Alternatives Analysis Report
Town Highway Bridge Project

Main Street, Town Highway #2, Bridge #102 over Vermont Railway
Merchants Row, Town Highway #8, Bridge #2 over Vermont Railway

State Project Number: Middlebury WCRS(23)

SUBMITTED TO
Town of Middlebury, VT

SUBMITTED BY
Vanasse Hangen Brustlin, Inc.

JULY 23, 2013

Alternatives Analysis Report

MIDDLEBURY WCRS(23) BRIDGE PROJECT

Middlebury, Vermont

Prepared for **Town of Middlebury**
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July 23, 2013

Project Number: 57603.00

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1.0 Executive Summary

1.1 Background

This Alternatives Analysis Report documents the engineering and environmental analyses conducted during the Project Definition stage of the Middlebury WRCS(23) Bridge Project (the Project). The need for this analysis and the Project itself is to address the continuing deterioration of the two bridges spanning the Vermont Railway, Inc. (VTR) mainline in downtown Middlebury in order to ensure safe use for vehicular and non-vehicular users.

A scoping process was used to identify the range of alternatives and associated impacts to meet the objectives of the Project Purpose and Need statement. This included public involvement as well as a series of meetings with the Federal Highway Administration (FHWA), Vermont Agency of Transportation (VTrans), and the Town of Middlebury (Town). Public input was solicited from local and regional officials, interest groups, stakeholders, regulators, property owners, business owners, and members of the general public through public notices, email distribution lists, newsletters, a Project website (www.MiddlburyBridges.org), and multiple public meeting presentations and surveys.

Based on the outcome of the Alternatives Analysis, complete bridge replacement with a new tunnel structure is the recommended Preferred Alternative

1.2 Existing Bridge Status

The current bridges at Main Street and Merchants Row were constructed between 1920 and 1921. Both are two-span concrete-encased steel beam bridges generally supported by granite ashlar abutments with some cast-in-place concrete components.

Both bridges are in poor condition with concrete cracking, delamination, and spalling on all bridge components with particular deterioration noted on the fascias. Inspection reports from 1994 (Merchants Row) and 1995 (Main Street) recommended bridge replacement and both bridges have been on the State Bridge Program's Candidate list since funding for preliminary engineering was established in March 1999.

1.3 Alternative Analysis

Per the requirements of the National Environmental Policy Act of 1968 (NEPA) and Section 4(f) of the Department of Transportation Act of 1966, the development of Project alternatives included a no-build alternative, rehabilitation of the existing structures, building new bridges at new locations (i.e., rail or roadway realignments), and options for complete bridge replacement.

The evaluation criteria and alternatives to be considered were established based on input received and presented to the design team by state, federal, and municipal representatives through a series of Project meetings held from February through July of 2013. No objections to the Project criteria used to govern the bridge replacement concepts were received.

Through a series of meetings with the VTrans Rail Section, it was recommended that the goal for railroad vertical clearance under the bridges be a minimum of 20'-9" from top of

highest rail to bottom of bridge or tunnel top surface low point. The Vermont State Design Standards and the Vermont State Statutes recommend an ultimate goal of 23′-0″ vertical clearance if achievable. VTrans is currently evaluating the final desired vertical clearance for this Project with the operating Railroad (VTR), and intends to provide a recommendation for the final design phase. There were four (4) categories of alternatives considered as follows:

1.3.1 No Build

The No Build alternative does not meet the Purpose and Need as the severity of the structural deficiencies precludes their being addressed satisfactorily by repair or maintenance work.

1.3.2 Rehabilitation

Bridge rehabilitation involves comprehensive structural repairs to an existing bridge to address deterioration, deficient geometry, or so that it can meet minimum acceptable load ratings or required capacity. Rehabilitation for these bridges is not feasible due to engineering challenges of an extraordinary magnitude and unreasonable Project costs.

1.3.3 Build on New Location

When Federal funds are proposed for use on projects that involve the replacement of historic bridges, the Department of Transportation Act of 1966 requires an investigation of alternatives to construct new bridges on a new location or parallel to the existing bridge. This would involve changing either the railroad alignment or the roadway alignment so that the historic integrity of the existing structures is not compromised. Building on a new railroad or roadway alignment is not possible for this Project due to multiple constraints posed by the surrounding development, extensive impacts to historic resources and qualifying Section 4(f) resources, and unreasonable Project costs.

1.3.4 Replacement

Full bridge replacement would provide sufficient vertical clearance to allow for double stack freight cars. All State and AREMA Standards can be met with full replacement, while providing safe passage of pedestrian and vehicular traffic, fulfilling the requirements of the Purpose and Need.

Based on the preceding alternatives assessment summary, bridge replacement was the only viable alternative that emerged and was taken forward to conceptual design.

1.4 Development of Replacement Alternatives

Taking into account the design considerations, two alternatives for bridge replacement were evaluated: construction of two separate bridges and construction of a tunnel.

1.4.1 Two Bridge Replacement Alternative

The Two Bridge Replacement Alternative would replace the existing structures with the precast box shape. The area along the rail corridor between the two

bridges would be comprised of the same precast shape, but only a bottom U-shaped section would be installed. This U-shaped section would act as a retaining wall along each side of the railroad corridor between the two bridges. The height of the retaining wall would be 14′ to 20′. To conform to current safety guidelines, the perimeter of the trench between the two bridges would be protected by crash-tested railing, installed at ground level.

1.4.2 Tunnel Replacement Alternative

A Tunnel Replacement Alternative would replace the existing structures with the precast box shape. The area between the two bridge locations would also be comprised of the same box shape, creating a tunnel between Main Street and Merchants Row. The tunnel section between the bridge limits would be covered with granular fill and finished with topsoil to establish a grassy park setting that links Triangle Park with the remainder of the Village Green. Crash-tested railing would only be required on the north side of the Main Street Bridge and south side of the Merchants Row Bridge where the tunnel daylights.

1.4.3 Elements Common to Both Replacement Alternatives

Because of the inherent constraints of the narrow Project corridor and the constructability techniques required to allow for rail traffic to continue during construction, a number of design elements are common to both the Two Bridge and Tunnel Replacement Alternatives. For example, both Replacement Alternatives having identical limits of disturbance due to the structure type required to facilitate construction and the need to maintain a critical public drive at the Battell Block. As both Replacement Alternatives must achieve the same degree of track lowering, mitigating the risk of flooding via Otter Creek would be accomplished using identical flood walls/berms. Lastly, the design for stormwater management is largely dictated by topographic conditions (i.e., drainage from east to west) and by the need to tie into existing drainage infrastructure.

An assessment of the impacts associated with the two Replacement Alternatives, as well as the Non Build, Rehabilitation, and Build on New Location Alternatives is summarized below.

1.5 Impact Assessment

A summary of the potential impacts associated with the Project is provided below.

