Memorandum

To: Jason Charest, CCRPC
Ravi Venkataraman, Town of Richmond

Date: June 18, 2021

Project #: 58538.00

From: Karen Sentoff
Jenn Conley

Re: DRAFT Richmond Bridge Street Complete Streets Corridor Study
Technical Memorandum

Introduction

In collaboration with the Chittenden County Regional Planning Commission, the Town of Richmond, and the Richmond community, the Bridge Street Complete Streets Corridor Study was conducted to identify and prioritize multimodal improvements along the Bridge Street corridor. The study aimed to garner community support for a preferred alternative through a public process evaluating options for improved bicycle and pedestrian infrastructure while supporting local businesses and continuing to serve vehicular traffic. This memorandum outlines the process through which the alternatives were developed, evaluated, vetted through public forums, supported, and designed. Attached to this memorandum is a draft set of preliminary plans that detail the preferred alternative.

Existing Conditions

The Bridge Street corridor serves approximately 5,400 vehicles per day connecting the Town of Richmond on both sides of the Winooski River. The corridor runs from the north at the intersection with US 2 Main Street and the center of village activity across the Winooski River bridge to the intersection with Huntington Road / Cochran Road / Thompson Road. The parcels adjacent to the Bridge Street corridor are the hub of Richmond activity. New development at the Creamery parcel is indicative of continued growth and demand for multimodal accommodations.

In the existing condition, there are critical gaps in the pedestrian infrastructure. Although pedestrians on the west side of Bridge Street are accommodated by a sidewalk, there are no formal pedestrian accommodations on the east side aside from a sidewalk that runs half of a block to the midblock crossing in front of the commercial block. The sidewalk on the west side changes from concrete sidewalk to asphalt sidewalk to a 180' crosswalk marking and continues along the length of Bridge Street in similar fashion with different treatments. It is noted that a separate project is planned for construction in 2021 to upgrade the asphalt sidewalk section between the legs of Depot Street to concrete sidewalk with curb. In addition, there are no formal bike accommodations along the route.

Previous studies of the corridor have identified areas that are critical to the pedestrian network and the ability for those not in a car to navigate the corridor, including the 2010 Bridge Street Bicycle and Pedestrian Feasibility Study. The high priority gaps in the infrastructure from that study include sidewalk connections on the east side of Bridge Street and improved accommodations at the intersection with Huntington Road / Cochran Road / Thompson Road.

A brief review of the safety data available for the corridor was conducted. The segment of Bridge Street between Depot Street / Pleasant Avenue and the south side of the bridge over the Winooski was designated a High Crash Location according to the VTrans 2012-2016 High Crash Location Report. Based on the data gathered for the report, there were 3 injury crashes and 9 property damage only crashes reported for the segment. It is noted that the intersection of Bridge Street with US 2 Main Street is also identified as a High Crash Location intersection, but is peripheral to the study area. A more recent query of the VTrans Crash Query Tool from 2015 through 2019 revealed

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18 crashes along the Bridge Street corridor between the intersection with US 2 Main Street and the intersection with Huntington Road. Of these crashes, there were two involving pedestrians. Both were listed to have occurred at night with one resulting in injury near the intersection with Railroad Street and one resulting in fatality near the intersection with Church Street. There were also six crashes identified at the intersection of Bridge Street with Huntington Road / Cochran Road / Thompson Road. All of the crashes at the intersection were listed as property damage only.

Purpose & Need Statement

The purpose and need statement was developed for the study based on review of previous studies, existing conditions, and feedback from the community. The statement helped to guide the study process and decision making.

Purpose

The purpose of the Bridge Street Complete Streets Corridor Study is to identify and prioritize improvements to create a multimodal corridor through the Richmond Village Center. The study will evaluate, select, and develop improvements to better accommodate pedestrians and bicyclists where critical infrastructure gaps exist while continuing to serve vehicular traffic, specifically:

- Along the east side of Bridge Street from Route 2 to Jolina Court;
- At the intersection of Jolina Court and Railroad Street; and,
- At the intersection of Cochran Road and Huntington Road.

Needs

Enhance mobility for pedestrians and bicyclists: There are critical gaps in the existing pedestrian network and a lack of defined space for bicyclists.

Improve safety for pedestrians and bicyclists: With the lack of delineated pedestrian and bicyclist accommodations, vulnerable users have to share space with vehicular traffic. The existing roadway environment, including a high crash location, enables vehicle operation and speeds unsuitable for a multimodal Village Center.

Maintain parking in support of businesses: Access to convenient parking options is linked to the vitality of businesses in the Village Center, requiring maintenance of well-located, on-street parking.

Public Engagement

On December 10, 2020, a Local Concerns Meeting was held via Zoom with the primary purpose of understanding what the issues and opportunities along Bridge Street are from the community perspective. A brief overview of the recommendations from previous studies of the corridor was presented and a draft purpose and need based on the information gathered to date was shared. The remainder of the time was focused on gathering input from the community at focus areas along the Bridge Street corridor, particularly between US 2 Main Street and Railroad Street, at the intersection of Railroad Street / Jolina Court, and at the intersection of Huntington Road / Cochran Road /

Thompson Road. The stakeholders at this meeting included Transportation Committee members, residents, and business owners, gathering a broad range of perspectives. Through this engagement, it became clear that not only are there critical gaps in the sidewalk infrastructure and a desire to better accommodate pedestrians and cyclists safely but maintaining parking in support of the area businesses is an utmost priority.

The project team refined the purpose and need based on the feedback from the Local Concerns Meeting and began to develop alternatives for Bridge Street. An interim meeting with the project team on the various alternatives narrowed the focus to three alternatives for the Bridge Street corridor focused on the area between US 2 Main Street and Railroad Street / Jolina Court and three alternatives for the intersection of Bridge Street with Huntington Road / Cochran Road / Thompson Road.

