The preparation of this report has been financed in part through grant[s] from the Federal Highway Administration and Federal Transit Administration, U.S. Department of Transportation, under the State Planning and Research Program, Section 505 [or Metropolitan Planning Program, Section 104(f)] of Title 23, U.S. Code. The contents of this report do not necessarily reflect the official views or policy of the U.S. Department of Transportation.
# CONTENTS

**1.0 INTRODUCTION** ................................................................. 1  
1.1 REP SCOPING STUDY (2013–2016)...........................................2  
    PURPOSE AND NEED STATEMENT ..................................2  
    ALTERNATIVES IDENTIFICATION AND SELECTION ..........3  
1.2 REP SUPPLEMENTAL SCOPING STUDY ....................................4  
    OBJECTIVE AND GOALS .................................................5  
1.3 STAKEHOLDER COORDINATION AND OUTREACH ....................5  
    STAKEHOLDER COMMITTEE ...........................................5  
    STEERING COMMITTEE ................................................5  
    STUDY PROCESS ........................................................6  

**2.0 EXISTING CONDITIONS ASSESSMENT UPDATE** ...................... 7  
2.1 SURVEY INVESTIGATIONS ...................................................9  
    PRIVATE PROPERTIES AND RIGHT-OF-WAY ......................9  
2.2 HISTORIC AND ARCHAEOLOGICAL RESOURCES ....................11  
    HISTORIC RESOURCES ................................................11  
    ARCHAEOLOGICAL RESOURCES ....................................13  
    ENVIRONMENTAL ASSESSMENT AT 339 PINE STREET ...........17  

**3.0 ALTERNATIVES DEVELOPMENT** ........................................ 19  
3.1 STARTING POINT ............................................................19  
3.2 CROSS SECTIONS ..........................................................20  
3.3 ALIGNMENT VARIATIONS ..................................................21  
    DESIGN CRITERIA .......................................................21  
    ALIGNMENT VARIATION OPTIONS ................................24  
    NORTHERN TRUCK ACCESS TO RAILYARD .....................25
3.4 INTERSECTIONS .......................................................... 28
   PINE STREET INTERSECTION OPTIONS .............................. 28
   SOUTH CHAMPLAIN STREET INTERSECTION ........................... 29
   MAPLE STREET INTERSECTION ........................................ 29
3.5 IMPACTS ........................................................................... 30
   HISTORICAL AND ARCHAEOLOGICAL IMPACTS .................... 30
   RAILYARD IMPACTS AND MITIGATION ................................. 31
   PRIVATE PROPERTY IMPACTS ............................................ 36
   PUBLIC PARKING IMPACTS ............................................... 36
   STORMWATER MITIGATION ............................................... 37

4.0 ALTERNATIVES EVALUATION .................................................. 38
   SUMMARY OF EVALUATION .............................................. 41

5.0 FINDINGS AND RECOMMENDATIONS ....................................... 43
   5.1 SUMMARY OF FINDINGS .............................................. 43
   5.2 RECOMMENDATIONS ................................................ 43
   5.3 CITY COUNCIL APPROVED MOTIONS ................................ 43

LIST OF FIGURES

FIGURE 1-1: REP STUDY AREA ............................................... 1
FIGURE 1-2: REP SCOPING PHASE 2 ALIGNMENTS ..................... 3
FIGURE 1-3: REP SCOPING PHASE 2 ALTERNATIVES TO ADVANCE INTO NEPA ......................................................... 3
FIGURE 1-4: STUDY AREA OF REP SUPPLEMENTAL SCOPING STUDY ............ 4
FIGURE 2-1: PINE STREET AND BATTERY STREET HISTORIC DISTRICTS .......... 12
FIGURE 2-2: INDEPENDENT BLOCK ........................................ 13
FIGURE 2-3: ARCHAEOLOGICAL SITES IN REP STUDY AREA .................. 14
FIGURE 2-4: ROUNDHOUSE EXCAVATION PHOTO ........................ 16
FIGURE 2-5: UVM CAP EXCAVATION AND ELEVATION POINTS ................. 17
FIGURE 2-6: ADJACENT DEED-RESTRICTED PROPERTIES .................... 18
FIGURE 3-1: ALTERNATIVE 1B FROM REP SCOPING STUDY ................. 19
FIGURE 3-2: ALTERNATIVE 1B CROSS SECTIONS ............................ 20
FIGURE 3-3: POTENTIALLY IMPACTED STRUCTURES AND OPERATIONS .... 23
FIGURE 3-4: ALIGNMENT VARIATIONS WITH PRIMARY IMPACTS ............ 24
FIGURE 3-5: PINCHED CROSS SECTION OF VARIATION 3 .................... 25
FIGURE 3-6: NORTHERN TRUCK ACCESS TO RAILYARD .................... 27
FIGURE 3-7: INTERSECTION OPTIONS AT PINE STREET ..................... 29
FIGURE 3-8: MAPLE STREET INTERSECTION .................................. 30
FIGURE 3-9: EXISTING RAILYARD STRUCTURES AND OPERATIONS .......... 32
FIGURE 3-10: RELOCATED RAILYARD STRUCTURES IN VARIATION 1 & 3 .......... 34
FIGURE 3-11: RELOCATED RAILYARD STRUCTURES IN VARIATION 2, 3 ........ 35
FIGURE 4-1: EVALUATION MATRIX ......................................... 39
FIGURE 4-2: COST ESTIMATION COMPONENTS ................................ 42

LIST OF TABLES

TABLE 2-1: EXISTING CONDITIONS UPDATE SUMMARY ..................... 7
TABLE 2-2: PARCELS IN STUDY AREA POTENTIALLY AFFECTED BY REP ........ 10
TABLE 3-1: RELOCATED RAILYARD STRUCTURES/OPERATIONS ................ 33
TABLE 4-1: SUMMARY EVALUATION SCORES ................................ 41
TABLE 4-2: SUMMARY COST ESTIMATES .................................... 41
Appendices
Appendix A  Field Survey
Appendix B  Updated Storm-Sewer Utilities Map
Appendix C  Archaeological Investigations of the Roundhouse
Appendix D  Phase II Environmental Site Assessment - 339 Pine St
Appendix E  Stormwater Engineering Feasibility Assessment
Appendix F  Cost Estimates
Appendix G  Stakeholder and Public Engagement

List of Abbreviations
CCRPC  Chittenden County Regional Planning Commission
CSS  Combined Stormwater-Sewer
DPW  Department of Public Works
FHWA  Federal Highway Administration
NAPL  Nonaqueous Phase Liquids
NEPA  National Environmental Policy Act
P&N  Purpose and Need
REP  Railyard Enterprise Project
SMAC  Site Management Activities Complete
TEUC  Transportation, Energy and Utilities Committee
VRS  Vermont Railway Systems
1.0 INTRODUCTION

In early 2013, the City of Burlington, in partnership with the Chittenden County Regional Planning Commission (CCRPC) and in close cooperation with the Vermont Agency of Transportation (VTrans) and Federal Highway Administration (FHWA), initiated the Railyard Enterprise Project (REP). The REP aims to address multimodal safety, mobility, and operational transportation issues and to advance economic development opportunities in the southern Waterfront area of Burlington (Figure 1-1) by improving access and mobility through new urban streets.

The REP followed an enhanced scoping process under FHWA’s Every Day Counts/Planning and Environmental Linkages (EDC/PEL) initiative.

FIGURE 1-1: REP STUDY AREA

The result of the REP Scoping Study was the selection, by the Burlington City Council, of three REP alternatives to advance into preliminary engineering and permitting under the National Environmental Policy Act (NEPA), a process required for using federal funds to finance transportation projects. This REP Supplemental Scoping Study is a follow-on to the REP Scoping Study and its goal is to further refine and evaluate one of those alternatives, Alternative 1B, and to explore the feasibility of implementing the project without federal funding, using state and local funds only, thereby needing to conduct a complex, lengthy, and costly NEPA process.
1.1 REP SCOPING STUDY (2013–2016)

The Purpose and Need (P&N) statement of a project is essential in establishing a basis for the development and screening of alternatives and selection of preferred alternative(s). The REP Scoping Study developed a P&N Statement that remained the same under the REP Supplemental Scoping effort.

**Purpose and Need Statement**

**PURPOSE:**

The purpose of the Railyard Enterprise Project is to develop a network of multimodal transportation infrastructure improvements connecting Pine Street and Battery Street, which incorporate the principles of Complete Streets, and to: 1) support economic development in the area; 2) improve Livability of the surrounding neighborhoods; 3) enhance multimodal travel connectivity between the Pine Street corridor and Battery Street in the Burlington Waterfront South area; and 4) improve intermodal connections to the Burlington Railyard, a National Highway System (NHS)-designated intermodal facility.