1.1.1 Cost

The costs below are a summary of order-of-magnitude cost estimates for the five project alternatives. Alternatives 2 through 5 assume a 23′0″ vertical clearance will be provided. If this is reduced to the 20′-9″ vertical clearance goal for final design, there will be an associated cost savings realized across all of these alternatives.

Alternative 1 – No Build:	***No associated costs***
Alternative 2 – Rehabilitation:	***$27.1M***
Alternative 3 – Build on New (Roadway) Location:	***$32.7M***
Alternative 4 – Replacement - Two Bridges:	***$16.0M***
Alternative 5 - Replacement – Tunnel:	***$17.5M***

1.1.2 Engineering

The No Build Alternative does not improve or change any of the existing conditions. The Rehabilitation Alternative and both Replacement Alternatives would provide enhanced conditions at the completion of the Project (i.e., enhanced vertical and horizontal clearances).

1.1.3 Impacts

No Alternative is anticipated to have any natural resource impacts. Impacts to archaeological resources would be identical for each action alternative, and would mitigated by the development of a Phase IB report and the implementation of construction protocols approved by the VTrans Archaeology Officer. Impacts to Historic Resources are discussed in Section 1.6 below.

1.1.4 Local and Regional Issues

Most of downtown Middlebury lies within the Middlebury Village Historic District (MVHD) and the Town is very much involved in project development and advocacy. The 2012 Middlebury Town Plan notes that the replacement of the current bridges with a continuous tunnel between Merchants Row and Main Street would "…close up the chasm that exists in the downtown area…" Public feedback was gathered at the Local Concerns Meeting held on 3/28/13 and the Alternatives Presentation Meeting held on 6/4/13. Various questions were asked and individual response to multiple choice options was collected using anonymous electronic polling via handheld devices. There was unanimous agreement amongst meeting attendees that the aesthetics of the downtown were of high importance with overwhelming support for unifying the Village Green and Triangle Park spaces. The Town's Selectboard has also submitted a letter to VTrans stating their support of the Tunnel Alternative.

1.1.5 Permits

Permits would not be required for the No Build Alternative; any required permits would be the same for each action alternative.

1.1.6 Other

ROW would not be required for the No Build Alternative. Required ROW acquisition (temporary or permanent) would be the same for the Rehabilitation Alternative and both Replacement Alternatives. The Build on New Location Alternative would involve considerably more ROW taking than the above alternatives.

1.6 Preliminary Determination of Effect on Historic Resources

Historic districts within the Project limits are the National Register-listed MVHD and the National Register-eligible Railroad Historic District (RRHD). In addition, the Main Street and Merchants Row Bridges are eligible for the National Register as contributing resources to the MVHD and RRHD (specifically the 19th century ashlar abutments and railings). The retaining walls along the railroad are similarly eligible as contributing resources to both districts. Lastly, the Rutland Railroad corridor is eligible as a contributing resource to the MVHD.

The adverse effects that would result from the Tunnel Alternative are comparable to those for the Two-Bridge Alternative. However, by reestablishing the approximate former extent of the Village Green, the Tunnel Alternative offers impact mitigation that is superior to the Two Bridge Alternative. In addition, public support for the Tunnel Alternative is considerably stronger than for the Two Bridge Alternative.

1.7 Preliminary Section 4(f) Evaluation

Based on coordination with the VTrans HPO and the FHWA Environmental Program Manager, either Replacement Alternative is considered eligible for Section 4(f) approval via the Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges (Bridge Use PA). Should any use of a qualifying Section 4(f) resource(s) outside of the Project ROW be required (e.g., permanent easements, fee acquisitions, conversions to transportation use) and providing that there are no adverse effects from the takings, a separate Section 4(f) *de minimis* evaluation would be required. If adverse impacts are associated with ROW takings, additional Section 4(f) evaluations would be required. At this point, the amount of ROW taking required for the Project has not been confirmed but is expected to be limited, if at all.

In accordance with the requirements of the Bridge Use PA, the replacement of the Main Street and Merchants Row Bridges must take all measures to minimize harm. Potential measures to minimize harm are discussed in detail within the report.

1.8 Recommendation

Based on the outcome of the alternatives analysis and in consideration of the Project's Purpose and Need, it is recommended that the No Build, Rehabilitation, and Build on New Location Alternatives be eliminated from further consideration. Of the two Replacement Alternatives, it is recommended that the Tunnel Alternative be selected as the Preferred Alternative and advanced to the final design and permitting phase.

2.0 General Information

2.1 Project Purpose

The purpose of the Middlebury WCRS(23) Bridge Project has been defined in accordance with the requirements of NEPA, CEQ Regulations 40 CFR Part 1500-1508, and FHWA's Technical Advisory T6640.8A as follows:

- To address the structural deficiencies and existing pedestrian facilities of two roadway bridges in downtown Middlebury where Main Street (VT 30/TH 2 Bridge 102) and Merchants Row (TH 8 Bridge 2) span the Vermont Railway, Inc. (VTR) track.

See **Appendix 1** for the complete Project Purpose and Need.

2.2 Project Overview

The Middlebury WCRS(23) Bridge Project (the Project) is a critical infrastructure improvement undertaking for both the State of Vermont and the Town of Middlebury. The Project recognizes the urgent need to address substandard conditions that have been long documented at both Main Street and Merchants Row Bridges in historic downtown Middlebury where the Vermont Railway (VTR) line connects Burlington to Rutland. The VTR line provides communities along the line with daily shipments of grail, fuel and oil, while the roadway bridges provide mobility of bicycle, pedestrian, and vehicular traffic in downtown Middlebury, which is also home to Middlebury College.

With construction slated to being in the 2014 season, the Project is on an extremely aggressive schedule. To help expedite the design process, a Construction Manager/General Contractor (CMGC) process has been selected instead of using the standard approach of Design, Bid, and Build process. The CMGC process allows a contractor to be selected in the design phase of the Project to provide schedule, cost and constructability input. The designer and contractor work together to create a more efficient design on an accelerated schedule.

Figure 1: Deterioration of south fascia, Merchants Row Bridge (Photo by VHB, March 2008).

Public input is a key design issue for the Project. A past attempt to address the substandard conditions of the bridges in 2008 was halted when a public meeting introduced the concept of raising the Main Street and Merchants Row roadways to increase the vertical clearance for double stack freight cars, as required by state standards for any such bridge replacement project. The increased roadway elevation would have impeded access to downtown businesses as the roadway would have been several feet above the existing sidewalk, necessitated split sidewalks. Both the residents and the Town of Middlebury strongly objected to this

design and bridge replacement was put on hold, allowing the bridges to fall into further disrepair. In order for this Project to be a success, public concerns must be addressed as a key component of the design efforts.