A presentation of the alternatives was developed for the focal areas and the public meeting was scheduled for April 8, 2021. The meeting was intended to gage community support for a preferred alternative for each of the focal areas. Discussion of the alternatives and the evaluation and tradeoffs associated with each revealed the preferences of the community for alternatives to carry forward for further refinement. These alternatives and their assessments are discussed in more detail below.

Alternatives Development and Evaluation

Based on previous studies, existing conditions assessments, and community input, three alternatives were developed for two focal areas: the Bridge Street corridor between US 2 Main Street and Railroad Street / Jolina Court and the intersection of Bridge Street with Huntington Road / Cochran Road / Thompson Road. The alternatives and their evaluation are discussed herein.

Bridge Street Corridor between US 2 Main Street and Railroad Street / Jolina Court

Alternatives for consideration in the first focal area aimed to improve the sidewalk connections and bike accommodations along the corridor, while maintaining as much parking as feasible, particularly along the commercial block. Each alternative connected sidewalk on the east side and formalized sidewalk on the west side where there is a crosswalk marked in the existing condition. Alternative 1 evaluates installation of sidewalks on the east and west sides and shared travel lanes while minimizing impacts beyond the current edge of pavement. Alternative 2 evaluates installation of sidewalks on the east and west sides and a northbound bike lane to facilitate uphill cyclists. Alternative 3 evaluates a sidewalk on the west side and a shared use path on the east side.

Alternative 1, as depicted in Figure 1, provides a 5’ sidewalk on the west side along the Richmond Market frontage between Railroad Street and the southern connection of Depot Street. This segment of sidewalk would replace the existing crosswalk pavement marking that extends approximately 180’ in the current condition. This sidewalk segment would be primarily in the existing right-of-way, with the exception of a small sliver to connect to the existing sidewalk in front of Richmond Market. The crossing of the railroad in this location would require ramps down to the rail grade and detectable warning surfaces on either side of the crossing. Coordination with New England Central Railroad will be crucial to the success of the project. Because it is an active rail line, construction will require adherence to Federal

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Railroad Administration requirements for safety and railroad flagger agreements will need to be coordinated through the single office which administers such agreements and takes ample time to coordinate.

The sidewalk on the east side will similarly require coordination with the railroad to establish the appropriate crossing treatments. For this alternative, the east side sidewalk is generally accommodated within the existing roadway cross section with minimal impact to adjacent properties. Along the segment just north of the intersection with Pleasant Street, the short retaining wall at the TD Bank property will need to be replaced to accommodate the 5' sidewalk through this section. With the curb line moving in towards the center of the roadway, it is anticipated that some drainage structures will need to be relocated.

Given that Alternative 1 attempts to minimize the impacts beyond the existing edge of pavement, the current pavement width is reconfigured to accommodate sidewalk and two travel lanes with offsets to the curb. It is therefore envisioned that this alternative would have shared lane markings on the travel lanes to indicate the presence of bicyclists.

Pedestrian crossings would be formalized at the intersection of Railroad Street / Jolina Court, where safe pedestrian landings with ramps and detectable surfaces would be installed. Although not specific to this alternative, a new crossing is depicted along with this alternative on the south leg of the Pleasant Street / Depot Street intersection. The proposed location of this crossing would retain the current midblock crossing at the commercial block but would additionally facilitate those pedestrians currently utilizing Pleasant Street and Depot Street.

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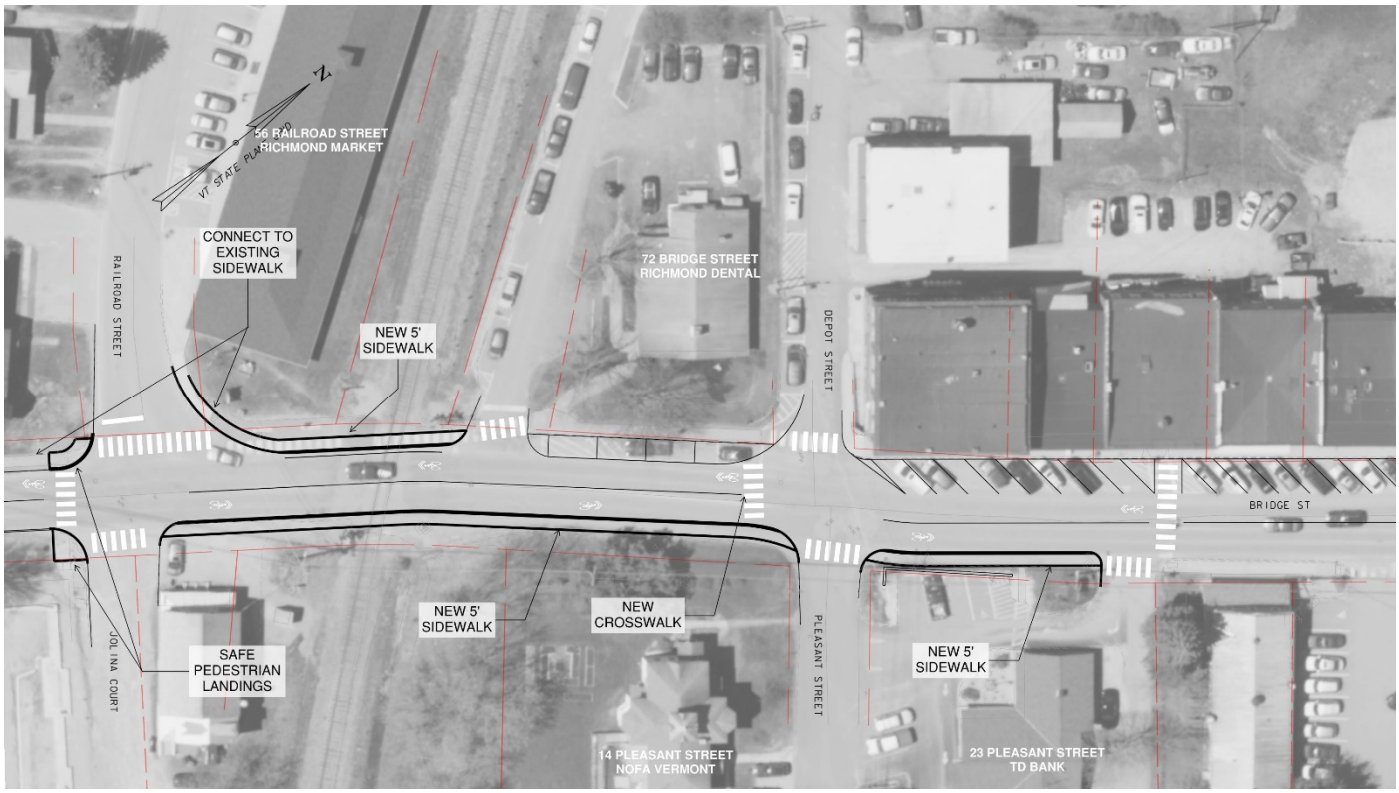
Figure 1. Alternative 1 – Sidewalk and Shared Lanes



