East Allen Street
Gateway Enhancements
Scoping Study
Winooski, VT

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Introduction

The East Allen Street Gateway Enhancement Scoping Study examines the East Allen Street (Vermont Route 15) corridor from the Winooski Circulator east through the I-89 interchange to Roland Court to identify a suite of transportation and streetscape recommendations that improve safety and enhance accommodations for all modes along this important gateway into Winooski. This study, which was identified as a high priority recommendation in Winooski’s Transportation Master Plan, was developed with significant input from the public, community stakeholders, the Public Works and Planning Commissions, and the Winooski City Council. The recommendations identified in this study were developed to ensure that improvements within the public right-of-way are compatible with the future development pattern envisioned along the corridor as articulated in Winooski’s Gateway and Downtown Core zoning districts.
1.1 Project Overview

The East Allen Street Gateway Enhancements Scoping Study was conducted in coordination with the Chittenden County Regional Planning Commission (CCRPC), City of Winooski, and various stakeholders including the Vermont Agency of Transportation (VTrans), Green Mountain Transit (GMT), the Winooski Police and Fire Departments, members of the Winooski Planning Commission, Public Works Commission, property and business owners, and developers along the project corridor.

The goal of this study is to identify improvements along the corridor that advance the vision set forth by the City in previous planning efforts. This vision involves a multi-modal corridor that encourages slow vehicle speeds, provides safe pedestrian and bicycle facilities, and accommodates the dense, mixed-use infill development articulated in the Gateway and Downtown Core zoning districts.

The study area runs approximately 0.7 miles along East Allen Street (VT 15) from the downtown Winooski Circulator to Roland Court, just east of the I-89 interchange.

1.2 Purpose and Need

1.2.1 Purpose of the Project

The purpose of the East Allen Street Scoping Study is to identify and prioritize short- and long-term improvements along East Allen Street from the Winooski Circulator to Roland Court which will foster a vibrant and welcoming gateway to downtown Winooski by enhancing mobility and improving safety for all modes of transportation. These improvements are intended to maximize gateway development and redevelopment opportunities as prescribed by the Winooski Gateway Corridors Form Based Code, while enhancing aesthetics, parking, and pedestrian and bicyclist accommodations along the corridor.

1.2.2 Needs for the Project

The needs for this project are driven by deficiencies in the current transportation infrastructure and a need for comprehensive corridor planning. These needs are further articulated below:

- **Enhance Travel for Pedestrians and Bicyclists:** The 2015 Winooski Gateways Corridors Study highlighted insufficient pedestrian and bicyclist accommodations and called for a streetscape redesign, including street trees, pedestrian scale lighting, raised bicycle track, and limited building setbacks along East Allen Street. Between 2012 and 2017, eight crashes were reported involving pedestrians along this corridor. Some of these pedestrian crashes are likely attributable to the lack of safe crossing opportunities and auto-oriented nature of the corridor. East Allen Street is shown as a High Priority and High Feasibility corridor in the CCRPC’s Active
Transportation Plan. The existing bike facilities along this corridor are disconnected and lack clear designation from motorists. Between 2014 and 2017, there were three bicycle crashes, all of which resulted in injuries.

- **Assist Economic Growth:** Wide pavement and limited on-street parking may be seen by some as a barrier to (re)development, particularly to projects with first-floor retail or commercial space. As a gateway to Winooski, the streetscape should serve to promote economic investment while accommodating all modes of travel.

- **Improve Safety:** There are three designated High Crash Location intersections along the East Allen Street Corridor. These include East Allen Street’s intersections with Abenaki Way/East Street, Dion Street, and the I-89 Northbound Off Ramp. At these three intersections, there were a total of 92 crashes between 2012 and 2016.

- **Increase Transit Accommodations:** Three Green Mountain Transit routes currently operate on East Allen Street: 1) the Blue Line (Essex to Shelburne), 2) the Green Line (Pine Street to Winooski), and 3) the Jefferson Commuter. There are five bus stops along this corridor which provide limited amenities for transit users. The lack of shelters, lighting, and seating diminish the experience for existing users and do not promote transit use by new riders.

- **Manage Vehicular Congestion:** Numerous operationally inadequate intersections are present along this corridor. Long queues are present at the Exit 15 interchange and Circulator entrance, especially during weekday peak hours. These intersections, along with the intersection with East Spring Street, experience operational issues that impact the efficacy of other intersections along the corridor.
2

Existing Conditions

The first step of this Gateway Scoping Study was to identify the existing transportation, natural resource, and land use conditions along the project corridor to identify issues and opportunities to be addressed through the study. This chapter includes an evaluation of the corridor’s existing and future land use characteristics, existing transportation infrastructure, existing and projected traffic flows, historic safety data, and a review of previous studies.
2.1 Study Corridor Description

The 0.7 mile study corridor is located along East Allen Street (VT 15) with a western terminus at the downtown Winooski Circulator and an eastern terminus at Roland Court, immediately east of the Interstate-89 Exit 15 Interchange. East Allen Street serves as the main connection between Essex and Colchester to downtown Winooski and provides direct access to I-89 and connections to downtown Burlington. This corridor is used by approximately 19,000 vehicles per day in the more heavily-trafficked segment between East Spring Street and I-89 and approximately 14,000 vehicles per day closer to downtown Winooski. East Allen Street is also a major corridor for three Green Mountain Transit (GMT) routes: the Blue Line (Essex to Shelburne), the Green Line (Pine Street to Winooski), and the Jefferson Commuter.

The full project study corridor is shown in Figure 1 on the following page.

2.2 Land Use & Zoning Characteristics

Existing land uses along the corridor are varied and include retail, office, light industrial, institutional, and single-family and multi-family residential. The density of existing development generally decreases moving east along the corridor, from dense, 4-5 story mixed use buildings adjacent to the downtown core, to more auto-oriented single-story retail uses and single-family homes at the eastern end of the corridor.

Future growth and development along East Allen Street will be dictated by the Downtown Core zoning regulations and the Gateways Form Based Code. The Form Based Code districts applicable to this section of East Allen Street are Urban General and Townhouse/Small Apartment.

The Urban General designation in the Form Based Code is intended to promote denser, pedestrian-friendly development and requires two to four and a half story buildings built close to the roadway with commercial or residential ground floor uses. The Townhouse/Small Apartment district promotes slightly less dense development with two to three-story residential uses built with stoops, front porches, and/or gardens located directly adjacent to the property line.