**NEED:**

Develop supporting infrastructure to be consistent with the long-term vision of PlanBTV (Downtown and Waterfront part of the municipal plan\(^1\)) associated with the Railyard Enterprise Project area, that supports economic development in the area and enhances Railyard operations. There is a need for a new street network connecting Pine Street to Battery Street and related infrastructure to support economic development in the area. PlanBTV has identified the Railyard Enterprise Project area as prime for infill, mixed-use development to increase economic activity and to provide accessibility to underutilized lands adjacent to the Railyard.

**Improve livability and connectivity in the Railyard Enterprise Project area.** There is a need to improve the livability of residential areas and emerging mixed-use districts in the Railyard Enterprise Project area. Livability can be enhanced by dispersing traffic and reducing vehicle queues at neighborhood intersections, including the intersections of Pine Street with King and Maple Streets. Additional transportation connections between Pine Street and Battery Street, that do not involve Maple or King Street, will help improve Livability and travel conditions for all users in the Railyard Enterprise Project area.

**Enhance multimodal travel connections and choices in the Railyard Enterprise Project area.** There is a need for additional multimodal connections in the Railyard Enterprise Project area to support transit system performance, enhance bicycle and pedestrian connectivity and access and facilitate travel for families from existing neighborhoods to Battery Street, the Waterfront, and Lake Champlain. There is also a need to create safe and efficient, family-friendly, dedicated pedestrian and bicycle connections from Pine Street neighborhoods between Maple Street and Lakeside Avenue to the Waterfront, the Burlington Bike Path, and Lake Champlain and improve access from the King Street neighborhood.

**Improve connectivity and access between nearby streets, the Burlington Railyard, an NHS-designated intermodal facility, and Battery Street, while reducing the impacts of freight operations on adjacent neighborhoods.** There is a need to improve connections to the railyard in a way that enhances its operations while also reducing the impact of freight operations on adjacent neighborhoods.

---

\(^1\) Downtown and Waterfront PlanBTV: [https://www.burlingtonvt.gov/plan/planBTV/DW](https://www.burlingtonvt.gov/plan/planBTV/DW)
neighborhoods. PlanBTV recognizes the importance of the Burlington Railyard to the City’s economy and environment.

Alternatives Identification and Selection

The REP Scoping Study developed and evaluated numerous alternatives that met the P&N of the project and ultimately identified the alternatives shown schematically in Figure 1-2 to move forward for more detailed evaluation.

FIGURE 1-2: REP SCOPING PHASE 2 ALIGNMENTS

The REP Steering Committee met on October 29, 2015 to review the evaluation scores and select several wide-ranging alternatives to recommend to the Burlington City Council for advancement into preliminary engineering and permitting under NEPA. The REP Steering Committee supported the advancement of alternatives 1B, 2, and 5B into NEPA and send their recommendation to the City Council for their approval. At their December 21, 2015 meeting, the Burlington City Council resolved to support the advancement of the recommended REP alternatives 1B, 2 and 5B (see Figure 1-3) into NEPA and they also expressed their strong preference for alternatives that have the least impact to private property and existing businesses.

FIGURE 1-3: REP SCOPING PHASE 2 ALTERNATIVES TO ADVANCE INTO NEPA

Source: RSG
1.2 REP SUPPLEMENTAL SCOPING STUDY

The REP Supplemental Scoping Study further investigates Alternative 1B, one of the three preferred alternatives from the REP Scoping Study. Of those three alternatives, Alternative 1B was chosen as the most viable project because it has fewer impacts and costs compared to the other REP alternatives. The Burlington City Council resolved on December 12, 2016 to evaluate Alternative 1B due to its potential to be funded entirely through state and local funds, thereby negating the need for a NEPA process, and possibly expediting the delivery of the project.

Alternative 1B consists of a single street running between the Battery Street and Maple Street intersection and Pine Street, approximately 1,500 linear feet. The exact location of its Pine Street terminus depends on the type of intersection control at Pine Street, but it would likely be between Kilburn Street and Marble Avenue. The REP Supplemental Scoping Study area is smaller than the initial REP Scoping Study area (See Figure 1-4). This is because Alternative 1B has a smaller footprint and the analysis is limited to an area more immediately around the alignment.

FIGURE 1-4: STUDY AREA OF REP SUPPLEMENTAL SCOPING STUDY

The study area of the REP Supplemental Scoping Study (outlined in black with transparent yellow fill) is overlaid on a map from the REP Scoping Study that includes the original study area (in red), the latest version of Alternative 1B from the 2016 study, and the resource mapping from the 2016 study.

Source: RSG
Objective and Goals

The objective of the REP Supplemental Scoping Study is to develop and evaluate alignment and cross section variations of Alternative 1B that avoid or minimize impacts to railyard operations and private properties.

Important goals of further developing Alternative 1B are as follows:

- Minimize impact on railyard operations.
- Minimize impacts to structures outside of the railyard.
- Minimize permitting requirements.
- Minimize environmental impacts.
- Expedite the REP development process.
- Expedite the REP schedule.
- Minimize construction costs.
- Measure and mitigate risk.

1.3 STAKEHOLDER COORDINATION AND OUTREACH

The CCRPC and the Burlington Department of Public Works (DPW) retained a consultant team, led by RSG and including VHB and Third Sector Associates, to assist with the development of the REP Supplemental Scoping Study. The CCRPC managed the study and was responsible for its day-to-day progress. Various stakeholders were involved throughout the study to guide the process.

Stakeholder Committee

A group of the leading stakeholders for the REP met at critical junctures of the process to provide direction and guidance to the team. This Stakeholder Committee included representatives from the following agencies:

- CCRPC.
- The City of Burlington DPW.
- VTrans, represented by Policy and Planning, Rail and Environmental Sections, and the Municipal Assistance Bureau.

Steering Committee

The original REP Steering Committee was reconvened to represent multiple federal, state, local, public, and private stakeholders. Committee members reviewed and commented on specific project outputs and provided general oversight to the process. The Steering Committee comprised the following members:

- City of Burlington: City Council, Community Economic Development Office (CEDO), DPW, and the Department of Planning & Zoning.
- Ward 5 Neighborhood Planning Assembly and residents.
- King Street Neighborhood Revitalization Corporation.
- Champlain Housing Trust.
- Vermont Railway Systems (VRS).
• The Greater Burlington Industrial Corporation and a business representative.
• FHWA.
• VTrans.
• CCRPC.
• Local Motion.
• Green Mountain Transit (GMT).

Study Process

The supplemental scoping study included the following elements:

1. City Council resolution to proceed (November 28, 2016).
2. Steering Committee meeting initiating supplemental study (January 2017).
3. New/updated field data collection and analysis (January to May 2017).
4. Meetings and coordination with stakeholders (throughout the study), including the following:
   a. Private property owners (November–December 2016).
   c. Meetings with private property owners (June 2017).
   d. State Historic Advisory Council meeting (January 18, 2018).
5. Development of preliminary 1B variations (September 2017 to April 2018).
6. Steering Committee meeting with results from initial 1B evaluations (May 2018).
7. Refined 2D plans and environmental investigation (May to July 2018).
10. Coordination between the City and VTrans on best way to move the REP forward (2018 & 2019).

General information, presentations, meeting material and notes, and other relevant documents were made available on the project website: http://www.ccrpcvt.org/transportation/scoping/railyard-enterprise-project/.
2.0 EXISTING CONDITIONS ASSESSMENT UPDATE

The REP Scoping Study included an assessment of environmental, cultural, economic, and other resources and features in the study area. Because the data for this study were collected as early as 2013, the REP Supplemental Scoping Study includes an updated assessment of existing conditions to incorporate more recent data from the various surveys and related investigations. As noted earlier, the area of analysis was revised to include only the geographic limits of Alternative 1B.

Table 2-1 summarizes the existing conditions update. Investigations completed during the supplemental scoping study, which are referenced in Table 2-1, are described in subsequent sections of this report.