Similar to Alternative 1, Alternative 2 provides a sidewalk on the west side in front of Richmond Market with the same impacts. On the east side, this alternative pushes the infrastructure beyond the edge of pavement, but well within the right-of-way, to accommodate a 5' sidewalk and 5' uphill bike lane with a downhill shared lane condition. This reconfiguration will require approximately 4' of width beyond the existing edge of pavement and have grading impacts at the 14 Pleasant Street property to establish an appropriate 2:1 slope. A preliminary estimate of the slope impacts was depicted in green on the concept in Figure 2. Along the TD Bank frontage, a new retaining wall would be required to accommodate the sidewalk and bike lane. Drainage in this alternative may require some relocation, but given the location of new curb in close proximity to the existing edge of pavement, the effort is not likely to be as significant as with Alternative 1. As with Alternative 1, coordination with the railroad early in the project will be crucial.

Although not necessarily tied to this alternative, a new crossing of Bridge Street on the north leg of the intersection with Pleasant Street / Depot Street is depicted in Figure 2. The new crossing is envisioned to replace the midblock crossing in front of the commercial block. A new pedestrian bulbout would provide a place for pedestrians waiting to

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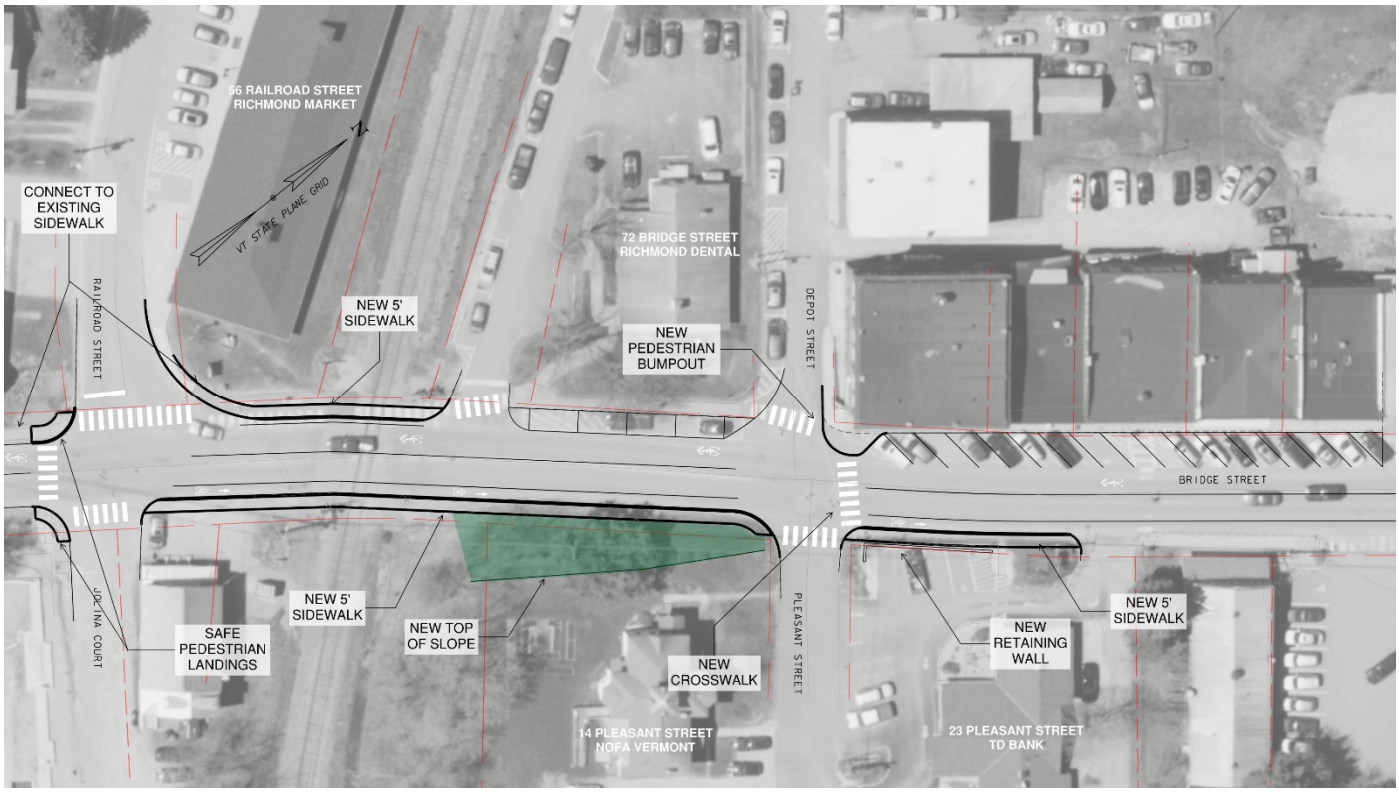
cross that is more visible to drivers. The bulbout is likely to provide some additional traffic calming benefit as drivers will feel pinched as they approach the intersection.