This report summarizes the existing conditions of the bridges and railroad track, describes how these conditions were considered in the development of Project alternatives (i.e., alignments, drainage infrastructure, and environmental concerns), provides an analysis of five (5) Project alternatives (including a preliminary Section 106 Determination of Effect and preliminary Section 4(f) evaluation), and makes a final recommendation of a preferred Alternative. Project limits include the width of the railroad Right-of-Way (ROW) from the Otter Creek Truss to the Elm Street Bridge, the approach spans leading to the Main Street and Merchants Row Bridges, and the bridges themselves. A map of the Project limits can be seen in **Appendix 2**.

3.0 Existing Site Conditions

3.1 Bridges

The current bridges at Main Street and Merchants Row were constructed between 1920 and 1921. Both are two-span concrete-encased steel beam bridges. The Merchants Row Bridge is supported by granite ashlar abutments and concrete-encased steel bridge seats. The north sidewalk and travel lanes of the Main Street Bridge are supported similarly, with the south sidewalk supported by a concrete abutment. For both bridges, the approach span is a concrete T-beam construction and the main approach is a concrete slab reinforced with steel rails (i.e., "rail top" span). The ends of the approach and main spans are supported by a concrete-encased steel pier. Bridge railings consist of three cast iron pipe or channel rails on steel posts.

Figure 2: Exposed rebar in Merchants Row Bridge approach span (Photo by VHB, March 2008).

For over twenty-five years, bi-annual VTrans bridge inspection records have chronicled the ongoing deterioration of both bridges. Concrete cracking, delamination, and spalling have occurred on all bridge components with particular deterioration noted on the fascias (see Figure 1). Embedded steel reinforcement is exposed in a variety of locations, especially at the fascias, the ends of the pier caps, and in the flanges of the approach spans under the sidewalks. Heavy efflorescence is common on the soffits of both bridges, indicating leakage through the deck. In April 1997, a hole in the sidewalk of the Merchants Row Bridge was reported. Inspection reports from 1998 to the present have noted that full depth holes can occur at any location in the Merchants Row Bridge, and are most likely to occur under the sidewalks

and parking areas. The 1986 bridge inspection report for this same bridge notes a hole in the soffit up to the steel mesh of the bridge decking. At present, the mesh is exposed in multiple locations on the Merchants Row Bridge (see Figure 2).

Inspection reports from 1994 (Merchants Row) and 1995 (Main Street) recommended bridge replacement. Both bridges have been on the State Bridge Program's Candidate list since funding for preliminary engineering was established in March 1999.

3.1.1 Rail and Pedestrian Safety

In 2008, VTR informed VTrans that spalling concrete from the bridges was falling onto the tracks and passing trains, presenting a safety concern. In response, VTrans issued a Critical Maintenance Report. This report noted that the safety concern extends beyond VTR operations to pedestrian traffic on the sidewalks of the bridges. VTrans recommended cleaning and patching or some type of safety netting to catch debris. The lack of sufficient vertical clearance precluded the installation of a safety net, leaving concrete patching as the only measure to address this problem. While such patching has been carried out over the years, ongoing deck saturation and the age of the structures render these measures as only short-term solutions. Concrete continues to spall from both bridges.

The deterioration of the fascias has compromised the footings of the support posts for the sidewalk-mounted railings. Some of these bases are cracked or rusted through. Railing couplings are cracked and sections of railing are missing. Between 2008 and 2010, chain link fencing was added to the railings to improve safety conditions. However, the integrity of the support posts remains compromised and the substandard bridge railings do not meet current design requirements.

3.1.2 Load Rating

Though VTrans' biannual inspections include a visual assessment for overstressing due to live loads, no design or construction plans are available for either bridge. This makes a more formal determination of the actual load capacity evaluation impossible as the internal size and configuration of steel reinforcement in concrete members is unknown. This leaves the current load capacity of the bridges in question.

Figure 3: Curved alignment, Post Office wall on right beyond bridge shadow. Note ponding between tracks, indicating poor drainage (Photo by VHB, March 2008).

3.2 Rail

The vertical clearance of the Main Street and Merchants Row bridges are 17′-10″ and 17′-8.5″ at the rail (ATR), respectively. These vertical clearances account for one of only two remaining barriers to double stack freight transport between Burlington and Rutland. Existing horizontal

clearances at both bridges are also substandard. The horizontal alignment has been changed several times to avoid a retaining wall located outside of the Middlebury Post Office that has been slumping toward the track over the years. The curve required to provide enough horizontal clearance from the Post Office is substandard for railroad track alignments (see Figure 3).

Drainage through the railroad cut is also poor, particularly under the Main Street Bridge, causing icing issues in the winter and ponding issues in the summer.

3.3 Roadway

In 2005, VTrans developed conceptual plans for bridge replacement that involved raising the grade of the bridges to achieve the necessary vertical clearance. Though the concept minimized superstructure thickness by using pre-stressed concrete panels, raising the bridge grade required raising the grades of the approaching roadways by several feet. Because of the proximity of the downtown buildings and drives, the concept required either rebuilding storefronts and constructing new entrances or introducing walls and split level bifurcated sidewalks. The proposed concept carried forward by VTrans included the split sidewalks, primarily because of the relative expense of rebuilding storefronts. The Town of Middlebury rejected the concept because of concerns regarding impacts to property values, public accessibility, parking, economic development, aesthetic and architectural impacts, drainage concerns, and quality of life in the downtown core. Accordingly, the alternatives for bridge replacement developed for the current Project must maintain existing bridge and roadway grades with only minimal changes, which can only be achieved by lowering the grade of the railroad under both bridges.

3.4 Historic Resources

The historic resources within the Area of Potential Effect (APE) that have been determined to contribute to an historic district listed in the National Register of Historic Places (National Register), or contribute to a National Register-eligible district are discussed in detail in the Determination of National Register Eligibility Report provided as **Appendix 3**. The report, dated April 19, 2013, was submitted to the VTrans Historic Preservation

Figure 4. Photo from Merchants Row Bridge looking north at southbound train passing under the Main Street Bridge in 1939. St. Stephens Episcopal Church is visible at top right. The rubble retaining walls between the bridges are also visible.

Officer (HPO), Scott Newman, and received his formal concurrence on the National Register eligibility recommendations on June 19, 2013. In summary, the historic resources determined to be eligible for the National Register include, per this report and concurrence, are:

- **The Main Street and Merchants Row Bridges:** determined to be eligible as contributing resources to the Middlebury Village Historic District (MVHD) and Rutland Railroad Historic District (RRHD). The railings and stone abutments of the bridges are considered character-defining features, but the bridge decks and support columns are not considered significant elements.
- **Railroad Corridor Retaining Walls:** determined to be eligible as contributing resources to the MVHD.
- **Rutland Railroad Corridor:** determined to be a contributing resource to the MVHD.

The report also concluded that the Lazarus Building, located just northwest of the Main Street Bridge, is not a contributing resource to the MVHD nor is it individually eligible for the National Register. An addendum to the report, dated May 29, 2013, concluded that the addition to the Bourdon Insurance Agency Building southeast of the Merchants Row Bridge (now functioning as a barber shop) is not a contributing resource to the MVHD nor is it individually eligible for the National Register.