### TABLE 2-1: EXISTING CONDITIONS UPDATE SUMMARY

<table>
<thead>
<tr>
<th>RESOURCE/ FEATURE</th>
<th>2017 UPDATE</th>
<th>RELEVANCE TO STUDY AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural Lands</td>
<td>Updated GIS data from Natural Resources Conservation Service. No change to the data within the study area.</td>
<td>No soils designated as Prime Agriculture are in or near the study area. Soils designated as statewide significance are found to the north and east; however, their urban and densely developed nature make agricultural use improbable.</td>
</tr>
<tr>
<td>Archaeological Sites</td>
<td>No newly discovered sites. However, further investigation of the roundhouse (site VT-CH-736) was conducted during the supplemental study. See details below.</td>
<td>Of the five known archaeological sites in the study area, University of Maine at Farmington Archaeology Research Center (UMF ARC) recommended in its 2013 study that three of the sites undergo a Phase 2 site evaluation if they will be impacted by the REP design: the roundhouse (VT-CH-736), the historic Gregory site (VT-CH-732), and the historic coal site (VT-CH-734). UMF ARC did not recommend additional study for the other two sites in the study area.</td>
</tr>
<tr>
<td>Deed-Restricted Properties</td>
<td>No change in data. However, a soils and hydrogeologic assessment was conducted at the 339 Pine Street deed-restricted site (the former street department site). See details below.</td>
<td>Three properties have deed restrictions associated with the Pine Street superfund site. One of these properties—the former street department site—overlaps with the southernmost part of the study area.</td>
</tr>
<tr>
<td>Fish and Wildlife</td>
<td>No new data.</td>
<td>No water bodies or streams in study area. Lake Champlain is to the west, and the Pine Street Barge Canal lagoon is to the south.</td>
</tr>
<tr>
<td>Flood Hazard Zones</td>
<td>No change in data.</td>
<td>A flood hazard zone is approximately 100 feet south of the study area, encroaching on the...</td>
</tr>
</tbody>
</table>
### RESOURCE/FEATURE | 2017 UPDATE | RELEVANCE TO STUDY AREA
--- | --- | ---
Hazardous Waste Sites | A soils and hydrogeologic assessment was conducted at the 339 Pine Street property (the former street department site), which determined there are no NAPLs (nonaqueous phase liquids) present in the area evaluated. See details below. | As identified in the 2016 REP Scoping Study, there are two low priority sites and two SMAC (site management activities complete) sites in or in the vicinity of the study area.

Historical Buildings | No newly identified historic sites. However, further evaluation was conducted of the Independent Block building. See details below. | Some buildings in the study area are deemed contributing resources to the National Historic Pine Street District. Independent Block (at 255 S. Champlain Street) is the only site that would potentially be affected by the revised Alternative 1B.

Noise | Not evaluated. | Traffic will be displaced from the dense residential areas of Pine, Maple, and King Streets to the new roadway.

Pervious Surface | RSG modified its pervious surface drawing to delineate pervious areas and rail ballasts separately. | The study area is almost entirely impervious. The compaction of the ground has limited infiltration throughout the railyard area.

Properties | Parcel lines, building edges, and other structures confirmed by field survey conducted in January 2016 by Vermont Survey and Engineering. See details below. | The study area includes private properties, the railyard, a City-owned parcel, and City right-of-way.

Rare, Threatened, or Endangered Species | Updated GIS data from the Vermont Fish and Wildlife Department. | Some areas are designated as having rare, threatened, or endangered species present to the southwest and north of the study area, but none within the study area itself.

Section 4(f) Properties | 4(f) properties are protected by the Code of Federal Regulations and include historic properties, public parks, recreation areas, and wildlife and waterfowl refuges. | Properties of this type in or near the project area include the historic sites noted above. Public lands nearby include the Burlington Bikeway (path) and Perkins Pier.

Utilities—Electric (at/above grade) | Data via field survey conducted in January 2016 by Vermont Survey | Electric utilities were identified in the study area.
<table>
<thead>
<tr>
<th>RESOURCE/ FEATURE</th>
<th>2017 UPDATE</th>
<th>RELEVANCE TO STUDY AREA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utilities—Storm, Sewer, and Water</td>
<td>Data via field survey conducted in January 2016 by Vermont Survey and Engineering and City of Burlington to supplement available GIS data. RSG conducted a review of both data sources to reconcile differences and provide a map logically combining the data. See details below.</td>
<td>Storm, water, and sewer utilities were identified in the study area.</td>
</tr>
</tbody>
</table>
| Wetlands                              | No change in data.                                                            | Several wetland areas were delineated during the Champlain Parkway Environmental Impact Study (2009) just southwest of the study area, but there are no wetlands within the study area. | Source: RSG

### 2.1 SURVEY INVESTIGATIONS

Vermont Survey and Engineering conducted a field survey of the REP Supplemental Scoping Study area. The survey includes topographies, parcel boundaries, aboveground and underground utilities, structures, and landscape features. These data inform how properties, stormwater management, and utilities may be affected by the REP. Land title research will be required as the project advances. The survey is shown in Appendix A.

**Private Properties and Right-of-Way**

Properties in the study area potentially affected by the REP include several privately owned properties, the railyard, and the City-owned 339 Pine Street (former street department parcel). Information on each of these is shown in Table 2-2. All have active commercial uses, ranging from office space to light manufacturing, and different needs that must be considered when developing alternatives.

Whether the entire segment of South Champlain Street south of Maple Street is part of the City right-of-way is disputed; a portion of it may be owned by the state (VTrans).
TABLE 2-2: PARCELS IN STUDY AREA POTENTIALLY AFFECTED BY REP

<table>
<thead>
<tr>
<th>ADDRESS</th>
<th>OWNER</th>
<th>LOT AREA</th>
<th>ZONING</th>
<th>NO. BUILDING UNITS</th>
<th>BUILDING TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>241-243 South Champlain Street (Independent Block)</td>
<td>Independent Block LLC</td>
<td>102,697</td>
<td>Battery Street Transition</td>
<td>5</td>
<td>Warehouse</td>
</tr>
<tr>
<td>216 Battery Street (&quot;Rambler&quot; building)</td>
<td>Complex Enterprises LLC</td>
<td>3,449 SF</td>
<td>Battery Street Transition</td>
<td>2</td>
<td>Office</td>
</tr>
<tr>
<td>315 Pine Street (Curtis Lumber)</td>
<td>Parkview at Ticonderoga LLC</td>
<td>139,313 SF</td>
<td>Enterprise—Light Manufacturing</td>
<td>1</td>
<td>Warehouse</td>
</tr>
<tr>
<td>47 Maple Street (parking lot)</td>
<td>MGD Inc</td>
<td>10,000 SF</td>
<td>Battery Street Transition (parking only)</td>
<td>n/a</td>
<td></td>
</tr>
<tr>
<td>7 Kilburn Street (Offices, Citizen Cider, USPS)</td>
<td>Kilburn Gates Industries LLC</td>
<td>129,722 SF</td>
<td>Enterprise—Light Manufacturing</td>
<td>34</td>
<td>Office</td>
</tr>
<tr>
<td>339 Pine Street (former Street Department building)</td>
<td>City DPW</td>
<td>140,700 SF</td>
<td>Enterprise—Light Manufacturing</td>
<td>1</td>
<td>Municipal Garage</td>
</tr>
<tr>
<td>101 Lavalley Lane</td>
<td>State of Vermont Agency of Transportation Rail Unit</td>
<td>849,454 SF</td>
<td>Enterprise—Light Manufacturing</td>
<td>2</td>
<td>Warehouse</td>
</tr>
</tbody>
</table>

Source: City of Burlington Grand List

**Utilities**

The survey includes both underground and aboveground utilities. It identifies the precise location of the following:

- Stormwater pipes and grates.
- Combined stormwater-sewer pipes and maintenance holes.
- Water pipes, water valves, and water wells.
- Gas valves.
- Fire hydrants.
- Utility poles and transmission poles.
- Guy wires.
- Overhead wires.
Stormwater and Sewer Data

Stormwater and sewer utility data—storm drains, maintenance holes, stormwater pipes, and combined stormwater-sewer (CSS) pipes—are also available as a GIS shapefile from the City, and RSG reviewed both sources to reconcile differences and provide a map logically combining the data.

In general, the survey was considered the more accurate location source of storm drains and maintenance holes. However, the survey did not include all pipelines, so the City’s GIS lines for stormwater and CSS pipes were adjusted to connect to the surveyed drains and maintenance holes.

In some case, pipelines were drawn in where they logically would be but were not shown in either data source. The final map (see Appendix B) uses different line types to differentiate between these unconfirmed lines, data from the survey, and data from the City.

2.2 HISTORIC AND ARCHAEOLOGICAL RESOURCES

The study area includes archaeologically sensitive sites and historic structures. The presence of these were investigated first as part of the Champlain Parkway project, then during the REP Scoping Study.