Figure 2. Alternative 2 – Sidewalk and Uphill Bike Lane



Much like Alternatives 1 and 2, the west side in Alternative 3 will have a 5′ sidewalk replacing the crosswalk markings. In Alternative 3, although not exclusive to this alternative, a new mountable curb extension was envisioned for the corner of Railroad Street. The purpose of this feature is twofold. The mountable curb area provides a visual cue and physical guide for drivers of smaller vehicles, like passenger cars, to turn at the tighter radius while accommodating larger vehicles by allowing them to pass over the mountable area. The tighter turning radius will have a traffic calming effect for drivers making the right-hand turn, where they will need to make the movement at a slower speed. This, in turn, will benefit the pedestrians at the intersection with vehicles operating at a slower speeds. Additionally, the curb extension effectively shortens the distance over which pedestrians are exposed to vehicle movements through the crossing. Although the detectable warning surface and safe place for pedestrians to wait will still be at the ramp at the edge of the sidewalk, the mountable area provides some additional protection for pedestrians when crossing Railroad Street.

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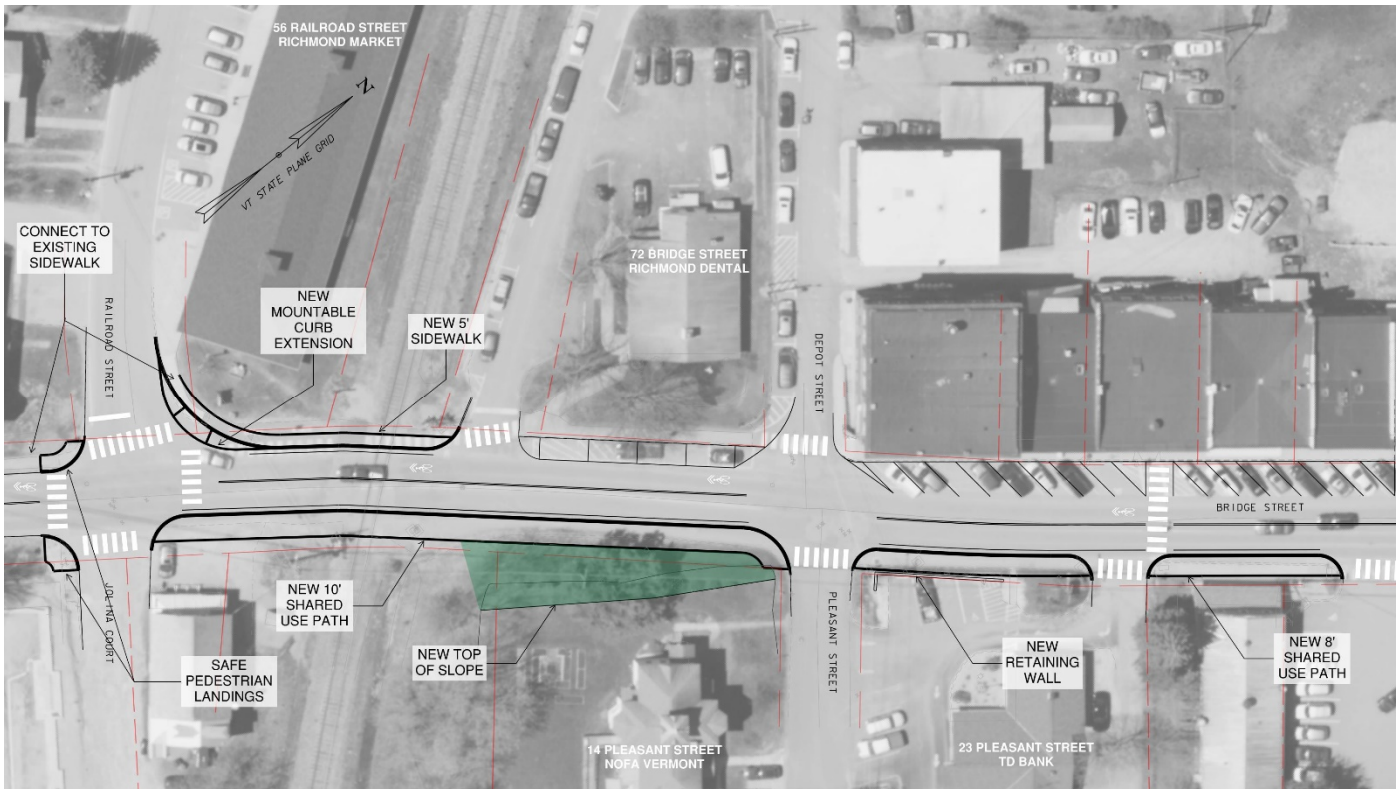
On the east side, Alternative 3 includes a shared use path. The segment from Jolina Court to Pleasant Avenue allows for a 10' shared use path width. The segment from Pleasant Avenue to US 2 Main Street would narrow to 8' to retain the width required for angled parking in front of the commercial block and two travel lanes. This 8' shared use path would extend to Main Street and tie into the existing sidewalk and crossings at the intersection. Although pedestrians and bicyclists will both likely utilize the shared use path and are able to in both the uphill and downhill direction, on-road shared lane markings in the downhill direction are recommended with this alternative to allow for those more confident cyclists to share the lane while cruising downhill at higher rates of speed. Similar to Alternative 2, the impacts of this alternative are anticipated to put the back of the shared use path at about 4' beyond the existing edge of pavement. The grading impacts at 14 Pleasant Street are estimated to be similar to those in Alternative 2 and are depicted in Figure 3 in green.

In this alternative, an additional crosswalk is marked on the north leg of the Railroad Street / Jolina Court intersection. It is envisioned that this crossing connects the west side sidewalk in front of the Richmond Market through the mountable curb extension area to the shared use path on the east side.

