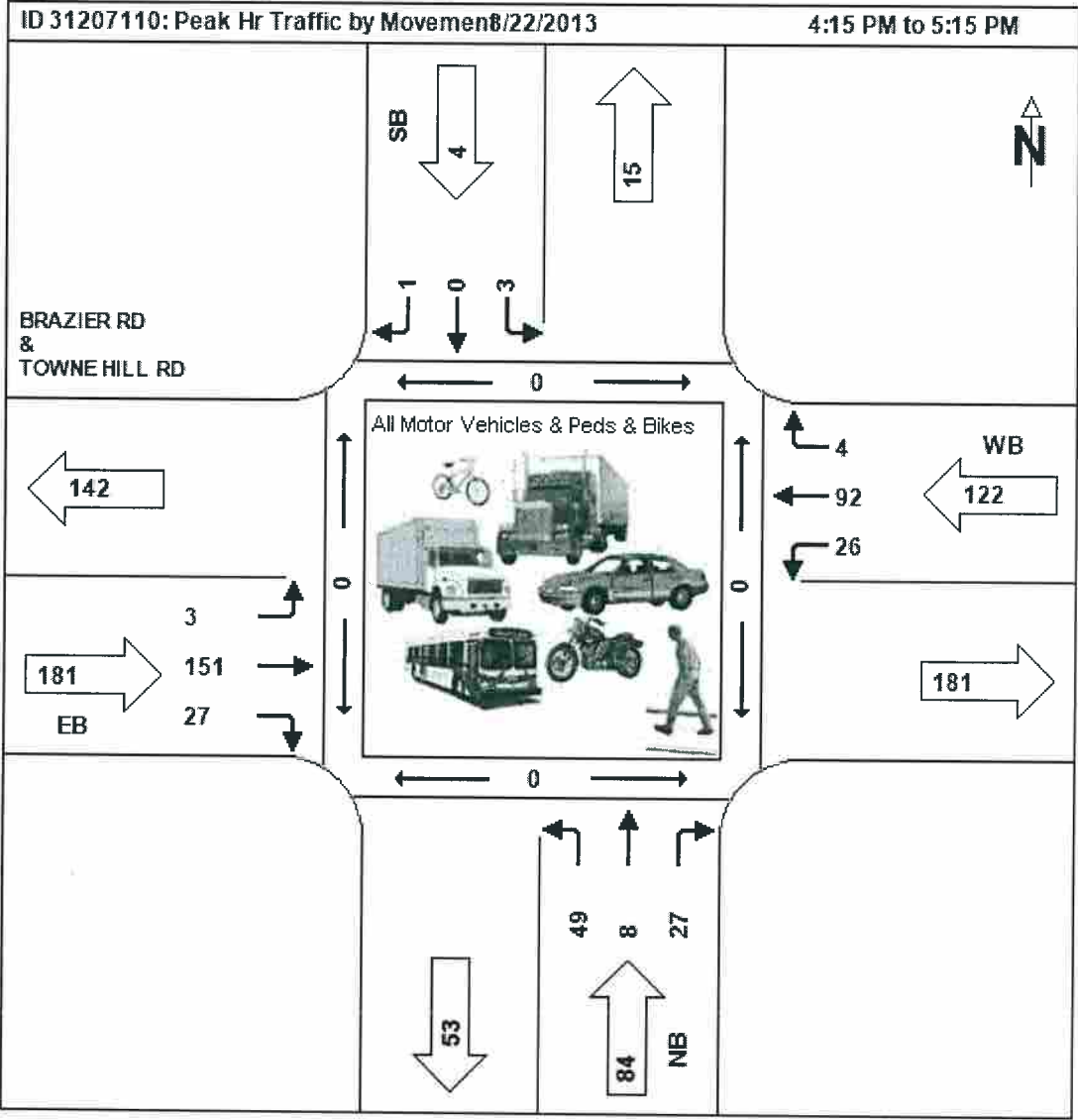
☒ Cars☒ Trucks☒ Pedestrians☒ Bikes



PM Peak Hour
08/22/2013

Start Time	NB					EB					SB					WB					App Int
	Left	Thru	Right	Ped	Total	Left	Thru	Right	Ped	Total	Left	Thru	Right	Ped	Total	Left	Thru	Right	Ped	Total	
4:15 PM	11	4	6	0	21	2	31	6	0	39	0	0	0	0	0	8	24	1	0	33	93
4:30 PM	8	1	2	0	11	0	39	5	0	44	2	0	0	0	2	3	22	1	0	26	83
4:45 PM	12	2	10	0	24	0	47	7	0	54	1	0	0	0	1	7	24	2	0	33	112
5:00 PM	18	1	9	0	28	1	34	9	0	44	0	0	1	0	1	8	22	0	0	30	103
Total	49	8	27	0	84	3	151	27	0	181	3	0	1	0	4	26	92	4	0	122	391
PHF	0.68	0.50	0.68		0.75	0.38	0.80	0.75		0.84	0.38		0.25		0.50	0.81	0.96	0.50		0.92	
HV%	0	0	0			0	1	4		0	0		0		0	1	0				

☒ Cars ☒ Trucks ☒ Pedestrians ☒ Bikes



Appendix B

ALTERNATIVES

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

Alternatives



Submitted by:

Lamoureux & Dickinson Consulting Engineers

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 inces 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 actiivated 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 - Benenfits 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 guarnatee 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 fruther 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 guarnatee 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 guarnatee 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