Historic Resources

The REP Scoping Study area lies within two historic districts (Figure 2-1). Most of the study area is within the National Registered Pine Street Historic District, and the northern end of the study area is within the National Register-listed Battery Street Historic District. Within these historic districts, each building is either a contributing resource or noncontributing resource to the district it is within. Independent Block, at 241-243 South Champlain Street, is the only building within the REP Supplemental Scoping Study’s area that is a contributing resource.
Independent Block

This long, narrow series of connected buildings measures 300 feet from north to south (Figure 2-2). For many years, it housed the Champlain Valley Fruit Company, which began in 1915 and was originally located at 171 Battery Street. In 1918, the company moved to South Champlain Street by purchasing a warehouse and refrigeration plant built in 1909. Today, the buildings are referred to collectively as “Independent Block.” This interconnected series of five buildings reflects the incremental growth and development of the Pine Street industrial area. Its location provides immediate access to the rail and road transportation network. While the buildings have evolved and changed over the decades, they still...
reflect the industrial past of the complex, and portions continue to be used for cold storage of bulk goods.

The southwestern part of the southernmost building would be impacted by one of the alignment variations. The southernmost building is a massive, one-story, flat-roofed concrete block building with four windows and a single loading dock door opening onto South Champlain Street. A railroad siding runs directly behind (west side) the building. It was constructed circa 1955 and served as warehouse space for the Champlain Valley Fruit Company.

VTrans, as a REP project partner, has made specific inquiries into Independent Block’s historical nomination and confirmed that the Independent Block in its entirety is classified as a contributing resource.

**FIGURE 2-2: INDEPENDENT BLOCK**

Image source: Google Maps

**Archaeological Resources**

The University of Vermont’s Consulting Archaeology Program (UVM CAP) conducted an archaeological resources assessment for the REP Scoping Study in 2013, summarized in its Report 730. It largely gathered data from an archaeological survey conducted in 1996 by University of Maine Farmington Archaeology Research Center (UMF ARC) as part of the Champlain Parkway Study; the entire REP study area is within the Champlain Parkway study area.

UVM CAP determined there are five archaeological sites in the REP study area:

- **VT-CH-732**, the historic “Gregory” site, comprised of a stone foundation.
- **VT-CH-733**, the historic “Post” site, which may represent a portion of a wooden shed associated with a lumber yard at this location.
- **VT-CH-734**, the historic “Coal” site, remnants of a coal storage facility consisting of two circular concrete foundations and a flat constructed stone surface.
- **VT-CH-735**, the historic “Lawn” site, remnants of a concrete foundation and associated wiring and piping, judged by earlier investigations not to be archaeologically significant.
- **VT-CH-736**, the historic “Rail” site, remnants of a circular foundation of the turntable portion of the roundhouse, described as “remarkably preserved beneath the current railroad yard.”
In addition to these five specific sites, a general area in the northeast quadrant of the study area was identified as sensitive for precontact Native American sites. A third area of sensitivity includes the area of the historic boat slip (aka the “Northern Slip”) adjacent to the Barge Canal. These archaeologically sensitive sites in the REP study area are shown in Figure 2-3.

**FIGURE 2-3: ARCHAEOLOGICAL SITES IN REP STUDY AREA**

Source: UVM CAP Report 730, June 2013

Archaeological sites and archaeologically sensitive areas within the study area of the REP Scoping Study.
In Report 730, UVM CAP’s recommendations for further investigation include the following:

- Phase 1 site identification, via backhoe trenching, in the area of the historic boat slip, now filled, that extends north from the Barge Canal.
- Phase 2 site evaluations of sites VT-CH-732 (“Gregory”), VT-CH-734 (“Coal”), and VT-CH-735 (“Lawn”).

The REP Supplemental Scoping Study focused on the roundhouse given the perceived significance of the resource as well as the balance of potential impact between archaeological significance and cultural historic significance of the Independent Block.

The UVM CAP recommendations of a Phase 2 evaluation of the above sites should be conducted during the preliminary engineering process.

**Roundhouse Investigation**

The historic railyard site (VT-CH-736), referred to as the “roundhouse” during this study, is the foundation remnants of the Rutland and Burlington Railroad facility constructed between 1851 and 1852, which was a roundhouse with a full interior turntable. The engine house burned in 1917. The turntable remained in service for several more months, being retired in April 1918.

This facility is remarkably preserved beneath the current Vermont Railway railyard, as shown in Figure 2-4 (Figure 6 of the historic district nomination report²). The circular foundation remnants of the turntable along with a substantial amount of the quarter-round-style foundation of the Rutland and Burlington Railroad engine house remain. A brick-lined floor and at least two brick-constructed maintenance pits are preserved within the interior portion of the engine roundhouse.

---

The roundhouse site was initially identified and investigated by the University of Maine at Farmington Archaeology Research Center (UMF ARC) in 1996. As part of the REP Supplemental Scoping Study, UVM CAP conducted a Phase 2 investigation of the eastern and northeastern sides of the roundhouse from May 3, 2017 to May 6, 2017.

UVM CAP uncovered the eastern and northeastern side of the roundhouse, designated the four bays as bays 1-4, and marked key points A-P with stakes (Figure 2-5). Following this, Northeast Archaeology Research Center surveyed those marked points to create an accurate map of the buried site’s location. As a result of this study, the horizontal and vertical position of bays 1-4 were identified. In addition, the southeastern side of the roundhouse was also identified in horizontal and vertical contexts.

The excavation identified that the depth of the roundhouse below the current grade varies, between 11 inches at point P (southern extent) and 32 inches at points A, B, and C (northern extent). The eastern bays are generally between 16 inches and 20 inches below the current grade.

The Vermont Advisory Council on Historic Preservation suggested that the horn track\(^3\) or the nonroad elements of the REP (the green belt, shared-use path, and barrier fence area) could be considered acceptable caps to provide protection to the roundhouse.

---

\(^3\) A curved parallel rail line track with several uses. The curvature and length of the horn track are key attributes, as is the access to heavy bulk materials like ballast.
Appendix C includes the following reports:

- Northeast Archaeology’s Archaeology Resource Mapping study (December 2016)
- UVM CAP’s End of Field Letter (May 2017)

**Environmental Assessment at 339 Pine Street**

339 Pine Street, the former City of Burlington Street Department site, is a property with deed restrictions due to the proximity to the Pine Street Canal Superfund site and the likely contaminations associated with historical activities at the site. The southernmost segment of all Alternative 1B alignment variations affect the 339 Pine Street parcel to varying degrees. Relocation of railyard uses and
coordination with the adjacent Curtis Lumber property all require that 339 Pine Street be reconfigured and utilized in new ways.

An environmental investigation was necessary to provide an initial evaluation. The evaluation sought to confirm that proposed loading on the site associated with the REP road or other railyard uses would not adversely affect the current remediation program at the superfund site. It also sought to confirm that no contaminants migrated to or are present within the project site.

**FIGURE 2-6: ADJACENT DEED-RESTRICTED PROPERTIES**

Waite-Heindel Environmental Management was retained to conduct geotechnical and environmental testing in late June 2017 and early July 2017. The primary objectives of the testing included:

- Confirm or deny presence of coal tar NAPL (nonaqueous phase liquid) in the subsurface soils under the Study Area (such as what has been observed at 453 and 351 Pine Street).
- Confirm or deny presence of coal tar NAPL in groundwater under the Study Area.
- Confirm or deny presence of organic soils (peat or organic silt) in the subsurface stratigraphy under the Study Area (such as what has been observed at 453 and 351 Pine Street).
- Conduct limited soil contaminant sampling in shallow soils to better understand the level of soil management/remediation that may be necessary if road construction is pursued.

The work entailed drilling and testing several borings, some to refusal, and testing both soil characteristics and water for possible contaminants. The investigation report results provided initial support for the proposed roadway alignment and reconfigured railyard on the 339 Pine Street property:

*The lack of NAPL and only low levels of petroleum in the soil under the Study Area suggests that a future roadway is unlikely to “cause migration of contaminated groundwater to Lake Champlain to such an extent that the remedial action may be jeopardized or that significant risk to Lake Champlain may result” as stated in the Grant of Environmental Restrictions and Right of Access, aka Superfund Easement.*

Environmental analysis findings from the investigation at 339 Pine Street are included in Appendix D.
3.0 ALTERNATIVES DEVELOPMENT

3.1 STARTING POINT

The development of Alternative 1B in this study began where the 2016 REP Scoping Study left off. The alignment of Alternative 1B from the REP Scoping Study is shown in Figure 3-1. Beginning at the intersection of Battery Street and Maple Street, it runs southeast along the eastern edge of the railyard, dips southward after South Champlain Street, then curves east to meet Pine Street with a roundabout.