The zoning districts along the corridor and adjacent area are shown in Figure 2.
Figure 1: Project Area
Figure 2: Project Area Zoning Map
2.3 Transportation System Characteristics

The following section summarizes the relevant transportation system characteristics of East Allen Street throughout the project area. Existing conditions identified as part of this study include daily traffic volumes, roadway geometry, multi-modal facilities, and other roadway elements.

**Functional Classification:** Principal Arterial

**Right of Way (ROW):** 4 rods (66 feet)

**2018 Annual Average Daily Traffic (AADT):** 14,000-19,000 vehicles per day

**Study Intersection Geometry:**

- **East Allen Street and Barlow Street/Cascade Way:**
  Two-way stop controlled with one lane in each direction on East Allen Street approaches and Barlow Street approach. One channelized right turn only lane on Cascade Way with acceleration/merge lane into East Allen Street eastbound.

- **East Allen Street and East Street/Abenaki Way:**
  Signalized intersection with one lane on the East Street and Abenaki Way approaches. One through/right lane and one left turn lane on both East Allen Street approaches. There are signalized pedestrian crosswalks across the northbound, southbound, and westbound approaches.

- **East Allen Street and East Spring Street:**
  One-way stop controlled with a single-lane approach on East Spring Street and an acceleration/receiving lane for left turns onto westbound East Allen Street. One through lane and one right turn lane on westbound East Allen Street. One through lane and a prohibited left turn on eastbound East Allen Street.

- **East Allen Street and I-89 Exit 15 Southbound On-Ramp:**
  Signalized intersection with two eastbound through lanes and a yield-controlled channelized right turn lane, and two through lanes and one left turn lane in the westbound direction.

- **East Allen Street and I-89 Exit 15 Northbound Off-Ramp:**
  Signalized intersection with two eastbound and westbound through lanes. The I-89 northbound off ramp has two channelized right turn lanes and one left turn lane.
Adjacent Land Uses: Circulator to East Street/Abenaki Way
Commercial and residential buildings located directly along the street with underground utilities, street trees and decorative lighting placed in the brick sidewalk.

East Street/Abenaki Way to East Spring Street
Primarily residential land uses along with the Community College of Vermont and retail plaza setback from the roadway. Underground utilities and vehicle-scale overhead lighting are present.

East Spring Street to I-89 Exit 15 Interchange
Land uses are mixed use with residences, industrial/office park, and gas stations. Street trees are located in front of residences on the north side of the street along with automobile-scale overhead lighting.

Pedestrian Facilities:
- Eight-foot brick sidewalks on both sides of the street from the Circulator to the Abenaki Way/East Street intersection.
- Five-foot sidewalk on the north side of the street from East Street to the eastern end of the corridor.
- Eight-foot shared use path on the south side of the street from Abenaki Way to the I-89 Exit 15 Interchange
- Crosswalks across East Allen Street at the Circulator, Cascade Way, Abenaki Way, Manseau Street, Dion Street, and the Exit 15 Interchange off-ramp

Bicycle Facilities:
- Eastbound bike lanes from the Circulator to Abenaki Way (with a short gap at Cascade Way)
- Westbound bike lanes from East Spring Street to the Circulator
- Eight-foot shared use path on the south side of the street from Abenaki Way to the I-89 Exit 15 Interchange

2.4 Safety Assessment
A review of reported crashes along the study corridor was conducted for the most recent five-year time period that data is available (2013 – 2017). During this time period, there were 296 reported crashes, with 115 of these occurring at intersections or the I-89 interchange. 117 (40%) of the reported crashes were rear end crashes which is to be expected along a
corridor with numerous unsignalized intersections at side streets and frequent driveways. The distribution of reported crashes along the corridor is shown in Figure 2 below.

**Figure 3: Reported Crash Location Heat Map (2013-2017 Crash Data)**

Rear end crashes are also often the result of high vehicle speeds which cause a reduction in reaction time for drivers to notice a vehicle stopping in front of them. A breakdown of crashes along the corridor by direction is shown in Figure 4 below.

**Figure 4: East Allen Street Crashes by Direction of Collision (2013-2017)**

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>Rear End</td>
<td>40%</td>
</tr>
<tr>
<td>Sideswipe</td>
<td>20%</td>
</tr>
<tr>
<td>Left turn &amp; thru</td>
<td>10%</td>
</tr>
<tr>
<td>Thru moves</td>
<td>10%</td>
</tr>
<tr>
<td>Head on</td>
<td>5%</td>
</tr>
<tr>
<td>Right turn &amp; thru</td>
<td>5%</td>
</tr>
<tr>
<td>Single Vehicle</td>
<td>5%</td>
</tr>
<tr>
<td>Other / Missing / Unknown</td>
<td>5%</td>
</tr>
</tbody>
</table>
The most recent VTrans High Crash Location (HCL) report (2012-2016) identified the following three designated HCL intersections along the corridor: 1) East Allen Street at East Street and Abenaki Way, 2) East Allen Street at Dion Street, and 3) East Allen Street at the I-89 Exit 15 Off-Ramp. Over the five-year period from 2012 to 2016, there were a total of 92 reported crashes within these HCLs, 26 of which resulted in an injury. Fatalities were reported during this period. A breakdown of crash data within the three HCLs is shown below in Table 1. Complete crash data can be found in Appendix C.

Table 1: VTrans 2012-2016 High Crash Locations

<table>
<thead>
<tr>
<th>Location</th>
<th>Statewide Rank</th>
<th>Crashes</th>
<th>Fatalities</th>
<th>Injuries</th>
<th>PDO* Crashes</th>
<th>Actual / Critical Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>E Allen St and East St/Abenaki Way</td>
<td>80</td>
<td>26</td>
<td>0</td>
<td>10</td>
<td>19</td>
<td>1.146</td>
</tr>
<tr>
<td>E Allen St and Dion St</td>
<td>98</td>
<td>30</td>
<td>0</td>
<td>6</td>
<td>25</td>
<td>1.062</td>
</tr>
<tr>
<td>East Allen St and I-89 Off Ramp</td>
<td>103</td>
<td>36</td>
<td>0</td>
<td>10</td>
<td>28</td>
<td>1.044</td>
</tr>
</tbody>
</table>

* PDO: Property Damage Only

2.5 Review of Previous Studies

2.5.1 2008 Route 15 Corridor Study

In 2008, BFJ Planning and Resource Systems Group completed a corridor study of Route 15 from the City of Winooski to the Essex/Jericho Town Line. The result of this study was an implementation plan which provided recommendations for intersection, roadway, and multimodal accommodations. The following improvements were identified in the implementation plan which are relevant to the East Allen Street corridor:

- Install a permanent eastbound slip lane and splitter island on the western approach to the intersection with East Spring Street.
- Study a potential signal or detection loop at Dion Street along with access management and circulation changes.
- Eliminate the slip lane at the I-89 northbound off-ramp and adjust the lane configuration to include one right turn lane, one left turn lane, and one shared left and right turn lane.