4.0 Development of Project Alternatives

4.1 Design Considerations

4.1.1 Right-of-Way

Right-of-Way (ROW) limits in the Project area were determined from Town owned roadway ROW and State owned railroad ROW. The railroad ROW limits are within the Project limits. Given the developed nature of the corridor, opportunities for ROW acquisition are limited. This means that the rail alignment cannot be shifted dramatically in one direction or another. Should any ROW takings be required, an agreement must be made between the State of Vermont and the Town of Middlebury regarding future maintenance and access to permanent ROW impacted areas.

Figure 5. Looking north at Merchants Row Bridge, ashlar retaining wall at left, rubble wall retaining wall at right (VHB, February, 2013).

4.1.2 Constructability and Sequencing

During construction, VTR will require daily passage of trains through the Project area. Work windows are expected to be 20 hours per day, with four hour shut downs to allow VTR train traffic to pass.

Construction sequencing will likely allow one bridge to be open at a time to local traffic as the construction moves in a unidirectional fashion through the Project limits. While constructability and sequencing have been discussed in the preliminary design, a Construction Manager/General Contractor (CMGC) Project approach will allow a contractor to be brought on during the design phase to provide input on the final construction plan and scheduling.

4.1.3 Vertical and Horizontal Clearance

Per Vermont Statute 5 V.S.A. § 3670, any bridge work over or adjacent to any railroad track must meet minimum standard vertical railroad clearance of 23′-0″ above top of rail, unless a variance is approved by the transportation board. A minimum of 20′-9″ must be provided to accommodate future double stack freight cars. As per the Project's Purpose and Need and as discussed in Section 3.3, roadway elevations must be maintained with minimal changes, requiring additional vertical clearance to be obtained by track lowering. Project limits for rail work were dictated by the fixed points that are the Otter Creek truss bridge to the south and the Elm Street Bridge to the north.

Per the American Railway Engineering and Maintenance-of-Way Association (AREMA) standards, a minimum of 16′-0″ of horizontal clearance shall be provided centered about the centerline of the track.

4.1.4 Horizontal Rail Alignment

Considerations of the determination of the horizontal railroad alignment included:

- Removal of substandard reverse curve in existing alignment.
- Maintaining access to the Battell Block driveway and parking lot behind the building both during construction and post-construction.
- Minimize impacts to Otter Creek and adjacent properties.
- Provide design speed of 30 mph.
- Accommodate tangents between reverse curves as to not preclude:
  - Long wheelbase equipment.
  - Increase in maximum authorized speed to 40 mph.
  - Increase in super-elevation and spiral length.
- Accommodate potential future passenger rail service.

4.1.5 Flood Hazard Area

Due to the proximity of Otter Creek to the Project corridor, all Project alternatives must consider the potential impact of floodwaters, especially considering the need to lower the track profile to achieve the clearances discussed in the Section 4.3.3. The Flood Insurance Study (FIS) for the Town of Middlebury was acquired from the Federal Emergency Management Agency

(FEMA) and verified using a stream gage located south of the Battell Block driveway (FEMA 1984).

4.1.6 Drainage Infrastructure

The Otter Creek flows from south to north just west of the Project area. The 100-year storm baseflow water surface of the Otter Creek drops approximately 19 feet downstream of the Otter Creek Falls, which are located just north of Main Street. The 100-year water surface elevation below the falls is also roughly 20 feet below the lowest point in the proposed track profile, as opposed to being 4 feet above the proposed track low point at an approximate distance of 425' upstream of the dam. This arrangement means that a gravity driven stormwater management system can be developed for the Project. Moreover, an existing stormwater outfall is present on the right (east) bank of the Otter Creek below the falls. This outfall is apparently already accommodating surface drainage adjacent to the railroad tracks through the MarbleWorks area. Accordingly, utilizing this existing drainage alignment and its associated easement will greatly facilitate Project construction, preventing new ROW from being acquired. The Town has already discussed this use with the current property owner and received concurrence that they support the improvements. Routing stormwater to the creek upstream of the dam would require a pumping system, which can be expensive to install and maintain. Coordination with the DEC Stormwater Program has also determined that a pumping system may require an operational-phase stormwater discharge permit; whereas a gravity feed system would most likely not, depending on the extent of Project construction.

4.2 Alternatives Considered

Per the requirements of the National Environmental Policy Act of 1968 (NEPA) and Section 4(f) of the Department of Transportation Act of 1966, the development of Project alternatives included a no-build alternative, rehabilitation of the existing structures, building new bridges at new locations (i.e., rail or roadway realignments), and options for complete bridge replacement.

4.2.1 No Build

The No Build alternative does not meet the Purpose and Need as the severity of the structural deficiencies precludes their being addressed satisfactorily by repair or maintenance work. This alternative would result in continued degradation of the superstructures and substructures with an elevated concern for public safety via ongoing concrete spalling onto the track, the possibility of full-depth holes developing in the sidewalk or road surface, or structure collapse.

4.2.2 Rehabilitation

Bridge rehabilitation involves comprehensive structural repairs to an existing bridge to address deterioration, deficient geometry, or so that it can meet minimum acceptable load ratings or required capacity. Rehabilitation of the Main Street and Merchants Row Bridges cannot be carried out for a number of reasons. First, the bridge deck and supporting columns are so thoroughly

degraded that no component is considered salvageable for continued incorporation in the rehabilitated structure. Second, preserving the abutments and retaining walls in situ would not address the existing deficiency in railroad alignments presented by the current wall locations. Third, Vermont statute 5 V.S.A. §3670 states that:

> *"No person shall construct, alter, or permit construction or alteration of a railroad track, railroad bridge, or structure over or adjacent to any railroad track unless the clearances provided equal or exceed the minimum standards set forth in the American Railway Engineering Association's [1]Manual for Railway Engineering, as in effect at the time work begins."*

The AREMA Standards require the vertical clearance to be increased to allow passage of double stack freight cars. As noted in Section 3.3, raising the roadbed to provide the necessary clearance is not possible. Accordingly, the vertical clearance must be achieved by lowering the track profile approximately 6 feet to achieve the minimum 23'-0" clearance. The nature and condition of the foundations of the bridge abutments and retaining walls within the Project limits is not fully understood. The excavation necessary at the faces of these features would be roughly 4 to 5 feet deeper than the target rail elevation (i.e., 10 to 11 feet below existing conditions). This degree of excavation would compromise the structural integrity of the retaining walls and abutments. Moreover, to incorporate abutments and retaining walls in the design, exceptional measures would be required to excavate underneath these structures in order to develop new foundations. This would require temporary but complex structure stabilization, the construction of reinforced steel concrete foundations or retaining walls and cast-in-place concrete foundations, and supplemental tie back reinforcement to anchor the stones. The rubble retaining walls would need to be grouted or some means of catch fence installed to prevent materials from abscising onto the track, which would be approximately 6 feet below existing conditions.