**FIGURE 3-1: ALTERNATIVE 1B FROM REP SCOPING STUDY**

Refining Alternative 1B in the supplemental scoping study was an iterative process that took a more detailed look at roadway geometry (using a topographic survey), the site (using the updated existing conditions assessment), railyard operations (review of specific operations for all areas of the railyard), and how these all can be integrated. It resulted in three alignment variations, three intersection options at Pine Street, development of the intersections at South Champlain and Maple streets, and development of a northern truck access from the REP road into the railyard. All these pieces are discussed in the following sections.

*Source: REP Scoping Report (RSG, 2016)*
3.2 CROSS SECTIONS

In the REP Scoping Study, Alternative 1B was designed with three different cross sections: Complete Street 3 north of South Champlain Street, Complete Street 2 south of South Champlain Street, and Slow Street 1 on South Champlain Street. All include one 10-foot travel lane in each direction, pedestrian accommodations, and a 6-foot tree belt between the roadway and any sidewalks or shared-use paths. When bordering the railyard, the street would also have a three-foot zone on the west side with a barrier fence.

These cross sections generally remained the same in this supplemental study; exceptions are alignment-specific and are discussed in the following section. The base cross section designs used in this supplemental scoping study are shown in Figure 3-2.

FIGURE 3-2: ALTERNATIVE 1B CROSS SECTIONS
3.3 ALIGNMENT VARIATIONS

Design Criteria

The REP study area is a complex and dynamic environment comprising an active railyard, legacy users benefiting from an open and unconstrained area, and limited options for relocating important operations. For these reasons, laying out a new street through the REP site might be aptly described as threading a series of needles.

The area includes numerous structures and operations. Due to space constraints, and in order for the street to meet the needs of its users, impacts to some users are inevitable. Variations on the 1B alignment were designed to provide a usable roadway design while minimizing impact to the structures and operations.

Figure 3-3 shows the structures and operations that the designs attempt to avoid or mitigate the impacts of.

The primary structures and operations the designs attempt to avoid or mitigate impacts on include the following:

- **Privately owned buildings**
  - Independent Block: A large, concrete block wall structure near the horn track and a contributing resource to the Pine Street Historic District.
  - 216 Battery Street (the “Rambler” building): The private building has adjacent parking and a parcel boundary immediately adjacent to the REP alignment.

- **The horn track**: A curved parallel rail line track with several uses. The curvature and length of the horn track are key attributes, as is the access to heavy bulk materials like ballast.

- **The roundhouse**: A well-preserved archaeological site consisting of the underground foundation of the original roundhouse. The Vermont Advisory Council on Historic Preservation suggested that the horn track or the nonroad elements of the REP could be considered an acceptable cap to provide protection to the resource.
The study area includes several other structures and operations that the designs attempt to avoid or mitigate the impacts of, including the following:

- **Independent Block’s loading area**: For a portion of the building to continue serving its current purpose, trucks need space to access and circulate in the area around the loading dock on the west side.

- **Railyard operations and structures**: Truck access and circulation, fuel tanks, salt shed, and the ballast area. If the horn track is relocated, then other structures and operations will also be affected. Railyard structures and operations are comprehensively identified in Figure 3-9.

- **Parking spaces**: Parking spaces behind Independent Block and the Karma Bird House (47 Maple Street, owned by MGD, Inc) that require access to the REP.

- **Right-of-way**: Even if not impacting structures or operations, it is desirable to avoid encroaching on private property when possible to avoid the expense associated with purchasing right-of-way.

---

*Independent Block’s loading dock*

*MDG Inc’s parking area*
FIGURE 3-3: POTENTIAL IMPACTED STRUCTURES AND OPERATIONS

Source: Google Maps with markup by RSG
Alignment Variation Options

Three alignment variation options were developed, each of which were designed to avoid or minimizing impacts on one or more of the primary structures/operations in the study area. They are illustrated in Figure 3-4 and described below.

FIGURE 3-4: ALIGNMENT VARIATIONS WITH PRIMARY IMPACTS

Variation 1: Impact Horn Track (Minimize Private Property Impacts)

Variation 1 does not impact Independent Block or the Rambler building, which requires relocating the horn to the west. The relocated horn track would then lie above the western edge of the roundhouse. The shared-use path of the REP is also likely to partially overlap and cover the roundhouse. The depth of the horn track ballast and shared-use path are expected to avoid any physical impact on the roundhouse.

Variation 2: Impact Buildings (Minimize Railyard Impacts)

Variation 2 does not impact the horn track or roundhouse, but it would result in a full demolition of the Rambler building and a demolition and partial reconstruction of the southern end of Independent Block.

Variation 3: Pinched Cross Section (Balanced Impacts)

Variation 3 attempts to balance and minimize any one significant impact by modestly shifting the horn track to the west and narrowing the roadway cross section in the tightest spot. Figure 3-5 shows the...
“pinched” cross section at 34-feet wide (37 feet with the barrier fence), with no green belt between the shared-use path and the roadway. The horn track would overlap with the outer edge of the roundhouse.

**FIGURE 3-5: PINCHED CROSS SECTION OF VARIATION 3**

![Image of pinched cross section](source: RSG)

**Northern Truck Access to Railyard**

All three variations include a break in the REP south of Maple Street for vehicle access to the railyard. A sliding gate/fence would control access at this driveway. The design and dimensions of the access depend on the alignment variations and are shown in Figure 3-6.

The railyard’s primary heavy-vehicle access to the REP road is via the southern driveway across from South Champlain Street. However, WB-67s will not have sufficient space to turn around within the railyard and will use the northern driveway to return to the City street grid. WB-67s are expected to drive only in one direction through the railyard (either southbound or northbound)—though smaller trucks may use either driveway in either direction by being able to turn around in the railyard.

In addition to regular truck access, the northern driveway would also be used a few times a year for trucks loading and unloading from a new rail siding specifically built for an operation termed “circus loading” used for the Champlain Valley Fair and a recent Vermont Army Reserve’s trip to Louisiana. Because of the tight proximity of the siding and the roadway and large truck turning radii, variations 1 and 3 would require a portion of the path and green belt adjacent to the driveway to be mountable by trucks. This infrequent exercise would require that the entire REP road would be closed to regular traffic. The operation requires direct loading of vehicles or equipment from the end of the rail car. The apparatus then needs to access the REP. The ‘circus loading’ configuration is one of the most space intensive operations that occurs in the railyard.

RSG was on-site for the loading and unloading of some of the Champlain Valley train cars to measure actual turning radii and the space required for the vehicles to maneuver. These informed the location and design of the northern REP access.
Source: RSG

Unloading for the Champlain Valley Fair
FIGURE 3-6: NORTHERN TRUCK ACCESS TO RAILYARD

Source: RSG
3.4 INTERSECTIONS

Pine Street Intersection Options

At the REP road’s southern terminus intersection with Pine Street, the REP Scoping Study showed a roundabout in place. In the current REP Supplemental Scoping Study, three intersection options are considered:

- Roundabout.
- Signalized T intersection.
- “Tangential” intersection.

Any of the three options can be combined with any of the roadway alignment variations. They are described below and shown in Figure 3-7.

With the signalized intersection option, the REP road meets Pine Street south of Kilburn Street, at the driveway shared by Citizen Cider, USPS, and other tenants of the Kilburn Gates property. A northbound left-turn lane and protected signal phase would encourage and support a high flow to the REP, attempting to reduce flows north of the REP along Pine Street. The T intersection geometry has the least amount of traffic diversion onto the new REP roadway, estimated to attract 35% of the Pine Street traffic.

The roundabout option was located to avoid impacting the Curtis Lumber and Kilburn Gates properties; it mainly overlaps with 339 Pine Street, the former street department site. The inscribed diameter of the single-lane roundabout is 120-feet wide. The roundabout complicates the daily movements of large trucks to and from the Citizen Cider property, just north of the intersection. The roundabout is assumed to fall midway between the signal and the tangent option in the amount of traffic it diverts from Pine Street to the REP roadway.

With the tangential intersection option, Pine Street and the REP road flow into each other without traffic control to divert traffic from surrounding neighborhoods. The segment of Pine Street north of the REP road would curve to meet the REP road at a signalized T intersection, making the REP the direct path into the City. This option will reduce traffic flows the most at northern Pine Street and the Pine Street/Maple Street intersection, with an estimated 59% of Pine Street traffic diverted to the new REP road.