2.5.2 2015 Winooski Gateway Corridors Form Based Code

In 2015, the City of Winooski published their Form Based Code (FBC) guidelines which are applicable to the major gateway corridors into downtown. These standards set the foundation for the preferred development types and building styles along each corridor. This document identified two districts along East Allen Street: Urban General and Townhouse/Small Apartment.
The Urban General designation in the Form Based Code is intended for denser, more pedestrian-heavy areas, while the Townhouse/Small Apartment district is intended to be in a less dense area and encourages smaller residential buildings along the corridor.

### 2.5.3 2017 Winooski Transportation Master Plan

The Winooski Transportation Master Plan (TMP) was completed in 2017 and further progressed the vision defined by the two previously mentioned studies. The TMP provided recommendations for infrastructure improvements throughout the City, a number of which are relevant to East Allen Street. The recommendations for this corridor included in the TMP include the following:

1. **Conduct an assessment of the East Allen Street (VT 15) corridor from Abenaki Way to Roland Court to evaluate opportunities to enhance safety, accessibility for walkers and cyclists, and enhance the aesthetics.** Potential improvements include
   a. The feasibility of a road diet between East Spring Street and the I-89 interchange to provide a single travel lane in each direction,
   b. A center two-way left-turn lane and raised island,
   c. An enhanced mid-block pedestrian crossing between Manseau Street and Dion Street,
   d. Evaluate whether any measures can be made to improve the ability for vehicles from Dion Street to cross onto East Allen Street without compromising East Allen Street traffic operations,
   e. Evaluate options to improve the traffic operations, safety, bicycle/pedestrian accommodations at the East Allen/East Spring/Hood Street intersection. This evaluation should consider realigning East Spring Street to intersect East Allen Street in more of a “T” configuration.

2. **Eliminate the merge lane on eastbound East Allen Street east of Cascade Way and replace with striped bicycle lane from Cascade Way east for half a block to tie into the existing bike lane prior to Abenaki Way.**
Public Outreach

A robust public outreach process was conducted by engaging a diverse group of stakeholders on the project Advisory Committee and providing ample opportunities for public input over the course of the study’s development. Three public meetings were held for this project including an initial Local Concerns Meeting, an Alternatives Presentation, and a final meeting to present the Advisory Committee’s recommended Preferred Concept Plan to the Winooski City Council. Before bringing materials to the public, the Advisory Committee was convened to ensure all necessary components were considered and the Purpose and Needs of the project were being met.
3.1 Project Advisory Committee

The project Advisory Committee consisted of a diverse group of stakeholders including representatives from the City of Winooski staff, CCRPC staff, Winooski Planning and Public Works Commission members, Vermont Agency of Transportation (VTrans) staff, Winooski Fire and Police Departments, Green Mountain Transit staff, local developers, and business association representatives.

This committee served as an advisory body throughout the project and was responsible for vetting all materials and concepts before they were presented to the public for review and comment. The Advisory Committee provided input and ultimately finalized the Purpose and Need statement which was used as the basis for all alternative concepts and evaluation. The Advisory Committee also identified preferred alternatives along the corridor for consideration by the Winooski City Council.

3.2 Local Concerns Meeting

A Local Concerns Meeting was held on February 14, 2019 to solicit public input at the onset of the project. The attendees were provided with an overview of the project and then asked to identify any opportunities or concerns along with the corridor. This meeting was facilitated through two smaller breakout groups and then reconvened to review what the individual groups determined to be the priorities along the corridor. Many common themes along the corridor emerged, including the following:

- Traffic calming mechanisms including street trees, bicycle facilities, and on-street parking could help to slow traffic,
- Safety at East Spring Street is a major concern for all users,
- A road diet along the eastern end of the corridor would be supported,
- Limited pedestrian and bicycle facilities are present along East Allen Street, and
- The intersections at Manseau and Dion Streets are difficult to navigate with high speeds and nearby pedestrian crossings.

These concerns and opportunities led to the development of the graphic shown in Figure 5. The highlighted elements were evaluated by the project team and served as the foundation for the alternatives and project focus areas that were evaluated as the study progressed. The meeting agenda, presentation, and minutes can be found in Appendix D.
3.3 Draft Alternatives Presentation

On June 13, 2019, the project team presented the draft alternatives for three focus areas along the East Allen Street corridor (Cascade/Barlow, East Spring Street, Three/Four-Lane Section) for public input to help determine a preferred concept plan. In addition to these focus areas, proposed baseline improvements were also presented for comment. The alternatives presented to the public are described in detail in Chapter 4.

Based on public input, it was determined that the final recommendation would consist of two packages of alternatives for short- and long-term implementation along the corridor. This decision was based on numerous comments requesting short-term, lower-cost projects for the corridor. Many of the attendees expressed interest in developing a long-term vision for the corridor which could be constructed as funding allows in the future. The two concept plans are further elaborated in Chapter 5 and represent changes which were suggested by the public and then refined and approved by the Advisory Committee. Examples of the changes suggested by the public includes changes to on-street parking options presented, an increase in vegetated buffers between sidewalks and the roadway, and a recommendation to add more street trees.

The meeting agenda, presentation, and minutes can be found in Appendix D.

3.4 Preferred Alternative Presentations

On October 7, 2019, the project team presented the short- and long-term concept plans recommended by the Advisory Committee to the Winooski City Council. At this meeting, the Council discussed the long-term concept plan and provided comments on the long-term plan.

An amended long-term concept plan was presented to the City Council on November 4, 2019 along with the baseline improvements and short-term concept plans presented at the October 7 Council meeting. At this meeting, the City Council endorsed these plans as the preferred concept plans which are presented in Chapter 5 of this report.