Each of these measures is not feasible for the Project due to the accelerated construction schedule and the requirement to open the construction corridor to daily train traffic. They present engineering challenges of an extraordinary magnitude and would result in unreasonable Project costs, estimated to be almost double that of full replacement (see Section 5.1.1).

4.2.3 Build on New Location

When Federal funds are proposed for use on projects that involve the replacement of historic bridges, the Department of Transportation Act of 1966 requires an investigation of alternatives to construct new bridges on a new location or parallel to the existing bridge. This would involve changing either the

[1] The American Railway Engineering Association is currently known as the American Railway Engineering and Maintenance of Way Association (AREMA).

railroad alignment or the roadway alignment so that the historic integrity of the existing structures is not compromised. Building on a new railroad alignment is not possible for this Project for a variety of reasons, including but not limited to the following principal issues:

- It is not feasible and prudent to preserve the old bridges in place because the bridges are beyond rehabilitation for continued use by vehicular and pedestrian traffic and alternative in situ uses are not possible.
- The present bridge structures are already located in the only feasible and prudent location. To build new bridges on a new alignment will result in extraordinary bridge and roadway approach engineering, construction difficulty, and costs.
- There is insufficient ROW to alter the alignment to the degree necessary to construct two new bridges while leaving the existing bridges in place.
- Even if sufficient ROW was available, relocating the alignment would require extensive earthmoving and would likely necessitate building demolition and/or permanent impacts to access management (e.g., Printers Alley, Battell Block driveway). ROW acquisition at the level required would be extremely difficult, prohibitively expensive, and/or impossible to justify.
- The new bridges would be required to comply with requirements for vertical clearance. The excavation necessary to achieve this would presumably occur in close proximity to the existing retaining walls and abutments. Maintaining the historic integrity of these structures is not possible given the advanced state of deterioration and the degree of modification necessary to maintain structural integrity (see Section 4.2.2 for additional discussion).
- The installation of a parallel railroad line through downtown Middlebury would have an undue adverse effect on both the MVHD and RRHD.

Similar constraints would arise if new roadway alignments for both Main Street and Merchants Road were proposed. Shifting the Main Street roadway alignment to the south is not possible because of the proximity of St. Stephens Episcopal Church to both Main Street and the Main Street Bridge. Shifting the Main Street alignment to the north is not possible due to conflicts with existing structures, most of which are listed as contributing to the MVHD. Shifting Merchants Row to the north would require a strip taking of the Village Green and the loss of Triangle Park, both of which also are listed as contributing resources to the MVHD. A southerly shift in Merchants Row is not possible due to conflicts with other listed buildings. Sections 5.2 and 5.3 discuss impacts to historic resources and qualifying Section 4(f) resources that would arise from the Build on New Location Alternative, respectively.

4.2.4 Replacement

A full bridge replacement would involve the excavation of enough material to provide either the 20′-9″ or the 23′-0″ of vertical clearance need for double stack freight cars. All AREMA Standards as outlined in Section 4.2.2 can be met, while providing safe passage of pedestrian and vehicular traffic and fulfilling the requirements of the Purpose and Need.

Based on the preceding assessment, bridge replacement was the only viable alternative that emerged and was taken forward to conceptual design.

4.3 Development of Replacement Alternatives

Taking into account the design considerations discussed in Section 4.1, two alternatives for bridge replacement were evaluated: construction of two separate bridges and construction of a tunnel.

4.3.1 Two Bridge Replacement Alternative

The Two Bridge Replacement Alternative would replace the existing structures with the precast box shape as described in Section 4.3.3. The area along the rail corridor between the two bridges would be comprised of the same precast shape, but only a bottom U-shaped section would be installed. This U-shaped section would act as a retaining wall along each side of the railroad corridor between the two bridges. The height of the retaining wall would be 14′ to 20′. To conform to current safety guidelines, the perimeter of the trench between the two bridges would be protected by crash-tested railing, installed at ground level. Crash-tested railings would also be required on the outboard side of both sidewalks on the bridges.

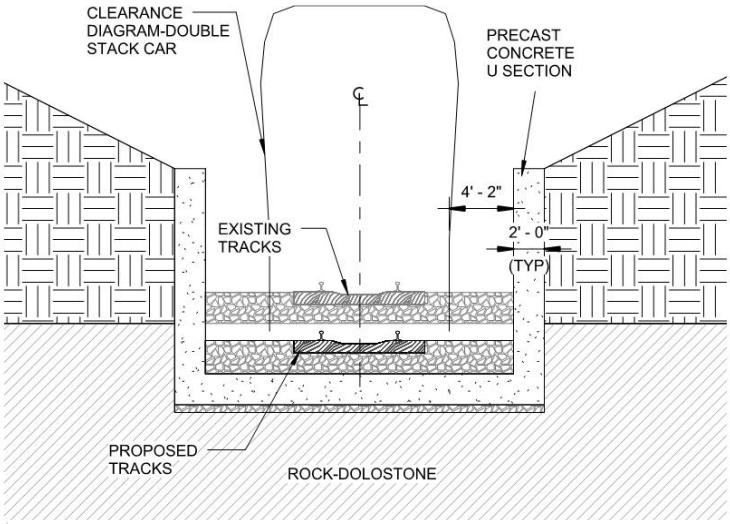

Figure 6: Precast U-Shape Cross-Section

4.3.2 Tunnel Replacement Alternative

A Tunnel Replacement Alternative would replace the existing structures with the precast box shape as described in Section 4.3.3. The area between the two bridge locations would also be comprised of the same box shape, creating a tunnel between Main Street and Merchants Row. The tunnel section between the bridge limits would be covered with granular fill and finished with topsoil to establish a grassy park setting that links Triangle Park with the remainder of the Village

Green. Crash-tested railing would only be required on the north side of the Main Street Bridge and south side of the Merchants Row Bridge where the tunnel daylights. **Appendix 4** shows the renderings of the proposed Tunnel Replacement Alternative.

4.3.3 Elements Common to Both Replacement Alternatives

The design considerations discussed in Section 4.1 result in a number of design elements that are common to both the Two Bridge and Tunnel Replacement Alternatives. These are summarized below.

Constructability and Sequencing

In addition to maintaining access to the Battell Block driveway, Project constructability is enhanced somewhat by temporarily using the existing western ashlar retaining walls and abutments as support of excavation during Project construction. These walls would subsequently be buried in situ as the precast concrete structures are installed. The existing bridge abutments and retaining walls along the eastern side of the Project corridor would be removed in their entirety to accommodate construction access and utility and drainage improvements.