When designing the Pine Street intersection options and REP alignment variations, a “seam” was created between the “top”—any given alignment variation north of the Pine Street intersection—and the “bottom”—the Pine Street intersection. The seam is south of S. Champlain Street. By doing this, a top and bottom can be swapped in and out easily in the design and analysis process.

The diversion was estimated by running the regional travel demand model and changing the intersection control.
FIGURE 3-7: INTERSECTION OPTIONS AT PINE STREET

<table>
<thead>
<tr>
<th>Signalized T</th>
<th>Roundabout</th>
<th>Tangent</th>
</tr>
</thead>
</table>

Source: RSG

Note: Even though these options are referred to as intersection options, they include most of the roadway south of South Champlain Street. The “seam” between the top alignments and the Pine Street intersection options is the same for all alternatives and is marked with a dashed red line.

South Champlain Street Intersection

Each alignment variation includes a driveway for the railyard at the South Champlain Street intersection with the REP road. The driveway and South Champlain Street intersection is likely to be stop-controlled, although a need for a signal would be monitored. The City and VRS should monitor if access or safety is being impeded by the side street stop-controlled drive to determine if a signal would alleviate the issues. The driveway into the railyard is designed to accommodate the WB-67 into and out of the site. The South Champlain Street is a slow street, designed to offer on-street parking, narrow lanes, and provide access to the adjacent land uses but minimize through traffic.

Maple Street Intersection

The northern intersection of the REP at Battery Street and Maple Street is the same for each variation. It remains a signalized intersection and is forecast to perform at a similar level of service as it does today – however the current heavy flow between Battery and Maple Streets will shift to a through movement from Battery Street to the REP in the future. The turning radius from the REP onto Maple Street would likely require a wider entry or a truck apron. The intersection improvements are shown in Figure 3-8 that also include a possible improved path connecting the REP road’s shared-use path with the Burlington Greenway.
Implementation of any of the Alternative 1B variations would involve impacts to private properties, the railyard, cultural resources, and stormwater management. This section identifies those impacts and offers mitigation strategies.

**Historical and Archaeological Impacts**

Alignment Variation 2 would impact the southwestern corner of the Independent Block building, a contributing resource in the Pine Street Historic District.

The well-preserved and unique roundhouse is also a contributing resource in the historic district. Regardless of the variation pursued, additional protections should be considered for the roundhouse; however, the complexities of jurisdiction make this difficult. Variations 1 and 3 both relocate the horn track and portions of the REP alignment over the roundhouse. In both instances, whether it be a rail line or a road alignment, the goal is to provide a permanent cap to the roundhouse that would minimize adverse forces that could deteriorate the structure.

For a railway over the roundhouse, VRS indicated that approximately 12 inches of ballast subbase would be used under the horn track. Given the depth of the roundhouse, least shallow elevation of 12 inches, the ballast fill, and the infrequent distributed loading, the structural loading impacts of the horn track are estimated to be less than what is currently experienced by the present gravel cover and frequent truck and ballast weight loads (point and distributed loading).
Variation 1 would locate a portion of the shared-use path over the roundhouse. The subbase and depth required for the shared-use path should also avoid any direct disturbance of the roundhouse. The roadway and any subdrains and subbase would be located away from the roundhouse.

The Advisory Council for Historic Preservation suggested that prior to any permanent cap of the resource, a full detailed Phase 3 investigation should be conducted to ensure that proper documentation, photos, and resource information can be shared and made available. A landmark and information display shall be erected in the project area to educate and share this and other historic resources with the public.

**Vermont Advisory Council for Historic Preservation**

A meeting held with the Vermont Historic Advisory Council provided the project preliminary guidance on the level of concern of potential impacts to the roundhouse versus the Independent Block.

The project team provided the committee with an overview of the project, the P&N, and the alternatives that are likely to affect one or both contributing historic and cultural resources. The response from the council was general and noncommittal at this level of planning; however, it was clear that the roundhouse was viewed as the more important resource to protect and conserve. The roundhouse is viewed as a rare and sensitive historical resource that deserves protection. The project heard that a “permanent cap,” such as relocating the horn track or the shared-use path, would be suitable solutions to protect the resource provided sufficient evidence is obtained during a Phase 3 investigation prior to capping. The details of the cover would be determined during the design phase of the project.

**Railyard Impacts and Mitigation**

The REP road would affect some structures and railyard operations in all variations; the differences come down to private property costs versus horn track/operational costs. Variation 2 has the least impact on the railyard; most significantly, the horn track remains. Variations 1 and 3 have almost identical impacts to the railyard and impact more structures/operations than Variation 2 does, including the horn track.

All known railyard structures and operations are shown in Figure 3-9, with the areas of ones potentially impacted shaded in red. Just as any other business, the VRS railyard in Burlington is never static and requires adapting to market conditions. Over the course of the REP scoping studies, operations continued to change and evolved to meet market needs.

The project team engaged with VRS to assess how the variations affect the operations of the railyard. The engagement occurred over several meetings and explored different layouts of the horn track; these meetings also explored the feasibility of locating operations on-site versus off-site.

Figure 3-9 summarizes the operations based on conversations with VRS during the supplemental scoping study.
Table 3-1 identifies railyard structures/operations affected by one or more REP variation and where they would be relocated in each variation. Impacted structures/operations would be either relocated elsewhere in the railyard or off-site to other VRS facilities.

For structures relocated on-site, suggested relocations are shown in Figure 3-10 and Figure 3-11.
<table>
<thead>
<tr>
<th>ID #</th>
<th>OPERATION</th>
<th>APPROXIMATE SIZE</th>
<th>VARIATION 1</th>
<th>VARIATION 2</th>
<th>VARIATION 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 3</td>
<td>Salt Shed &amp; Conveyor</td>
<td>20,000 SF</td>
<td>« off-site</td>
<td>« off-site</td>
<td>« off-site</td>
</tr>
<tr>
<td>2, 14</td>
<td>Ballast Area &amp; Stone Loading Area</td>
<td>23,000 SF</td>
<td>» Salt shed area</td>
<td>» Salt shed area</td>
<td>» Salt shed area</td>
</tr>
<tr>
<td>4</td>
<td>Fuel Facility</td>
<td>2,000 SF</td>
<td>» adjacent (drawn)</td>
<td>Remains</td>
<td>» adjacent (drawn)</td>
</tr>
<tr>
<td>5</td>
<td>Truck Trailer Terminal Storage</td>
<td>4,800 SF</td>
<td>» 339 Pine St</td>
<td>Remains</td>
<td>» 339 Pine St</td>
</tr>
<tr>
<td>8</td>
<td>Lumber/general surface space</td>
<td>4,300 SF</td>
<td>» on-site</td>
<td>Remains</td>
<td>» on-site</td>
</tr>
<tr>
<td>10</td>
<td>Bulk Unloading</td>
<td>3,000 SF</td>
<td>« off-site</td>
<td>« off-site</td>
<td>« off-site</td>
</tr>
<tr>
<td>12</td>
<td>Calcium Chloride</td>
<td>3,400 SF</td>
<td>» on- or « off-site</td>
<td>» on- or « off-site</td>
<td>» on- or « off-site</td>
</tr>
<tr>
<td>15</td>
<td>Track Unloading</td>
<td>8,000 SF</td>
<td>» on- or « off-site</td>
<td>» on- or « off-site</td>
<td>» on- or « off-site</td>
</tr>
<tr>
<td>16</td>
<td>Pike/general surface space</td>
<td>4,000 SF</td>
<td>» on-site</td>
<td>» on-site</td>
<td>» on-site</td>
</tr>
<tr>
<td>20</td>
<td>Industrial Track</td>
<td>785 LF</td>
<td>Remove</td>
<td>Remove</td>
<td>Remove</td>
</tr>
<tr>
<td>(n/a)</td>
<td>Horn Track</td>
<td>1,300 LF</td>
<td>» adjacent</td>
<td>Remains</td>
<td>» adjacent</td>
</tr>
</tbody>
</table>

**KEY:**
- » Relocate on-site
- « Relocate off-site
- Remove
- Remains

*Source: RSG*
Potential relocations of railyard structures are identified in blue. The alignment drawn here is Variation 1 with the tangent connection to Pine Street, but these changes are true for both Variation 1 and Variation 3.
Railyard Land

A potential mitigation option to address operational impacts to the railyard due to the REP is a land swap for a portion of 339 Pine Street and the western Curtis property. The larger combined area would allow for a 1:1 land compensation for the land removed for general use by VRS for the REP road. South of South Champlain Street, the REP road bisects the Curtis Lumber’s property, isolating a portion of it. That portion could be reallocated to VRS, and Curtis Lumber would gain the land formerly occupied by the Pine Street Spur (Industrial Rail) and possibly gain land on 3 Pine Street north of the REP road. Lastly, VRS would build a replacement to the existing Curtis Lumber structure to provide storage for bulk items that arrive by rail.
Private Property Impacts

Curtis Lumber

In all variations, and with all Pine Street intersection options, Curtis Lumber’s property is impacted. The roadway would bisect the property, and the storage barn/garage would require relocation. As discussed in the previous section and shown in both Figure 3-10 and Figure 3-11, there are options to mitigate the impacts to the Curtis property. The storage barn could be relocated along the former Pine Street Spur land (at the northeast corner of 339 Pine Street) or west of the current salt shed to provide proximity for loads coming by rail. The project should not affect the ability for Curtis Lumber to conduct business and should not adversely affect the daily operations in a material way.