The meeting agenda, presentations, and minutes can be found in Appendix D.
4 Alternatives Analysis

An analysis of up to three alternatives for each focus area identified along the corridor was conducted to determine the validity of various options and arrive at a preferred short- and long-term plan for the corridor.

The following three focus areas were examined along the corridor: 1) the intersection of East Allen Street at Barlow Street and Cascade Way, 2) the intersection of East Allen Street and East Spring Street, and 3) the roadway cross-section east of East Spring Street. Factors such as cost, traffic operations, safety improvements, right-of-way impacts and others were used as evaluation metrics to help arrive at a package of preferred improvements for the corridor.
4.1 Focus Area 1 – Cascade Way and Barlow Street Intersection

The intersection of East Allen Street at Cascade Way and Barlow Street is an unconventional intersection with stop-control on the Barlow Street approach. All other approaches are uncontrolled. The Cascade Way approach has a splitter island which allows a right turn exiting movement only. This right-turn movement is accommodated by an acceleration lane into East Allen Street traffic which complicates pedestrian and bicycle accessibility through the intersection and promotes higher vehicle speeds in the downtown. Similarly, the splitter island restricts westbound left turns and southbound through movements from accessing Cascade Way. In particular, the limitation on the westbound left-turning movement makes it more difficult for vehicles arriving from the Interstate and points east to access the parking garage entrance on Cascade Way.

The limited turning movement possibilities at the intersection and the acceleration lane on East Allen Street were expressed multiple times as concerns by the public and two alternatives were developed to address these issues.

Figure 6: Focus Area 1 – Existing Conditions

4.1.1 Alternative 1 – No Build

The No Build scenario was examined to determine a baseline for operations and safety at the East Allen Street intersection with Cascade Way and Barlow Street.

The current intersection alignment provides one lane on each East Allen Street approach with through, left, and right turning movements permitted for eastbound traffic and through and right turning movements permitted for westbound traffic. Vehicles travelling southbound on Barlow Street are permitted to turn right or left onto East Allen Street while northbound travelers on Cascade Way are only permitted to turn right onto East Allen Street.
to continue eastbound. The Cascade Way north and southbound lanes are divided by a splitter island which restricts turning movements. As vehicles turn right from Cascade Way, they are provided an acceleration lane onto East Allen Street which is approximately 150-feet long.

Pedestrians are accommodated with crosswalks across Cascade Way, Barlow Street, and the eastbound East Allen Street approach. All crosswalks are uncontrolled. The westbound bike lane on East Allen Street is continued through the intersection, however the eastbound bike lane that once continued through the intersection to Abenaki Way has not been maintained and a gap exists between the intersection and where the eastbound acceleration lane ends.

The Barlow Street approach in the current No Build scenario is anticipated to operate at LOS D with an average delay of 26.8 seconds per vehicle in the 2039 weekday evening peak hour. The maximum volume to capacity ratio occurs on the southbound Barlow Street approach and is 0.31.

4.1.2 Alternative 2 – Merge Lane Removal & Eastbound Bike Lane (Short-Term)

The short-term concept for this intersection removes the acceleration lane from Cascade Way onto East Allen Street and restripes the intersection to restore a continuous bicycle facility eastbound through the intersection. Safety for vehicles is also expected to improve under this short-term alternative as there will no longer be an acceleration lane for vehicles exiting Cascade Way. Vehicles exiting Cascade Way will yield to East Allen Street traffic.

As the intersection lane configuration is not anticipated to change under this alternative, the traffic operations results would be expected to be very similar to those reported for the No Build alternative. The cost of improvements for Alternative 2 is estimated to be $35,000.

A graphic of this alternative is shown in Figure 7.

4.1.3 Alternative 3 – Two-Way Stop-Controlled Intersection with Bike Lanes and Landscaped Buffer (Long-Term)

The long-term concept developed for this intersection includes the removal of the splitter island on Cascade Way to allow for all turning movements to be permitted, as well as the shifting of curblines along East Allen Street east of the intersection to create wider green belts on both sides of the street. Currently, trees and lighting are placed within the brick sidewalk and the proposed green belt provides space for these elements to be moved, creating a larger functional sidewalk and improving overall aesthetics along this block.

This concept includes the widening of the north and southeast curbs for added pedestrian space and shorter crosswalk lengths, crosswalks on all four approaches, and bicycle lanes through the intersection in both directions along East Allen Street.

Since all vehicle turning movements are permitted in this alternative, traffic operations are anticipated to be slightly worse than the No Build scenario. In the 2039 weekday evening peak hour, the Barlow Street approach is expected to operate at LOS F is with an average delay of 62 seconds. The highest volume to capacity ratio occurs on the southbound Barlow
Street approach and increases to 0.56 under this alternative. These operations, while worse than the No Build, are still efficient and are unlikely to cause significant congestion at the intersection. Further, opening up the intersection to all movements should reduce the amount of diverted traffic traveling on adjacent streets to make movements currently not permitted at the intersection.

The costs for these improvements, including construction, engineering and design, and traffic control during construction is estimated to be approximately $540,000.

A graphic of this alternative is shown in Figure 8.

4.1.4 Alternative 4 – Two-Way Stop-Controlled Intersection with Bike Lanes and On-Street Parking (Long-Term)

A fourth alternative was analyzed that created an intersection configuration similar to that proposed in Alternative 3. East of the intersection, a minor curb shift of the southern side of the roadway to the north and the addition of a six-foot eastbound bike lane and on-street parking is proposed.

As with the previous alternative, the anticipated operations are slightly worse than the No Build scenario. In the 2039 weekday evening peak hour, the Barlow Street approach is expected to operate at LOS F is with an increase in average delay to 62 seconds. The highest volume to capacity ratio occurs on the southbound Barlow Street approach and increases to 0.56 under this alternative.

The costs of the intersection reconfiguration, widened vegetated buffer, striping, as well as costs related to design and construction total to approximately $200,000.