Vertical and Horizontal Clearances

The AREMA standards require a minimum of 16′-0″ (8′-0″ from centerline of track) of horizontal clearance in the State of Vermont, which must be provided throughout the Project limits. The vertical clearance for both alternatives must be a minimum of 20′-9″. This means that both Replacement Alternatives must establish the same track profile through the Project area. A design width of 20′-0″ was maintained for both the Two Bridge and Tunnel Alternatives to allow for construction phasing, track maintenance activities and the potential for a track realignment to accommodate future passenger rail service.

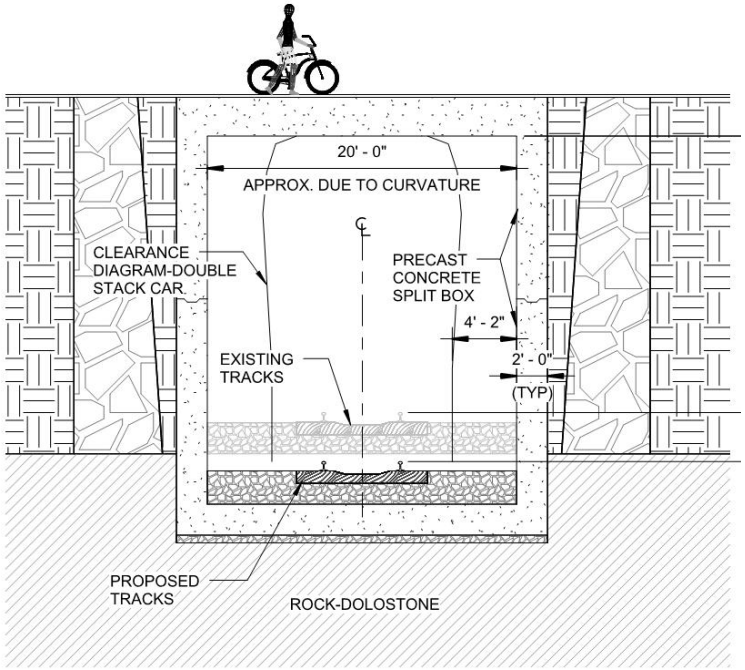

Figure 7: Precast Box Cross-Section

Replacement options designed the vertical

track profile to utilize the maximum allowable rail Project limits to provide required vertical clearance at both bridge locations while attempting to minimize the use of steep track grades on the approaches. Current maximum proposed grade on the north approach has been submitted to the Vermont Agency of Transportation (VTrans) Rail Section for final approval.

Horizontal Rail Alignment

Access to the Battell Block's rear parking lot and the Town sanitary sewer pump station is currently achieved via a driveway that runs between the east façade of the building and the west end of the Merchants Row Bridge. The east side of the driveway is coincident with the retaining wall that extends south from the bridge abutment parallel to the rail corridor. This means access must be maintained both during construction and post-construction. Accordingly, the driveway represents a fixed Project component that cannot be altered. To maintain the required design speeds and design curve, improvements to the track curvature will be made through the Project area within. The proposed improvements are identical for both alternatives.

Appendix 5 shows the proposed railroad plan and profile.

Structure Type

Due to narrow ROW and constructability constraints, the structural element to be used for both Replacement Alternatives is a U-shaped structure composed of precast concrete. The U shape does not require wide footings that would be necessary for typical bridge abutment structures and retaining walls along the railroad trench between the bridge locations. At the location of the existing roadways, two precast U-shaped pieces can be fit together on site to make a box, and the individual precast segment lengths can be adjusted per CMGC suggestions for constructability. The exterior box dimensions of 24' wide by 28' tall are based on providing AREMA clearances and the horizontal alignment with ballast and timber tie railroad tracks.

Flood Hazard Area

Due to the amount of track lowering required to achieve the necessary vertical clearance, approximately 860 feet of the proposed finished track elevation south of the low point of the proposed vertical alignment would lie at an elevation below that of the Zone AE Special Flood Hazard Area, which ranges from 349.60 to 346.8 feet NAVD 88 within the Project area. Accordingly, an earthen berm and a concrete wall with a top elevation of approximately 350.2 feet NAVD 88 would be constructed between the railroad tracks and Otter Creek to mitigate the risk of flooding within the sag of the track profile. The earthen berm would extend 300 feet south of the southern face of the Cross Street Bridge pier and the concrete wall would extend for a distance of 500 feet as measured from the northern face of the pier to the southern face of the Merchants Row Bridge.

Appendix 6 provides further information on flood elevations, retaining wall, berm, and drainage plan sheets.

Drainage Infrastructure

The favorable elevation of the Otter Creek water surface below the falls relative to that of the proposed track profile coupled with the possibility to tie into an existing stormwater drainage outlet provides an opportunity to use gravity flow for railroad track drainage, avoiding costly pump station installation and maintenance and potential complications associated with stormwater permitting. Therefore, both alternatives use this avenue for stormwater discharge from the Project area.

Also, because local topography slopes down from east to west, the Project's stormwater drainage infrastructure must accommodate flow collected by the existing network of pipes and catch basins located east of the rail corridor and convey it under the tracks to the west. This would require removal of portions of the existing rubble retaining wall between the two bridges to accommodate the required piping.

Summary

Because of the inherent constraints posed by existing conditions and the requirements of Vermont statute, both Replacement Alternatives have identical limits of disturbance. An assessment of the impacts associated with the two Replacement Alternatives, as well as the Non Build, Rehabilitation, and Build on New Location Alternatives is provided in the following section.

5.0 Impact Assessment

5.1 Evaluation Matrix and Discussion

The comparison of the impacts associated with each of the five alternatives, is provided in the Alternative Analysis Matrix in Table 5.1. A discussion of the matrix categories is provided below.

5.1.1 Cost

The costs shown in Table 5.1 are a summary of order-of-magnitude cost estimates for the five Project alternatives. The estimates are total costs taken from detail sheets in **Appendix 7** and rounded to the nearest $100,000. The cost estimates were created with the following basic assumptions:

- Railroad Alternatives assume Project limits extend along railroad from Otter Creek Truss to the south and to the Elm Street Bridge to the north. Track profile grades were adjusted accordingly within these longitudinal limits to allow for required vertical clearance under the various alternatives.

- Transit impacts assume that a temporary relocation of the current bus stop facilities on Merchants Row would be required to the south end of South Pleasant Street and that the permanent location would be back in its existing location on Merchants Row.

- For purposes of this estimate, drainage costs are all based on all railroad corridor and municipal drainage flowing north using a gravity system discharging via an existing outfall below the Otter Creek Falls, which would require an easement across the Marble Works property.

The overall costs for each Alternative are summarized below:

Alternative 1 – No Build:	***No associated costs***
Alternative 2 – Rehabilitation:	***$27.1M***
Alternative 3 – Build on New (Roadway) Location:	***$32.7M***
Alternative 4 – Replacement - Two Bridges:	***$16.0M***
Alternative 5 - Replacement – Tunnel:	***$17.5M***

The No Build Alternative has no associated cost, as no improvements would be carried out. This cost estimate does not include costs associated with routine maintenance and repair of the failing bridge superstructure and sidewalk or roadway damage.