Independent Block

All variations affect some parking spaces on the Independent Block property, with Variation 2 impacting the southwest corner of the southernmost building. The southern end of the structure currently serves as an interior vehicle parking area, last permitted locally in 2015 as a change in use from a warehouse use and is also home to several businesses.

In Variation 2, the roadway travels through what is currently the southern portion of Independent Block. While the entire structure is deemed a contributing resource to the historic district, the Advisory Council suggested their openness to consider physical impact to this structure while prioritizing protecting the railyard roundhouse. If the southern portion of the building is torn down, it would be along practical lines of deconstruction with all attempts to reconstruct to reflect the existing historical characteristics. The loading docks are of importance to the historic character and function of Independent Block. The loading docks (northern portion of building) should be operational in all variations; however, the ease of use and possible impact to adjacent parking should be further evaluated in subsequent phases of the project.

“Rambler” Building (216 Battery Street)

The “Rambler” building, owned by Complex Enterprises, LLC, would be torn down in Variation 2 and the parcel purchased as part of the project. The parcel may provide opportunities for storm water treatment, additional surface parking, or a “pocket” park, depending on the exact geometry of the REP roadway and interaction with adjacent MGD parking. The building is not impacted with REP Variation 1 and Variation 3, but some parking changes might be necessary depending on the final REP plans.

MGD, Inc

MGD, Inc. owns a rectangular parcel used as a parking lot in the area behind 47 Maple Street (i.e., Karma Bird House). Variation 2 would cut off a corner of the lot, affecting a few parking spaces. The area today is loosely managed and would require a revised layout if Variation 2 were pursued. Reconfiguring and formalizing the layout of the remaining parking spaces may further reduce the total amount of parking spaces.

Public Parking Impacts

In all variations, 14 street parking spaces along South Champlain Street would be impacted by the proposed “Slow Street” cross section. No other public parking would be affected by the REP.
Stormwater Mitigation

Stone Environmental, Inc. (Stone) was retained by the CCRPC to evaluate stormwater options for the REP. The original scoping study identified stormwater as a significant risk for the project given the elevation of the facility and the condition of the combined stormwater system in Burlington. Stone evaluated two potential stormwater outfalls for the REP that would include the water from the REP as well as adjacent facilities: Route #1 just south of Perkins Pier west of the existing railroad tracks; and Route #2 just north of the Pine Street Barge Canal. Outfall Route #1 was determined as the most feasible and was carried further into Phase 2 and Phase 3 of the study.

The Stone study evaluated several scenarios and analyses involving changes to the quantity of area that would direct water into the outfall, the frequency of closures due to inundation (design storm frequency) and impacts due to extreme Lake Champlain surface elevations.

Phase 1 results indicate that the REP alignment can be accommodated under all rainfall events and lake surface elevations, but when the system starts to include the rest of the railyard or other catchments such as Pine Street, there are failures (when surface water >4” at a catch basin) during less frequent storm events. Table 1 and Table 2 of the Stone final report highlight these instances.

Phase 2 of the study developed a high-level cost estimate for a closed drainage system for the REP, and Phase 3 of the study evaluated various water quality treatment options. The two treatment systems suggested including 19 Stormceptor systems for linear tree-pits that would reduce excavation and work within the narrow tree belt that is proposed within the REP cross section. In addition, deep sump catch basins are recommended throughout the project and have been shown to provide similar level of treatment as the tree pit system. The report summarizes maintenance considerations for these two treatment systems.

The final stormwater report by Stone Environmental is included in Appendix E.
4.0 ALTERNATIVES EVALUATION

The three alignment variations and the three Pine Street intersection options are evaluated individually against the evaluation criteria, with the ability to mix and match alignment with intersections to arrive at a full project evaluation. The no-build alternative is also considered in the evaluation process.

The categories of evaluation criteria are as follows:

- **Conceptual Cost Estimates**—for roadway construction, land and building acquisition, and relocation of railyard structures/operations.
- **Transportation Impacts**—including pedestrian and bicycle facilities, diversion of traffic from Pine Street, and impacts on transit.
- **Resource Impacts**—based on the resources identified in the Existing Conditions section of this report.
- **Private Property Impacts**—including parking spaces impacted and other impacts to the use of a property (land and building acquisitions are identified here but reflected in the cost estimate).
- **Railyard Impacts**—the degree of impact to its operations.
- **Local and Regional Issues**—whether it satisfies the project P&N, conforms to local/regional plans, and meets environmental justice criteria (all of which were determined in the REP Scoping Study).

An evaluation matrix (Figure 4-1) compares each alignment variation and each intersection option against the evaluation criteria. The project team conducted the evaluation with input from the stakeholder and steering committees.

The linear length, environmental impacts, and consistent compliance with local and regional issues are nearly identical among the variations. Each variation of Alternative 1B has similar impacts, aside from the two primary topics of private property and railyard impacts. Adding in the cost differential of the intersection options, these two issues drove the slight differences in overall costs for each of the variations.
### FIGURE 4-1: EVALUATION MATRIX

<table>
<thead>
<tr>
<th>CRITERIA</th>
<th>SPECIFIC MEASURE</th>
<th>No Build</th>
<th>North of Pine intersection</th>
<th>… and a bottom Pine intersection</th>
<th>T (Signal)</th>
<th>Roundabout</th>
<th>Tangent</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONCEPTUAL COST ESTIMATE</td>
<td></td>
<td></td>
<td>Variation 1</td>
<td>Variation 2</td>
<td>Variation 3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Roadway Construction</td>
<td>Cost of Materials, Construction, Engineering, and Contingency</td>
<td>$0</td>
<td>$30,000,000</td>
<td>$10,000,000</td>
<td>$10,000,000</td>
<td>$3,800,000</td>
<td>$7,200,000</td>
</tr>
<tr>
<td>Mitigation of Railyard Impacts</td>
<td>Cost of Land Acquisition and Relocation of Structures/Operations</td>
<td>$0</td>
<td>$3,580,000</td>
<td>$2,590,000</td>
<td>$3,540,000</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Right of Way</td>
<td>Cost of Land and Building Acquisition</td>
<td>$0</td>
<td>$123,513</td>
<td>$2,235,877</td>
<td>$124,313</td>
<td>$441,648</td>
<td>$569,302</td>
</tr>
<tr>
<td>TRANSPORTATION IMPACTS</td>
<td></td>
<td></td>
<td>T (Signal)</td>
<td>Roundabout</td>
<td>Tangent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycle &amp; Pedestrian Impacts</td>
<td>Pedestrian and Bicycle facilities</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Traffic</td>
<td>Diversion of Traffic from Pine Interchange - 2035 based on Pine/Maple intersection</td>
<td>n/a</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1.5</td>
<td>2.0</td>
</tr>
<tr>
<td>Transit Impacts</td>
<td>Qualitative</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1.1</td>
<td>1.1</td>
</tr>
<tr>
<td>ENVIRONMENTAL/RESOURCE IMPACTS</td>
<td></td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3.5</td>
<td>4</td>
</tr>
<tr>
<td>Archaeological Sites</td>
<td>Number of Non-Roundhouse Sites Impacted</td>
<td>0</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Deed Restricted Properties</td>
<td>Design Features over Roundhouse</td>
<td>0</td>
<td>-1</td>
<td>0</td>
<td>-0.5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Flood Hazard Zones</td>
<td>Area within Flood Hazard Zone (SF)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Hazardous Waste Sites</td>
<td>Quantity of Priority Sites Impacted</td>
<td>0</td>
<td>-1</td>
<td>0</td>
<td>-0.5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Cultural Historic Buildings</td>
<td>Quantity Impacted</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Peruvian Area</td>
<td>New Peruvian Area (SF)</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Utilities - Aboveground</td>
<td>Degree of Impact</td>
<td>0</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>Utilities - Underground</td>
<td>Degree of Impact</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>-1</td>
<td>-2</td>
</tr>
<tr>
<td>PRIVATE PROPERTY IMPACTS</td>
<td></td>
<td>0</td>
<td>-3</td>
<td>-3</td>
<td>-2.5</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>Independent Block - 241 S. Champlain Street</td>
<td>Area Acquired Without Building (SF)</td>
<td>0</td>
<td>reflected in cost estimate</td>
<td>reflected in cost estimate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ramblar Building - 216 Battery Street</td>
<td>Area Acquired Without Building (SF)</td>
<td>0</td>
<td>reflected in cost estimate</td>
<td>reflected in cost estimate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Curtis Lumber - 315 Pine Street</td>
<td>Area Acquired Without Building (SF)</td>
<td>0</td>
<td>reflected in cost estimate</td>
<td>reflected in cost estimate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MDS Inc Parking Lot</td>
<td>Area Acquired Without Building (SF)</td>
<td>0</td>
<td>reflected in cost estimate</td>
<td>reflected in cost estimate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citizen Cidney/USPS - 7 Kilburn Street</td>
<td>Area Acquired Without Building (SF)</td>
<td>0</td>
<td>reflected in cost estimate</td>
<td>reflected in cost estimate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>339 Pine Street (City DPW)</td>
<td>Area Acquired Without Building (SF)</td>
<td>0</td>
<td>reflected in cost estimate</td>
<td>reflected in cost estimate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RAILYARD IMPACTS</td>
<td></td>
<td>0</td>
<td>-0.5</td>
<td>-3</td>
<td>-1</td>
<td>-1</td>
<td>-1</td>
</tr>
<tr>
<td>VRS</td>
<td>Area Acquired (SF)</td>
<td>0</td>
<td>reflected in cost estimate</td>
<td>reflected in cost estimate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOCAL &amp; REGIONAL ISSUES</td>
<td></td>
<td>0</td>
<td>-3.5</td>
<td>-3</td>
<td>-3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Satisfies Purpose &amp; Need</td>
<td>Yes/No</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Conformance to Local/Regional Plans</td>
<td>Yes/No</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Environmental Justice</td>
<td>Qualitative</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL SCORE</td>
<td></td>
<td>0</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