A graphic of this alternative is shown in Figure 9.
Figure 7: Cascade Way and Barlow Street Intersection Alternative 2 (Short-Term)

- Install RRFB at existing crosswalk
- Add bike lane striping across intersection
- Expand curb length with hatched area and planters
- Replace merge lane with 5’ bike lane and hatched area or on-street parking
- Maintain roadway cross-section east of merge lane
Figure 8: Cascade Way and Barlow Street Intersection Alternative 3 (Long-Term)

- Expanded pedestrian area and shortened crosswalk
- New crosswalk
- Maintain roadway cross-section at Abenaki Way intersection
- New green belt or parking
- Remove splitter island and shift curblines and crosswalk
- New 5' bike lane
- New green belt or parking
Figure 9: Cascade Way and Barlow Street Intersection Alternative 4 (Long-Term)

- Expanded pedestrian area and shortened crosswalk
- Maintain roadway cross-section at Abenaki Way intersection
- Remove splitter island and shift curbline and crosswalk
- New green belt
- New 6’ bike lane and on-street parking
4.1.1 Focus Area 1 – Evaluation Matrix

An evaluation matrix of the alternatives presented in Section 4.1 is shown in Table 2 below. This matrix compares the costs, operations, safety, and impacts to various resources for each alternative.

Table 2: Cascade Way and Barlow Street Intersection Alternatives Evaluation Matrix

<table>
<thead>
<tr>
<th></th>
<th>Alternative 1 No Build</th>
<th>Alternative 2 Merge Lane Removal RRFB &amp; EB Bike Lane</th>
<th>Alternative 3 Two-Way Stop-Controlled Intersection with Bike Lanes and Landscaped Buffer</th>
<th>Alternative 4 Two-Way Stop-Controlled Intersection with Bike Lanes and On-Street Parking</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction (Including Contingency)</td>
<td>$0</td>
<td>$35,000</td>
<td>$340,000</td>
<td>$120,000</td>
</tr>
<tr>
<td>Traffic Control &amp; Mobilization/Demobilization</td>
<td>$0</td>
<td>$7,500</td>
<td>$65,000</td>
<td>$25,000</td>
</tr>
<tr>
<td>Engineering and Design</td>
<td>$0</td>
<td>$10,000</td>
<td>$80,000</td>
<td>$25,000</td>
</tr>
<tr>
<td>Resident (Construction) Engineering</td>
<td>$0</td>
<td>$7,500</td>
<td>$55,000</td>
<td>$25,000</td>
</tr>
<tr>
<td>Total (Not Including ROW)</td>
<td>$0</td>
<td>$60,000</td>
<td>$540,000</td>
<td>$200,000</td>
</tr>
<tr>
<td><strong>Traffic Operations (2039 PM Peak Hour)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowest Approach LOS</td>
<td>D SB from Barlow</td>
<td>D SB from Barlow</td>
<td>F SB from Barlow</td>
<td>F SB from Barlow</td>
</tr>
<tr>
<td>Maximum Volume to Capacity Ratio</td>
<td>0.31 SB from Barlow</td>
<td>0.31 SB from Barlow Street</td>
<td>0.56 SB from Barlow Street</td>
<td>0.56 SB from Barlow Street</td>
</tr>
<tr>
<td>Longest 95th Percentile Queue (veh)</td>
<td>1.3 SB from Barlow S</td>
<td>1.3 SB from Barlow Street</td>
<td>2.8 SB from Barlow Street</td>
<td>2.8 SB from Barlow Street</td>
</tr>
<tr>
<td><strong>Safety</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle Safety</td>
<td>-</td>
<td>Improved Reduce conflict point with eastbound bike lane</td>
<td>Slightly Improved Formal accommodations for all turning movements</td>
<td>Slightly Improved Formal accommodations for all turning movements</td>
</tr>
<tr>
<td>Pedestrian Safety</td>
<td>-</td>
<td>No Change</td>
<td>Improved Stopped traffic on Cascade Way</td>
<td>Improved Stopped traffic on Cascade Way</td>
</tr>
<tr>
<td>Vehicle Safety</td>
<td>-</td>
<td>Improved Reduce conflict point with merging vehicles</td>
<td>Slightly Improved Formal accommodations for all turning movements</td>
<td>Slightly Improved Formal accommodations for all turning movements</td>
</tr>
<tr>
<td><strong>Impacts</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utility Impacts</td>
<td>-</td>
<td>Minor Impacts</td>
<td>Minor Impacts</td>
<td>Minor Impacts</td>
</tr>
<tr>
<td>Railroad Impacts</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ROW Impacts</td>
<td>-</td>
<td>No Impacts</td>
<td>No Impacts</td>
<td>No Impacts</td>
</tr>
<tr>
<td>Constructability</td>
<td>-</td>
<td>Minimal Effort</td>
<td>Moderate Effort</td>
<td>Moderate Effort</td>
</tr>
<tr>
<td>Natural Resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conserved Lands</td>
<td>-</td>
<td>No Impacts</td>
<td>No Impacts</td>
<td>No Impacts</td>
</tr>
<tr>
<td>Wetlands</td>
<td>-</td>
<td>No Impacts</td>
<td>No Impacts</td>
<td>No Impacts</td>
</tr>
<tr>
<td><strong>Community Character</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aesthetics</td>
<td>No Change</td>
<td>Slightly Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>Satisfies Purpose &amp; Need</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

- LOS: Level of Service
- ROW: Right of Way
4.2 Focus Area 2 – East Spring Street Intersection

The second focus area is the intersection of East Allen Street/East Spring Street/Hood Street. This intersection has increased complexity due to the skewed geometry, a railroad crossing across East Allen Street, and the offset approach of Hood Street. This intersection is currently designated as a High Crash Location intersection and was identified in the 2017 Winooski Transportation Management Plan as a location suggested for further study.

The alternatives evaluated at this intersection include: 1) a No Build alternative, 2) the signalization of the intersection in its current location, 3) a realignment of East Spring Street to create a perpendicular intersection with East Allen Street to the west of its current location, 4) a single-lane roundabout, and 5) restricting East Spring Street to one-way traffic (eastbound or westbound). After completing preliminary investigations and discussions with the Advisory Committee, alternatives 4 and 5 were removed from further consideration due to cost, potential environmental impacts, and anticipated traffic impacts.

Figure 10: Focus Area 2 – Existing Conditions

4.2.1 Alternative 1 – No Build

In order to understand the impacts resulting from changes to this intersection, the existing conditions must first be analyzed. The No Build alternative is used as a baseline to determine the current operations and safety of the intersection for all users.
The East Spring Street intersection currently has one westbound through lane, one westbound right turn only lane, a single lane stop-controlled approach from East Spring Street, and a through only movement on eastbound East Allen Street. Left turns from East Spring Street have a partially-protected movement provided through the inclusion of an acceleration lane on eastbound East Allen Street. This lane is protected by bollards to ensure eastbound through traffic does not enter this lane before turning traffic is up to speed and a merge can occur. In addition to the three main approaches to the intersection, Hood Street intersects East Spring Street immediately to the west of the intersection. Hood Street is stop-controlled, and vehicles headed to East Allen Street are required to also stop once they reach the stop bar of East Spring Street. Pedestrians are accommodated by a single crosswalk across East Spring Street that is approximately 63-feet long. The current intersection configuration can be seen in the previous figure, **Figure 10**.