Figure 3. Alternative 3 – Shared Use Path



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A side-by-side comparison of the three alternatives for the corridor is summarized in Table 1. The comparisons were drawn based on conceptual cost estimates, pedestrian and bicyclist mobility and safety, right-of-way and utilities impacts, drainage considerations, and satisfying the purpose and need.

Table 1. Evaluation Matrix for Alternatives along Bridge Street between US 2 Main Street and Railroad Street

Alternative	Alternative 1 Sidewalks and Shared Lanes	Alternative 2 Sidewalks and Uphill Bike Lane	Alternative 3 Shared Use Path
Cost	$170,000	$200,000	$210,000
Pedestrian Mobility	Improved Sidewalk Network	Improved Sidewalk Network	Improved Network Connections
Pedestrian Safety	Designated Pedestrian Sidewalk	Designated Pedestrian Sidewalk	Separated from Vehicles Mixed with Bikes
Bike Mobility	No Change	Uphill Bike Lane	Choice of Shared Path or Shared Street Connections
Bike Safety	Shared Lane Markings and Signage	Designated Uphill Bike Lane for Slower Operation; Shared Lane Markings Downhill	Separated from Vehicles; Mixed with Pedestrians; Shared Lane Markings
ROW Impact	Minimal	More significant; Sidewalk within ROW with Slope Impacts	More significant; Path within ROW with Slope Impacts
Utilities Impact	Minimal	Moderate; Gas Line and Overhead Electric on Slope	Moderate; Gas Line and Overhead Electric on Slope
Drainage	More significant	Moderate	More significant
Satisfies Purpose & Need	No	Yes	Yes

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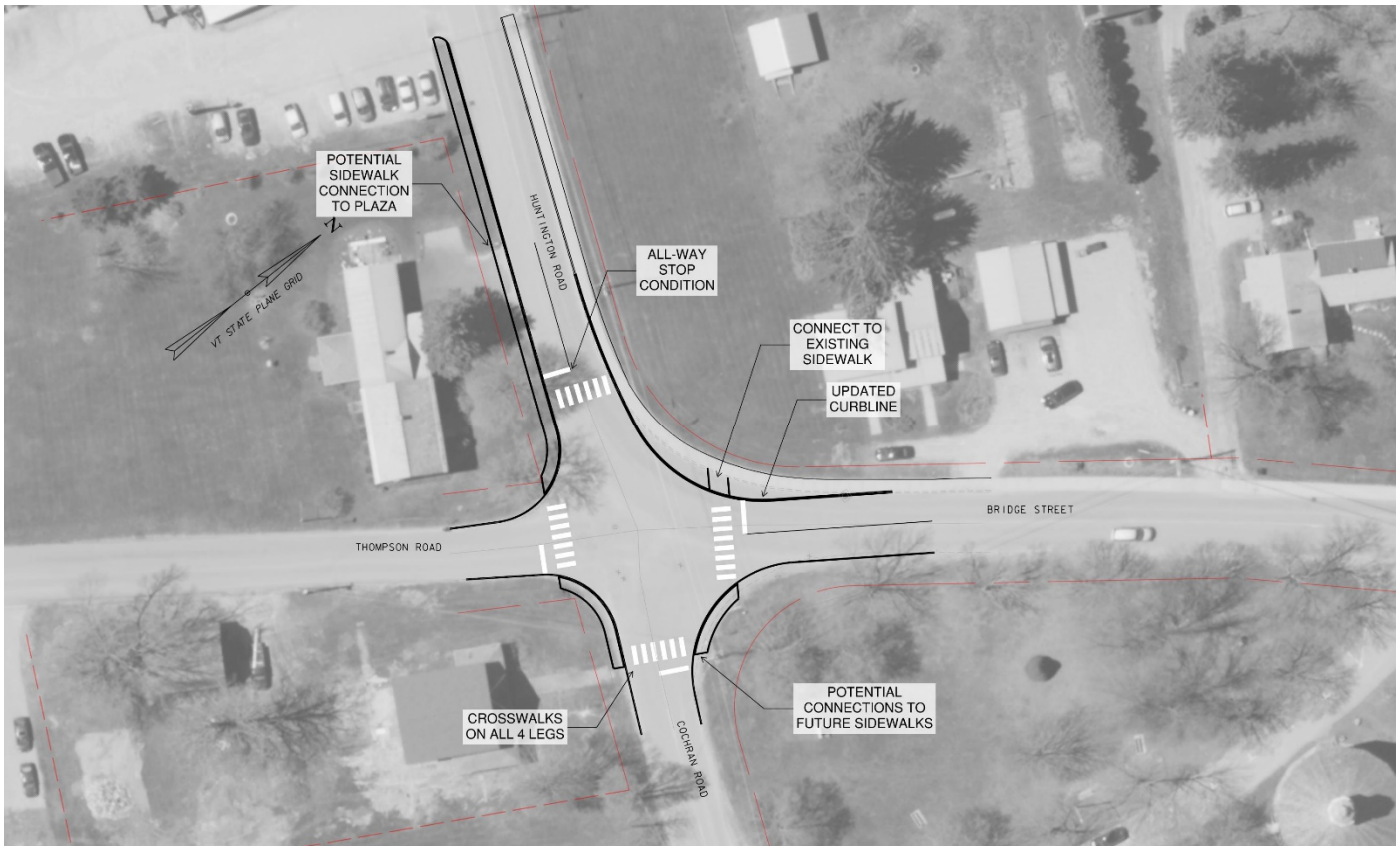
The intersection of Bridge Street with Huntington Road / Cochran Road / Thompson Road had three alternatives that were developed and refined based on input from the project team and presented to the public at the Alternatives Presentation. The three alternatives included Alternative 1 – All-Way Stop, Alternative 2 – Typical Two-Way Stop, and Alternative 3 – Mini-Roundabout. The three alternatives all create a more typical four-way intersection to better facilitate pedestrian crossings on all four legs.