The cost estimate for the Rehabilitation Alternative is the second highest of the five alternatives and reflects the extraordinary engineering and construction challenges required to install foundations for the existing stone abutments and rubble retaining walls. The cost estimate for the Build on New Location Alternative is highest, reflecting the same engineering challenges as well as increased roadway cost, ROW acquisition, and increased drainage complexity.

The two Replacement Alternatives have the lowest cost of the four action alternatives. The resulting differential is approximately 9% greater for the Tunnel Alternative. However, it should be noted that this variance is relatively small since the overall construction cost contingency used is greater than the difference at 20%. When the differences in cost estimates are less than the actual contingencies used, the information might be considered insignificant when comparing final Project costs at this level of estimating.

The most significant geometric differences between Two Bridges and a Tunnel are leaving the space between the bridges as an open trench or re-establishing new green space over the top of the railroad ROW. While it was initially expected that the cost differences would be much greater, the similar outcome is a consequence of the extensive modifications necessary to lower the track between the two bridges, thus requiring the bottom U-shape segments of the precast concrete box between the structures with or without the continuous tunnel. The resulting 10% cost increase for the tunnel is attributed to the cost of adding the top U-shaped concrete components of the box structure and covering the tunnel with fill.

5.1.2 Engineering

A summary of the engineering elements of each Replacement Alternative is included in Table 5.1. The No Build Alternative does not improve or change any of the existing conditions. The Rehabilitation Alternative and both Replacement Alternatives would provide enhanced conditions at the completion of the Project (i.e., enhanced vertical and horizontal clearances). Minor impacts to utility service may occur during construction these three alternatives, such as temporary service disconnections for water, electricity, sewer, and telecommunications. Depending on the roadway or railroad realignment, the Build on New Location Alternative may have an impact pedestrian access, bicycle access, and traffic safety. The degree of alignment change would be characterized as a major impact.

5.1.3 Impacts

A summary of impacts on resources that may occur due to construction are included in Table 5.1. No Alternative is anticipated to have any natural resource impacts. Impacts to archaeological resources would be identical for each alternative, and would mitigated by the development of a Phase IB report and the implementation of construction protocols approved by the VTrans Archaeology Officer, including but not limited to measures described in the Vermont statewide Federal Aid Highway Programmatic Agreement (i.e., Section 4(I): Discovery of Archaeological Sites During Project Construction, and Section 4(J): Treatment of Human Remains).

Impacts to historic structures and districts would occur for each action alternative. Specific information regarding these impacts and potential mitigation approaches are discussed in detail in Section 5.2, Preliminary Section 106 Determination of Effect.

5.1.4 Local and Regional Issues

Most of downtown Middlebury lies within the MVHD and the Town is very much involved in Project development and advocacy. The 2012 Middlebury Town Plan notes that the replacement of the current bridges with a continuous tunnel between Merchants Row and Main Street would "…close up the chasm that exists in the downtown area…" Public feedback was gathered at the Local Concerns Meeting held on 3/28/13 and the Alternatives Presentation Meeting held on 6/4/13. Various questions were asked and individual response to multiple choice options was collected using anonymous electronic polling via handheld devices. The results of those polls can be seen in **Appendix 8**. The results from the Alternatives Presentation showed unanimous agreement that the aesthetics of the downtown were of high importance, while 83% of attendees agreed that unifying the Village Green and Triangle Park space would increase the use of the space. With respect to the Tunnel Alternative, 81% of attendees were supportive of this option, with 10% responding as neutral and only 3% disagreeing. The Town's Selectboard has also submitted a letter to VTrans' Secretary stating their support of the Tunnel Alternative (see **Appendix 9**).

The Build on New Location Alternative would be inconsistent with the spirit of the Middlebury Town Plan, which acknowledges the need to preserve key green spaces (such as the Village Green) and the importance of retaining the integrity of the Middlebury Village Historic District. Furthermore, the Build on New Location Alternative may have adverse economic impacts due to resulting and significant change in the Downtown character, including pedestrian access.

5.1.5 Permits

Permits would not be required for the No Build Alternative; any required permits would be the same for each action alternative.

5.1.6 Other

ROW would not be required for the No Build Alternative. Required ROW acquisition (temporary or permanent) would be the same for the Rehabilitation Alternative and both Replacement Alternatives. The Build on New Location Alternative would involve considerable ROW taking.

Table 5.1 Alternatives Analysis Matrix		No Build Alternative	Rehabilitation Alternative	Build on New Location Alternative	Replacement: Two Bridge Alternative	Replacement: Tunnel Alternative
COST	Roadway Improvements	N/A	$700,000.00	$3,100,000.00	$600,000.00	$600,000.00
	Bridge/Tunnel Improvements	N/A	$19,500,000.00	$22,500,000.00	$9,800,000.00	$11,300,000.00
	Rail Improvements	N/A	$4,700,000.00	$4,700,000.00	$3,800,000.00	$3,800,000.00
	Rail Drainage	N/A	$2,100,00.00	$2,100,000.00	$1,700,000.00	$1,700,000.00
	Right-of-Way	N/A	Included	Included	Included	Included
	Traffic and Safety	N/A	Included	Included	Included	Included
	Bus Stop Temporary Relocation (ACTR)	N/A	$100,000.00	$300,000.00	$100,000.00	$100,000.00
	Detour	N/A	N/A	N/A	N/A	N/A
	Preliminary Engineering	N/A	Included	Included	Included	Included
	SUBTOTAL:	$0.00	$27,100,000.00	$32,700,000.00	$16,000,000.00	$17,500,000.00
	Contingency:	$0.00	25% Included	25% Included	20% Included	20% Included
	TOTAL:	**$0.00**	**$27,100,000.00**	**$32,700,000.00**	**$16,000,000.00**	**$17,500,000.00**
ENGINEERING	Typical Roadway Section	No Change	No Change	No Change	No Change	No Change
	Typical Bridge Section	No Change	No Change	No Change	No Change	No Change
	Rail Vertical Clearance	No Change	Improvement	Improvement	Improvement	Improvement
	Rail Horizontal Clearance	No Change	Improvement (16′-0″ H.C.)	Improvement (16′-0″ H.C.)	Improvement (16′-0″ H.C.)	Improvement (16′-0″ H.C.)
	Pedestrian Access	No Change	No Change	Potential Impact	No Change	Improvement
	Bicycle Access	No Change	No Change	Potential Impact	No Change	No Change
	Traffic Safety	No Change	No Change	Potential Impact	No Change	No Change
	Alignment Change	No Change	No Change	Major Impact	Enhancement	Enhancement
	Utilities	No Change	No Change	Major Impact	Minor Impact	Minor Impact
IMPACTS	Agricultural Lands	No	No	No	No	No
	Archaeological	No	Unknown	Unknown	Unknown	Unknown
	Historic Structures, Sites and	No	Yes	Yes	Yes	Yes
	Hazardous Materials	No	Yes (Existing Condition)	Yes (Existing Condition)	Yes (Existing Condition)	Yes (Existing Condition)
	Floodplains	No	No	No	No	No
	Fish & Wildlife	No	No	No	No	No
	Rare, Threatened & Endangered Species	No	No	No	No	No
	Public Lands - Section 4(f)	No	Yes	Yes	Yes	Yes
	LWCP - Section 6(f)	No	No	No	No	No
	Noise	No	Construction Related	Construction Related	Construction Related	Construction Related
	Streams	No	No	No	No	No
	Wetlands	No	No	No	No	No
LOCAL AND REGIONAL ISSUES	Concerns	N/A	Not Met	Not Met	Not Met	Satisfied
	Aesthetics	N/A	Yes	Yes	Yes	Yes
	Community Character	No	No	Yes	No	Yes
	Economic Impacts	No Change	Potential (Construction Related)	Yes (Construction & Road / Sidewalk Changes)	Potential (Construction Related)	Potential (Construction Related)
	Conformance to Regional Transportation Plan	No Change	Yes	Undetermined	Yes	Yes
	Conformance to 2012 Town Plan	No Change	No	No	No	Yes
	Satisfies Project Purpose and Need	No	Yes	Yes	Yes	Yes
PERMITS	Act 250	No	No	No	No	No
	401 Water Quality	No	No	No	No	No
	404 ACOE Permit	No	No	No	No	No
	Stream Alteration	No	No	No	No	No
	Vermont Wetland Permit	No	No	No	No	No
	Storm Water Discharge	No	No	No	No	No
	Lakes and Ponds	No	No	No	No	No
	Threatened & Endangered Species	No	No	No	No	No
	VT Construction SW Individual	No	No	No	No	No
	SHPO	No	Yes	Yes	Yes	Yes
OTHER	ROW Acquisition	No	Yes	Yes	Yes	Yes
	Road Closure	No	Yes	Yes	Yes	Yes
	Design Life	No	Yes	Yes	Yes	Yes