The No Build scenario was evaluated for the 2039 weekday evening peak hour and the East Spring Street approach is anticipated to operate at Level of Service (LOS) F with 77.5 seconds of average delay experienced per vehicle. The East Spring Street approach is projected to operate with a volume to capacity ratio of 2.63 during the 2039 weekday evening peak hour, meaning that volumes are projected to exceed that approach’s capacity by 163% during future peak hours.

### 4.2.2 Alternative 2 – Signalized Intersection

The second alternative, and first Build alternative, of the East Spring Street intersection includes the installation of a traffic signal with a new eastbound left turn lane onto East Spring Street and an additional crosswalk across East Allen Street. The new left turning movement on East Allen Street is made possible by the signal because it can now be served by a protected or permitted signal phase.

The signalization of this intersection would require coordination with New England Central Railroad to determine the appropriate placement of crosswalks, stop bars, and parking lanes and to provide a dedicated rail crossing signal controller to provide a red signal on all roadway approaches while the train is crossing the street. Additionally, an upgraded crossing with new railroad crossing flashers and gates on East Allen Street would be required.

This addition of a signal is anticipated to improve safety for all users due to its provision of green phases for each approach as well as providing a leading interval of time for pedestrians to cross at the crosswalks. The signalization will particularly improve safety for vehicles taking a left turn out of East Spring Street as they would no longer have to contend with any conflicting vehicles on East Allen Street.

The signalized intersection is estimated to cost approximately $1,100,000, which includes engineering and design, construction, traffic control during construction, and railroad crossing upgrade costs. In the 2039 weekday evening peak hour, the operations of the intersection are expected to improve to LOS B conditions, with an average delay of 16.5 seconds per vehicle, and a maximum volume to capacity ratio of 0.90 on the East Allen Street eastbound through movement.

A graphic of this alternative is shown in **Figure 11**.
4.2.3 Alternative 3 – Realignment of East Spring Street

Alternative 3 involves the complete realignment of East Spring Street so that it intersects East Allen Street west of the current intersection. The proposed realignment shifts East Spring Street to be constructed through the properties currently occupied by the Winooski Housing Authority and Waf’s Westside Deli. Coordination with these property owners as well as the railroad for a new at-grade railroad crossing are necessary considerations before this alternative could be constructed. If this alternative were selected to advance, an initial step would be to submit engineering drawings of the proposed at-grade crossing to New England Central Railroad requesting approval of the new at-grade crossing.

The reconfigured section of East Spring Street includes a new sidewalk on the eastern side as well as bike lanes along both sides of the street. In place of the current East Spring Street alignment, a public green space is proposed with a shared use path connecting to the sidewalk farther northeast on East Spring Street. The currently proposed realignment shows Hood Street becoming a dead-end street although there is the potential for the existing East Spring Street right-of-way to be used as an extension of Hood Street so that connection to East Spring Street is maintained or providing a stop-controlled approach of Hood Street directly onto East Allen Street.

This alternative provides all the safety benefits included in the previous signalized alternative, with the addition of a flatter grade which improves visibility from all approaches, a perpendicular intersection configuration, as well as more opportunities for safe bicycle and pedestrian facilities.

The realignment of East Spring Street with a signalized intersection is anticipated to operate with the same Level of Service as Alternative 2. This alternative has been estimated to cost approximately $2,400,000 and includes all other costs mentioned in Alternative 2. Right-of-way and property acquisition costs are a large unknown for this concept and are not included in the cost estimate.

A graphic of this alternative is shown in Figure 12.

4.2.4 Alternative 4 – Roundabout

An additional alternative of a roundabout was examined at the intersection at East Spring Street. This concept was not carried through the full alternatives evaluation as it was deemed cost prohibitive and overly-complex in terms of constructability by the Advisory Committee. Much of the costs were due to the railroad crossing and the need for a large retaining wall due to the presence of adjacent steep slopes which require stabilization to support the south side of the roundabout. Preliminary cost estimates of a 110-foot diameter roundabout totaled to $6,400,000 before including any potential Right-Of-Way costs.

A graphic of this alternative is shown in Figure 13.
Figure 11: Alternative 2 - East Spring Street Signalized Intersection
Figure 12: Alternative 3 – Realigned East Spring Street Signalized Intersection
Figure 13: Alternative 4 – Roundabout
4.2.5 Focus Area 2 – Evaluation Matrix

An evaluation matrix of the alternatives presented in Section 4.2 is shown in table below. This matrix compares the costs, operations, and resource impacts for each alternative.

| Table 3: East Spring Street Intersection Alternatives Evaluation Matrix |
|-------------------------------------------------|-----------------|-----------------|
| **Costs**                                        | **Alternative 1** | **Alternative 2** | **Alternative 3** |
| **Costs**                                        | **No Build**     | **Signalized Intersection** | **E Spring St Realignment** |
| Construction (Including Contingency)             | $0              | $700,000         | $1,500,000       |
| Traffic Control & Mobilization/Demobilization    | $0              | $130,000         | $290,000         |
| Resident (Construction) Engineering              | $0              | $160,000         | $340,000         |
| Engineering and Design                           | $0              | $110,000         | $230,000         |
| Total (Not Including ROW)                       | $0              | **$1,100,000**   | **$2,400,000**   |

| **Traffic Operations (2039 PM Peak Hour)**       |                       |                   |
| Lowest Approach LOS                              | **F**               | **B**             | **B**            |
| Maximum Volume to Capacity Ratio                 | **2.63**            | **.90**           | **.90**          |
| Longest 95th Percentile Queue (# veh)            | **20.4**            | **14.9**          | **14.9**         |

| **Safety**                                       |                       |                   |
| Bicycle Safety                                   | -                     | **Slightly Improved Bike Lanes provided westbound through signal** | **Improved Bike Lanes provided westbound through signal** |
| Pedestrian Safety                                | -                     | **Improved Signalized Crosswalk provided on 2 approaches** | **Improved Signalized Crosswalk provided on all approaches** |
| Vehicle Safety                                   | -                     | **Slightly Improved Phase Separated movements from E Spring St** | **Improved Perpendicular intersection & Phase Separated movements from E Spring St** |