Alternative 1 would implement an all-way stop condition, adding stop signs and stop bars to the Bridge Street and Huntington Road approaches. In addition, the radius on the corner between Bridge Street and Huntington Road would be tightened. Sidewalks with ramps, level landings, and detectable warning surfaces would be added to each corner of the intersection to provide appropriate pedestrian crossing locations. The opportunity to connect to future sidewalk segments would exist along each leg of the intersection if desired by the community.

Figure 4. Alternative 1 – All-Way Stop



Alternative 2 would reconfigure the intersection to be a typical two-way stop-controlled intersection, with stop control on the Bridge Street and Thompson Road approaches. This would effectively make the through movement the Huntington Road to Cochran Road movement. Similar to Alternative 1, the radius on the corner between Bridge

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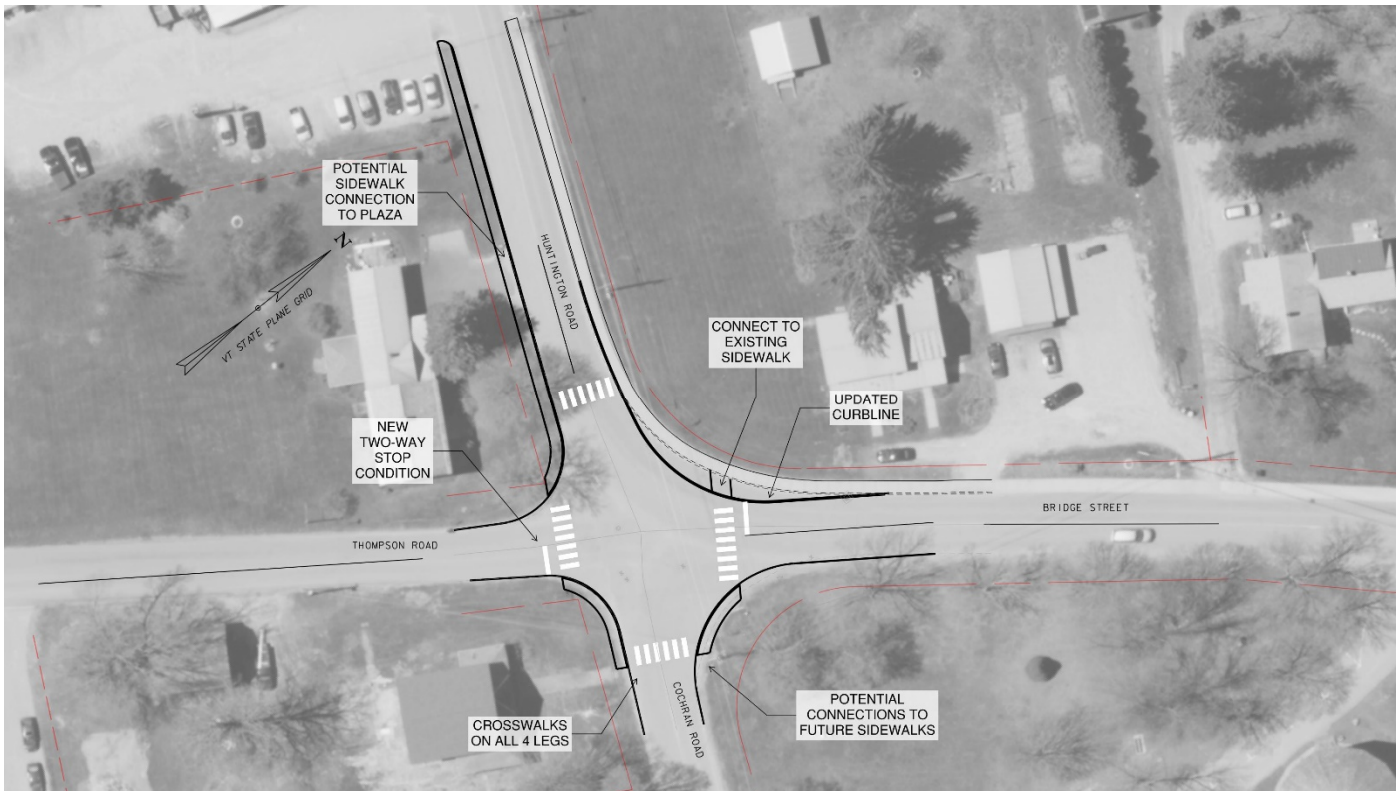
Street and Huntington Road would be tightened. Again, sidewalks with ramps, level landings, and detectable warning surfaces would be added to each corner of the intersection to provide appropriate pedestrian crossing locations.

Figure 5. Alternative 2 – Typical Two-Way Stop



The third alternative was a mini-roundabout. The circulating roadway would have an inscribed diameter of 90' and at this size would be able to accommodate large trucks on the major movements. The center island would be fully mountable to allow for those truck movements through the intersection. Splitter islands would channelize traffic on the Bridge Street, Huntington Road, and Cochran Road approaches to the intersection. These splitter islands would provide pedestrian refuge allowing for pedestrians to cross one lane of traffic at a time. Again, sidewalks connecting the crossings would be installed on all four corners of the intersection to provide appropriate crossing locations, with the option to connect to future sidewalk segments.