source: RSG
Summary of Evaluation

Table 4-1 and Table 4-2 show the score and cost, respectively, of the nine alternatives, each a combination of one alignment variation and one Pine Street intersection option. Table 4-1 shows the cumulative evaluation scores when combining the alignment variation with the intersection options. For example, Variation 1 scores a (-1) and a T-signal scores a (3) adding together = (2). The results indicate that the variations with the tangent intersection score consistently higher than the other intersection options. Variation 2 is consistently lower scoring compared to Variation 1 and Variation 3.

TABLE 4-1: SUMMARY EVALUATION SCORES

<table>
<thead>
<tr>
<th>Variation</th>
<th>VARIATION 1</th>
<th>VARIATION 2</th>
<th>VARIATION 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>T (Signal)</td>
<td>2.0</td>
<td>0.0</td>
<td>2.5</td>
</tr>
<tr>
<td>Roundabout</td>
<td>2.5</td>
<td>0.5</td>
<td>3.0</td>
</tr>
<tr>
<td>Tangent</td>
<td>5.0</td>
<td>3.0</td>
<td>5.5</td>
</tr>
</tbody>
</table>

Source: RSG

The nine permutations fall within a narrow range between $18 million and $22.6 million in 2018 dollars. The cost estimates were developed with specific input from VRS on the costs to relocate various railyard operations, the City of Burlington on grand list land values and unit costs, and VTrans to review quantities and unit costs. The costs of the options are shown in Table 4-2.

TABLE 4-2: SUMMARY COST ESTIMATES

<table>
<thead>
<tr>
<th>Variation</th>
<th>VARIATION 1</th>
<th>VARIATION 2</th>
<th>VARIATION 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>T (Signal)</td>
<td>$18,000,000</td>
<td>$19,000,000</td>
<td>$18,000,000</td>
</tr>
<tr>
<td>Roundabout</td>
<td>$21,500,000</td>
<td>$22,600,000</td>
<td>$21,500,000</td>
</tr>
<tr>
<td>Tangent</td>
<td>$20,100,000</td>
<td>$20,100,000</td>
<td>$20,000,000</td>
</tr>
</tbody>
</table>

Source: RSG

The costs generally comprise the elements shown in Figure 4-2. Recently completed projects in the Waterfront area provided guidance on the magnitude of items such as hazardous soil remediation and other environmental risks, which is a substantial component of the base cost and large continency used in the cost estimate.

Appendix F includes a breakdown of quantities and unit costs for each of the variations.
FIGURE 4-2: COST ESTIMATION COMPONENTS

Roadway & Intersection
Costs associated with the primary elements of the street design. Including quantities of roadway and shared-use path materials, stormwater, and utilities.

Railyard & Private Property
Costs associated with relocating specific operations or physical structures within or out of the railyard.
Costs for acquiring private property and land for the REP alignment.

Misc. & Contingency
Additional costs that are unforeseen but likely at this level of planning. These include, mobilization, misc. items, final design and construction engineering, and contingency.

Source: RSG
5.0 FINDINGS AND RECOMMENDATIONS

This REP Supplemental Scoping Study developed and evaluated three variations of Alternative 1B. Each variation has different degrees and types of impacts to the railyard and to private properties. Three intersection options were also developed and analyzed for the terminus of the new road and the intersection with Pine Street. Each has pros and cons for cost, access to adjacent parcels, traffic diversion, utilities, etc.

5.1 SUMMARY OF FINDINGS

- Variation 3, the “hybrid” solution that minimizes impacts to railyard and private property and reduces the roadway cross section for a length was identified as the highest-ranked (best) variation evaluated.
- The tangent intersection concept was identified as the highest-ranked intersection option.
- Impacts to the railyard will require Vermont Rail Systems to relocate certain operations out of Burlington. Some degree of mitigation can be accomplished in Burlington through land swaps and specific elements added to the roadway design.
- The project cost is expected to range from $18 million to $22.6 million depending on the REP variation and intersection option pursued.

Results of the Alternative 1B variations were presented to the REP Steering Committee and project partners for their review and comment.

5.2 RECOMMENDATIONS

Following consultation with various project stakeholders, including VTrans, and taking the Project Steering Committee’s input into consideration, City and CCRPC Staff recommend that the REP should revert back to the original scoping recommendation, approved by the Burlington City Council at their December 21, 2015 meeting. In 2015, the City Council resolved to advance three Phase 2 REP alternatives (1B, 2, and 5B) into preliminary engineering under NEPA using federal, state, and local funds. This recommendation is primarily based on the complexity and the cost magnitude of the REP that makes it infeasible to implement using local and state funds only.

CCRPC and City Staff presented the REP Supplemental Scoping effort to the Transportation, Energy and Utilities Committee (TEUC) on May 26, 2020 and the TEUC concurred with the staff recommendation to move the REP forward into preliminary engineering using federal, state, and local funds.

5.3 CITY COUNCIL APPROVED MOTIONS

The Burlington City Council voted on the following motions regarding the Railyard Enterprise Project at their June 29, 2020 meeting:

- To accept the Railyard Enterprise Project (REP) Supplemental Scoping report dated June 24, 2020 prepared by the Chittenden County Regional Planning Commission.
• To direct the Department of Public Works, in partnership with the State of Vermont Agency of Transportation and Federal Highway Administration, to seek State and Federal funds to advance the preliminary engineering for the Railyard Enterprise Project Phase 2 Alternatives 1B, 2 and 5B.

• To direct the Department of Public Works, in partnership with the State of Vermont Agency of Transportation and Federal Highway Administration, to pursue federal and state funding for 90% of up to $20M of actual project-eligible costs for federal participation and to direct the Administration and Department of Public Works to request the State of Vermont to expedite the availability of 90% grant funding for this project to advance into the preliminary engineering phase.

Appendix G includes Burlington City Council resolutions and motions, Steering Committee presentations and meeting notes as well as comments received by stakeholders.
RSG promotes sustainable business practices that minimize negative impacts on the environment. We print all proposals and reports on recycled paper that utilizes a minimum of 30% post-consumer waste. RSG also encourages recycling of printed materials (including this document) whenever practicable.

For more information on RSG's sustainability practices, please visit www.rsginc.com.