| **Impacts**                                      |                       |                   |
| Utility Impacts                                  | -                     | Minor Impacts     | Moderate Impacts |
| Railroad Impacts                                 | -                     | Minor Impacts     | Major Impacts   |
| ROW Impacts                                      | -                     | No Impacts        | Major Impacts   |
| Constructability                                 | -                     | Moderate Effort   | Major Effort    |

| **Natural Resources**                            |                       |                   |
| Conserved Lands                                  | -                     | No Impacts        | No Impacts      |
| Wetlands                                         | -                     | No Impacts        | No Impacts      |

| **Community Character**                          |                       |                   |
| Aesthetics                                       | -                     | No Change         | Improved        |
| Satisfies Purpose & Need                         | No                    | Yes               | Yes             |
4.3 Focus Area 3 – Roadway Segment East of East Spring Street

The third focus area is the segment of roadway east of East Spring Street to the I-89 exit 15 interchange. This segment has previously been a four-lane section with two travel lanes in each direction. Recent construction has reconfigured this segment to include one westbound travel lane and two eastbound travel lanes while maintaining the right turn lane for westbound traffic to turn onto East Spring Street. Two alternatives were examined for this segment which were categorized as short-term and long-term.

Figure 14: Focus Area 3 - Existing Conditions

4.3.1 Alternative 1 – Short Term Road Diet (No Curb Shifts)

The first alternative contains changes only to the existing lane striping and does not propose any adjustments to the existing curblines. This alternative adjusts the lane configuration to include one 11-foot travel lane in each direction, a 12-foot two-way center left-turn lane, and a five-foot downhill bike lane. In the vicinity of the intersection with East Spring Street, the westbound right turn lane is maintained as well as the acceleration lane for traffic turning left out of East Spring Street. As the corridor continues to the east, the eastbound acceleration lanes merges into a single travel lane and transition into the 3-lane configuration.

A slight curb shift to accommodate parking for an adjacent residential development on the southern side of the roadway has recently been completed along with the installation of a two-stage crosswalk with a rectangular rapid flashing beacon (RRFB) at the west side of the intersection with Manseau Street. This alternative accommodates both of these recent changes. A graphic of this alternative concept is shown in Figure 15.
4.3.2 Alternative 2 – Long Term Road Diet (Shifted Curbs)

The second alternative includes shifting the curblines on both sides of the street to narrow the roadway, accommodate a widening of the shared use path on the southern side of the road, and increase the width of the green belt on the northern side of the roadway. The proposed cross-section includes one 11-foot travel lane in each direction, a 12-foot two-way center left turn lane, a 12-foot shared use path with four-foot green belt on the south side of the street, and a five-foot sidewalk with 7.5-foot green belt on the north side of the roadway.

This alternative also includes shared-use lane markings for bicycles in both directions of travel but assumes that much of the bicycle traffic will use the proposed shared use path. The crosswalk at Manseau Street completed as part of the short-term concept is proposed to move to the easterly side of the intersection for this alternative.

As the roadway approaches the I-89 exit 15 interchange, East Allen Street widens to include a second eastbound travel lane. In the transition space, a relocated bus stop is accommodated at the start of the new lane to provide a protected space for busses as well as bring them into the proper lane to travel through the interchange.

A graphic of this alternative concept is shown in Figure 16.
Figure 15: Short-Term Road Diet Concept

- 5’ Buffered Bike Lane
- Curbed Pedestrian Refuge Space
- Modify Signal Timings
- 2 WB Left Turn Lanes
- Proposed Crosswalk with RRFB
- Merge Area from East Spring St Intersection
- 12’ Two-Way Center Turn Lane
- Expanded Median
- Future Connection to VT 15 Path
Figure 16: Long-Term Road Diet Concept

- Proposed Crosswalk with RRFB
- 7' Landscaped Buffer
- Curbed Pedestrian Refuge Space
- Expanded Median
- 2 WB Left Turn Lanes
- 12' Two-Way Center Turn Lane & 11' Travel Lanes
- Proposed GMT Stop
- Potential to replace slip lane with right-turn lane
- Future Connection to VT 15 Path
- 12' Shared Use Path and 7' Landscaped Buffer
4.3.3 Focus Area 3 – Evaluation Matrix

An evaluation matrix of the alternatives presented above is shown in the table below. This matrix compares the costs, operations, safety, and impacts to various resources for each alternative.

Table 4: East Allen Street Road Diet Alternatives Evaluation Matrix

<table>
<thead>
<tr>
<th>Costs</th>
<th>Short Term Road Diet with No Curb Shift</th>
<th>Long Term Road Diet with Shifted Curblines on Both Sides of East Allen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction (Including 25% Contingency)</td>
<td>$80,000</td>
<td>$1,350,000</td>
</tr>
<tr>
<td>Traffic Control &amp; Mobilization/Demobilization</td>
<td>$15,000</td>
<td>$260,000</td>
</tr>
<tr>
<td>Engineering and Design</td>
<td>$20,000</td>
<td>$300,000</td>
</tr>
<tr>
<td>Resident (Construction) Engineering</td>
<td>$15,000</td>
<td>$200,000</td>
</tr>
<tr>
<td><strong>Total (Not Including ROW)</strong></td>
<td><strong>$130,000</strong></td>
<td><strong>$2,150,000</strong></td>
</tr>
</tbody>
</table>

**Safety**

- **Bicycle Safety**
  - **Short Term:** Improved
  - **Long Term:** Improved
    - Buffered Bike Lane provided in westbound direction
    - Separated bike facility/shared use path provided

- **Pedestrian Safety**
  - **Short Term:** Slightly Improved
  - **Long Term:** Improved
    - Shorter, more visible crossings

- **Vehicle Safety**
  - **Short Term:** Slightly Improved
  - **Long Term:** Improved
    - Lower vehicle speeds

**Impacts**

- **Utility Impacts**
  - **Short Term:** No Impacts
  - **Long Term:** Moderate Impacts

- **Railroad Impacts**
  - **Short Term:** No Impacts
  - **Long Term:** Minor Impacts