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Figure 6. Alternative 3 – Mini-Roundabout

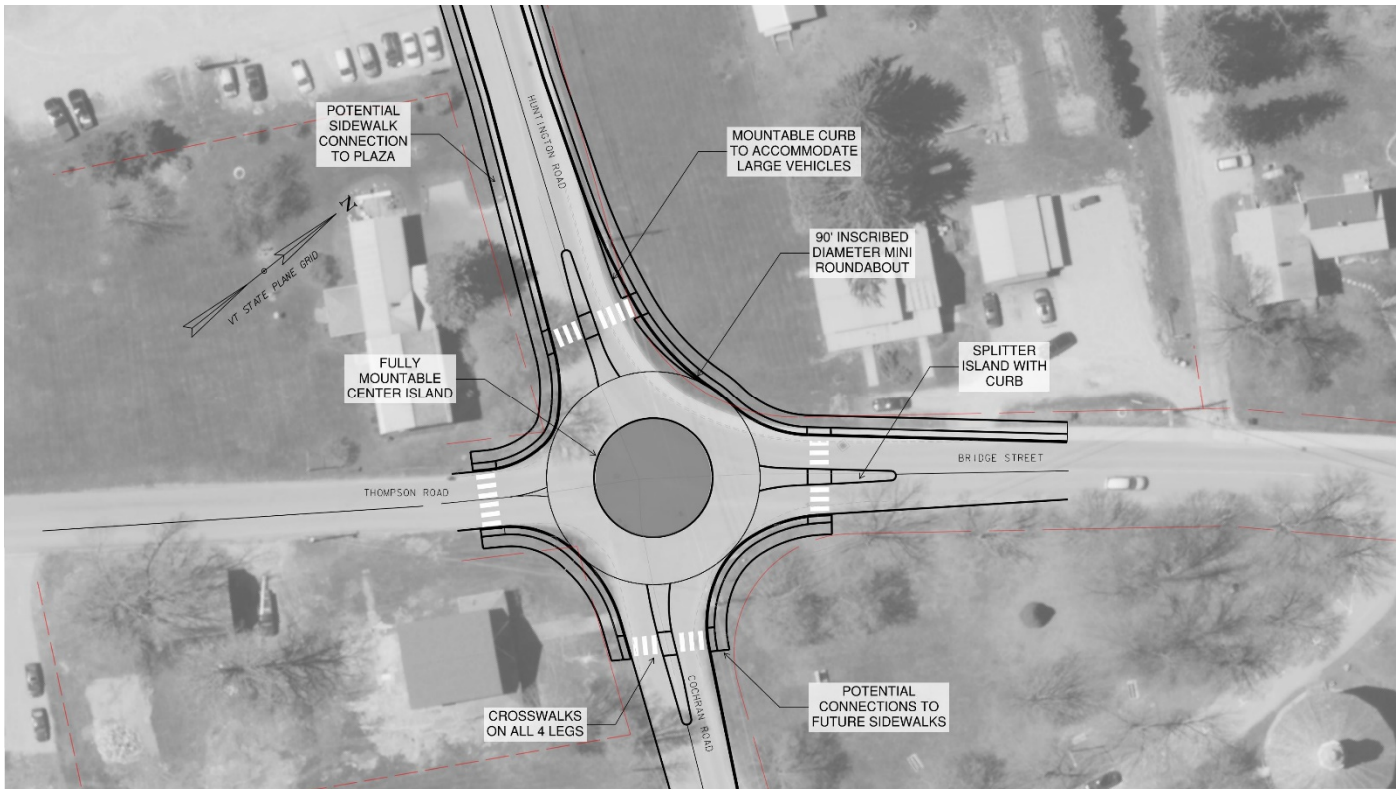

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Table 2. Evaluation Matrix for Alternatives at the Intersection of Bridge Street / Huntington Road / Cochran Road / Thompson Road

Alternative	Alternative 1 All-Way Stop	Alternative 2 Two-way Stop	Alternative 3 Mini Roundabout
Cost	$100,000	$100,000	$850,000
Pedestrian Mobility	Improved Connections to Crossings of Low Volume Roadways	Improved Connections to Crossings of Low Volume Roadways	Improved Connections to Crossings of Low Volume Roadways
Pedestrian Safety	Stop Condition for All Crossings	Stop Condition for 2 Crossings	Median Refuge on 3 Crossings
Bike Mobility	Potential for bike lanes or shared lane markings	Potential for bike lanes or shared lane markings	Potential for shared lane markings
Bike Safety	All vehicles stop. lower traffic speeds for better bike travel with vehicles thru intersection	Some lower traffic speeds for better bike travel with vehicles thru intersection	Slower vehicle speeds thru roundabout better bike travel with vehicles
ROW Impact	Minimal	Minimal	Moderate
Utilities Impact	Minimal	Minimal	Moderate
Drainage	Minimal	Minimal	Moderate
Satisfies Purpose & Need	Yes	Yes	Yes

Preferred Alternative Refinement and Design

Through the Alternatives Presentation and Public Meeting, as well as outreach efforts prior to and following the meeting, there was clear support for Alternative 2 for the Bridge Street corridor between US 2 Main Street and Railroad Street / Jolina Court, which proposes the installation of a sidewalk and uphill bike lane. In addition to Alternative 2, the mountable curb area on the Railroad Street corner, the pedestrian bulbout and crosswalk on the north leg of the Pleasant Street / Depot Street intersection, and additional crossing on the north leg of the Railroad Street / Jolina Court intersection garnered support from the community and Transportation Committee.

For the intersection of Bridge Street with Huntington Road / Cochran Road / Thompson Road, support for a more typical four way intersection was heard, but consensus on a particular alternative was lacking. Alternative 3 – Mini-Roundabout was supported by some, but the price tag was a significant deterrent. Alternative 1 – All-Way Stop was discussed in detail, but hesitation to stop the "through" movements between Bridge Street and Huntington Road was

insurmountable. Through much deliberation, the Transportation Committee ultimately supported the No Build condition here with low-cost enhancements and pedestrian accommodations.

In the design phase, details on some design features and the tradeoffs they entail were investigated more rigorously. Highlights of these refinements are included below.