Intersection Design Feasibility Study
October 10, 2017

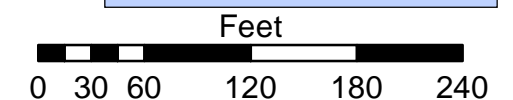
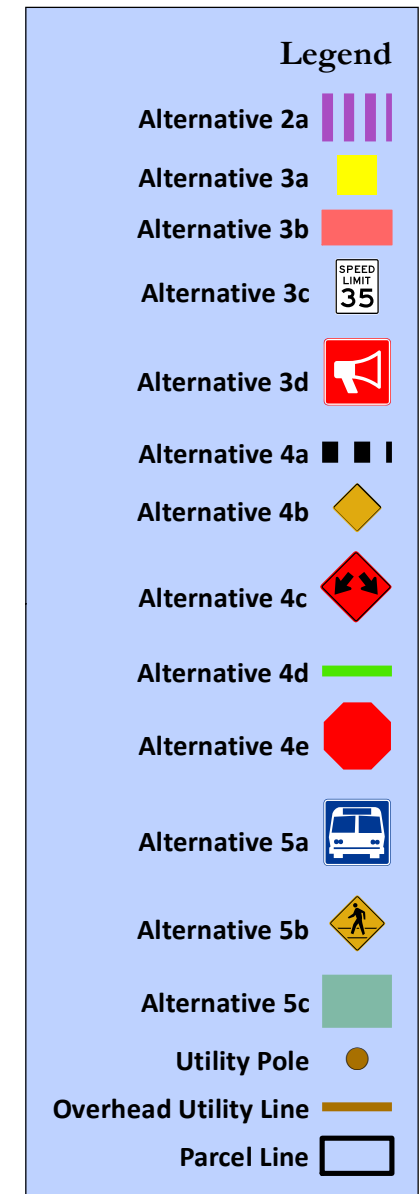
	NO ACTION	INCREASE SIGHT DISTANCE		NO ACTION	IMPROVE BICYCLING AND WALKING CONDITIONS		
	No Action	2a: Reduced High Point on Towne Hill Road	2b: Increased Summer & Winter Maintenance near Intersection	No Action	5a: GMT Bus Stop Signs on Towne Hill Road	5b: Crosswalk with RRFB on Towne Hill Road at Intersection	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
Pemanant 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							

TABLE B-3 Speed Reduction / Heightened Awareness Alternatives
Town of East Montpelier
Intersection Design Feasibility Study
October 10, 2017

[illegible]

Intersection Design Feasibility Study

East Montpelier, Vermont



BROADREACH
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Alternatives



**UVM
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October 10, 2017

Figure B1

Appendix C

PUBLIC WORK SESSION NOTES



BROADREACH
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Heritage Landscapes LLC

UVM
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