- **ROW Impacts**
  - **Short Term:** No Impacts
  - **Long Term:** Minor Effort

- **Natural Resources**
  - **Conserved Lands**
    - **Short Term:** No Impacts
    - **Long Term:** No Impacts
  - **Wetlands**
    - **Short Term:** No Impacts
    - **Long Term:** No Impacts

**Community Character**

- **Aesthetics**
  - **Short Term:** Improved
  - **Long Term:** Highly Improved

- **Satisfies Purpose & Need**
  - **Short Term:** Yes
  - **Long Term:** Yes

*Does not include RRFBs (installed by others)*
5 Preferred Concept Plan

Based on input from the public, the project Advisory Committee, the City Council, and findings from the technical analysis, two preferred concept plans were developed to represent the proposed short-term and long-term package of improvements for the East Allen Street corridor. The short-term improvements include changes that can be implemented relatively quickly and cost-effectively, such as restriping and installation of signage, planters, or bollards. The set of long-term improvements require a higher level of effort for stakeholder coordination, design and construction, and are generally more expensive than the short-term improvements. On October 17, 2019 the City Council reviewed the proposed concept plans and on November 4, 2019 the City Council approved the recommendations presented in this chapter.
5.1 **Baseline Improvements**

Two areas along the corridor that were identified for improvement but were not determined to require an alternatives analysis include the I-89 Exit 15 On-Ramp and the Casavant Natural Area. The following sections describe the proposed improvements in both locations.

5.1.1 **I-89 Exit 15 Interchange**

Based on an evaluation of current traffic operations, it is proposed that the westbound approach to the I-89 southbound on-ramp be restriped to include two exclusive left turn lanes and a single through lane. This reconfiguration provides additional capacity for this critical turning movement. This adjustment reduces the westbound left turn lane average delay from 53 seconds per vehicle to 28 seconds per vehicle in the 2039 weekday evening peak hour. The 95th percentile queue length was also cut nearly in half during this peak period. When the restriping occurs, the signal timings should be modified to balance the new capacities and demands on the east and westbound approaches. To accommodate the two left-turning lanes, the I-89 southbound on-ramp would need to be widened and restriped to provide a merge from two to one lane prior to entering I-89.

*Figure 17: I-89 Exit 15 Improvements*
5.1.2 Casavant Natural Area

The Casavant Natural Area trailhead was identified by several members of the public as an area that is not very well marked from East Allen Street and does not reflect the asset that the area is to the community. A conceptual sketch of improvements was developed to include more formalized parking, a green space with room for trees, benches, and a trailhead area. It is also recommended that a visual separation from the adjacent property be added in the form of trees and hedges to the west of the proposed parking area. A sketch of the proposed improvements is shown below in Figure 18.

Figure 18: Casavant Natural Area Concept Sketch

5.1.3 Short-Term Concept Plan

The following figure, Figure 19, and implementation plan depict the preferred short-term improvements being proposed along East Allen Street that were approved by the City Council.
Figure 19: Short Term Concept Plan
Figure 19b: Short Term Concept Plan (Continued)
Table 5: Short Term Concept Plan Implementation Matrix

<table>
<thead>
<tr>
<th>Location</th>
<th>Description of Improvements</th>
<th>Estimated Cost*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Restripe eastbound merge lane to include 6' bike lane with hatched area and planters along southern curb</td>
<td>$60,000</td>
</tr>
<tr>
<td>2</td>
<td>Formalize parking and convert portion of current parking area to green space with vegetation and trailhead</td>
<td>TBD - based on elements incorporated in final design</td>
</tr>
<tr>
<td>3</td>
<td>Merge eastbound lanes into one lane before road diet begins</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Install road diet configuration with 11-foot travel lanes in each direction, 12-foot two-way center left turn lane, and 6-foot downhill bike lane with 2-foot striped buffer</td>
<td>$130,000</td>
</tr>
<tr>
<td>5</td>
<td>Widen curbed median for single westbound through lane west of I-89 Exit 15 interchange and add western curbed pedestrian refuge on western edge of median</td>
<td>$35,000</td>
</tr>
<tr>
<td>6</td>
<td>Restripe westbound East Allen Street approach to include two left turn lanes onto I-89 Southbound on-ramp, update signal heads, and optimize signal timings</td>
<td>$20,000</td>
</tr>
<tr>
<td>7</td>
<td>Widen I-89 Southbound on-ramp to accommodate additional lane and merge to one lane prior to entering I-89</td>
<td>$250,000</td>
</tr>
</tbody>
</table>

*Costs include construction, contingency, engineering and design, traffic control and mobilization/demobilization. Does not include Right-of-Way or property acquisition costs

5.1.4 Long-Term Concept Plan

Figure 20 on the following page depicts the preferred improvements being proposed along East Allen Street as the long-term corridor concept which was approved by the City Council.
Figure 20: Long Term Concept Plan
Figure 20b: Long Term Concept Plan (Continued)
### Table 6: Long Term Concept Plan Implementation Matrix

<table>
<thead>
<tr>
<th>Location</th>
<th>Description of Improvements</th>
<th>Estimated Cost*</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Allen Street Between Cascade Way and Abenaki Way</td>
<td>Relocate curbs on both sides of the road to create 6-foot northern and 8-foot southern green belt and install 5-foot bike lanes and 11-foot travel lanes in both directions. The southern 8-foot green belt may be converted into on-street parking contingent on retail development and City approval.</td>
<td>$540,000</td>
</tr>
<tr>
<td>East Spring Street</td>
<td>Install signalized intersection with eastbound left turn lane</td>
<td>$1,100,000</td>
</tr>
<tr>
<td>Manseau Street</td>
<td>Relocate crosswalk and RRFB to east side of Manseau Street</td>
<td>$20,000</td>
</tr>
<tr>
<td>East Allen Street Between East Spring and Dion Streets</td>
<td>Relocate curbs on both sides of the roadway to create the following cross-section, from north to south: 6-foot sidewalk, 7-foot green belt, 11-foot travel lane, 12-foot two-way center left turn lane, 11-foot travel lane, 7-foot green belt, 12-foot shared use path</td>
<td>$2,150,000</td>
</tr>
<tr>
<td>GMT Stop on South Side of East Allen</td>
<td>Relocate bus stop to transition area after road diet before second eastbound travel lane is added for I-89 Interchange</td>
<td></td>
</tr>
</tbody>
</table>

*Costs include construction, contingency, engineering and design, traffic control and mobilization/demobilization. Does not include Right-of-Way or property acquisition costs*