- The existing and proposed crossings of Bridge Street were deliberated with the Transportation Committee and project team extensively. A crossing at the intersection of Bridge Street with Pleasant Avenue and Depot Street was prioritized as shown in Alternative 2. Placing the crosswalk on the northside of the intersection as a means of facilitating pedestrian crossings along the commercial block with the impetus of maximizing parking and removing the existing midblock crossing and RRFB. Pedestrians would be corralled towards the proposed bulbout and crossing to safely cross at Depot Street / Pleasant Avenue. The Transportation Committee and feedback from the outreach efforts revealed a preference to implement the new bulbout and crossing at Depot Street / Pleasant Avenue as well as retain the midblock crossing and RRFB in the center of the commercial block.
- The opportunity to implement a retaining wall as a means of limiting slope impacts and creating a streetscape feature along the east side sidewalk between Pleasant Avenue and the railroad was met with support. This feature was included in the preferred alternative design plans at a cost of about $40,000. It is important to note that compared to a 2:1 slope implemented in this location, the construction impacts for the retaining wall would be more significant as the cut necessary to build the retaining wall would be greater than the cut necessary to regrade the slope. In the final condition, the retaining wall would have modest benefits in limiting the impact to the yard space of the 14 Pleasant Avenue property. The anticipated top of slope for the retaining wall feature would be approximately 2 feet further west than the anticipated top of slope for the regrading at a 2:1 slope.
- The mountable curb extension at the corner of Bridge Street and Railroad Street that was illustrated as part of Alternative 3 was retained as a modification to the preferred alternative for the Bridge Street segment. As depicted in Figure 7 below, the mountable curb extension allows for the effective corner radius to be tightened for smaller vehicles while still allowing large vehicles (i.e. WB-67 design vehicle) to have access to Railroad Street. The tighter turning radius will compel drivers to take the turn at slower speeds, creating a safer and more welcoming environment for the pedestrians attempting to navigate the intersection.

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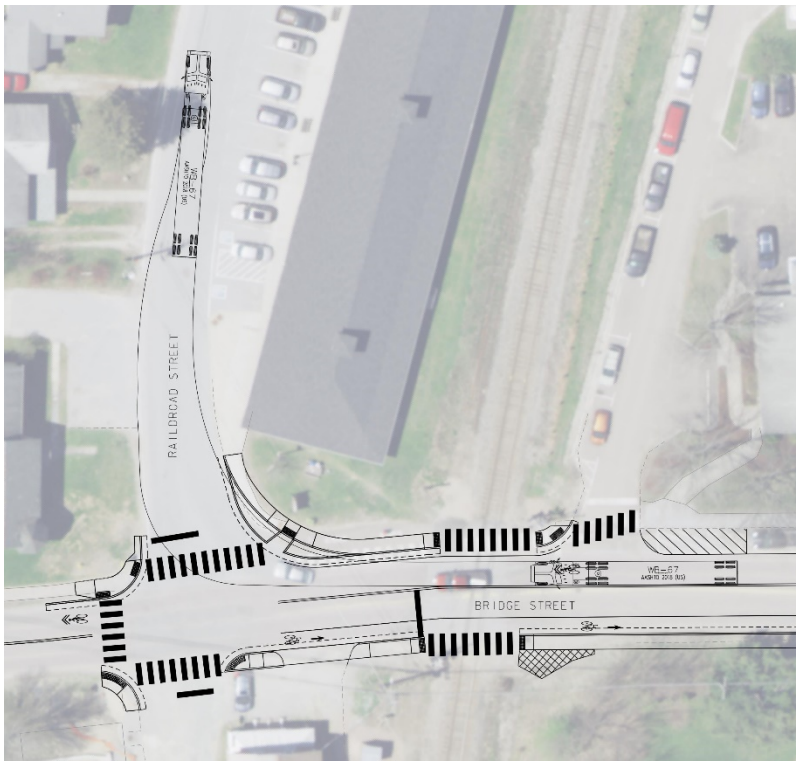
Figure 7. Mountable Curb Extension with Design Vehicle Turning Movement



- The desire to retain driveway access from Bridge Street and parking in front of Richmond Community Kitchen was heard through outreach efforts. With limited area to provide parking, sidewalk, and safe refuge for crossing pedestrians, the tradeoffs associated with this design detail were weighed carefully. Creating a safe pedestrian crossing of Jolina Court remained a top priority. In order to have an appropriate ramp, level landing, and detectable surface for this crossing, the width of the driveway to Richmond Community Kitchen from Bridge Street was limited to the 24' minimum for a commercial driveway. With the proposed driveway and sidewalk configuration, at least two parking spots in front of Richmond Community Kitchen can likely be retained on the parcel property. The current gravel area and parking configuration along the Bridge Street frontage overlaps the railroad right-of-way. In the proposed condition, an additional parking spot may be possible with the continued use of the railroad right-of-way. It is important to note that with the driveway curb cut on Bridge Street, there was not an appropriate landing for the additional pedestrian crossing on the north leg of the intersection.
- At the intersection of Bridge Street with Huntington Road / Cochran Road / Thompson Road, even in the no build condition, the desire for pedestrian access and safe crossings remains. Therefore, provision of pedestrian landings and crosswalks on all four legs of the intersection was the priority. Support for a

Rectangular Rapid Flashing Beacon (RRFB) was heard from the community. With the volumes, speeds, and context for the crossing of Huntington Road, an RRFB is not advisable. Other enhancements, like raised median treatments, can be effective in slowing traffic and providing visual cues for drivers. A mountable median on the Huntington Road leg was designed as a possible enhancement to the intersection. In addition, given the pedestrian accommodations and enhancements proposed, the design team raised concerns with the ability to bring these elements through to final design without some additional traffic control at the intersection. The primary concern was with the lack of clear yielding behavior at the intersection given the atypical through movement between two adjacent legs of the intersection (i.e. Bridge Street to Huntington Road and vice versa). As shown in the plan set, it was proposed that Bridge Street approach be yield controlled, unless the community is amenable to one of the other alternatives proposed (i.e. all-way stop or typical two-way stop).

These design features and the other design details for the preferred alternatives are detailed in the attached draft preliminary plan set.