5.2 Preliminary Determination of Effect on Historic Resources

As presented in Section 3.4, historic districts that lie within the Project limits are the National Register-listed MVHD and the National Register-eligible RRHD. In addition, the Determination of Eligibility Report (**Appendix 3**) concluded that the Main Street and Merchants Row Bridges are eligible for the National Register as contributing resources to the MVHD and RRHD (specifically the 19th century ashlar abutments and railings). The retaining walls are similarly eligible as contributing resources to both districts. Lastly, the report concluded that the Rutland Railroad corridor is eligible as a contributing resource to the MVHD.

A preliminary determination of the effect on historic resources resulting from each of the Project Alternatives is provided below. The findings of the determination are summarized in Table 5.2. This determination includes those two Alternatives that are considered unviable per Sections 4.2.2 and 4.2.3 (Rehabilitation and Build on New Location, respectively).

5.2.1 No Build Alternative

Effects

Actions proposed under the No Build Alternative would include ongoing maintenance efforts to repair areas of spalled concrete and other structural deterioration, including failure of the railings on both bridges. However, these measures would be insufficient to prevent continued deterioration of the superstructure of both bridges. Deterioration of the substructure of the Main Street Bridge, which is a combination of ashlar and board-formed plain concrete, would also continue, as would deterioration of the retaining walls. Accordingly, the No Build Alternative would have an adverse effect on resources determined to be eligible as contributing to the MVHD and RRHD.

Potential Mitigation

Periodic maintenance and repair are insufficient to mitigate the effects of ongoing bridge deterioration. Pursuing an iterative approach to bridge and retaining wall repair conducted in an ad hoc fashion would continue the amalgamation of spot treatments, the combined effect of which would degrade the appearance of the structures and result in an adverse effect. The No Build Alternative includes no mitigation approach to offset adverse effects.

Summary

The No Build Alternative would have an adverse effect on historic resources contributing to the MVHD and RRHD through the continued degradation of the substructure and superstructure of both the Main Street and Merchants Row Bridges and the iterative approach to repair work. The existing railings on both bridges do not meet current codes and represent a public safety concern. The No Build Alternative does not meet the Project Purpose and Need.

Table 5.2 Summary Determination of Effect on Historic Resources	**No Build Alternative**		**Rehabilitation Alternative**		**Build on New Location Alternative**		**Two Bridge Replacement Alternative**		**Tunnel Replacement Alternative**	
	Periodic maintenance and repair are the only actions proposed under the No Build Alternative.		The existing structures would be rehabilitated to the extent feasible.		Construct two new bridges on new roadway alignments, either north or south of existing.		Replace existing bridges with new bridges, maintain U-shaped structural element between bridges.		Replace existing bridges with tunnel extending from south of Merchants Row to north of Main Street.	
	Effect	**Mitigation**	**Effect**	**Potential Mitigation**	**Effect**	**Potential Mitigation**	**Effect**	**Potential Mitigation**	**Effect**	**Potential Mitigation**
Middlebury Village Historic District	ADVERSE EFFECT - BRIDGES AND RETAINING WALLS. Adverse effect on historic integrity of bridges via continued deterioration of railings, substructure and superstructure. Retaining walls would continue to degrade.	None	ADVERSE EFFECT - BRIDGES The extensive modifications to bridge elements required by rehabilitation would remove a portion of the historic fabric of the bridges, including: removal of railings, removal of the piers supporting the approach spans; use of tie backs for abutment stabilization. ADVERSE EFFECT - RETAINING WALLS The extensive modification of retaining walls via application of grout and/or catch fence would affect the historic integrity of the walls.	Use of concrete forms to mimic ashlar on face of new foundations for abutments and retaining walls. The design of railing replacement (crash-rated railing) would be approved by VTrans HPO.	Same as Rehabilitation with additional impacts: ROADWAY INSIDE CURRENT BRIDGES: ADVERSE EFFECT - MULTIPLE RESOURCES Roadway alignment to inside of current bridges would have adverse effect on Village Green, Triangle Park, St, Stephens Episcopal Church, and retaining walls. ROADWAY OUTSIDE CURRENT BRIDGES: ADVERSE EFFECT - MULTIPLE RESOURCES Roadway alignment to inside of current bridges would have adverse effect on multiple listed buildings.	Little or no mitigation opportunities to offset considered impact. The design of railing replacement (crash-rated railing) would be approved by VTrans HPO.	ADVERSE EFFECT - BRIDGES & RETAINING WALLS Complete removal of both historic bridges and removal or burial of retaining walls. ADVERSE EFFECT - CONTEXT The requirement to bring safety measures to code would necessitate the installation of crash-rated guardrails around the perimeter of the track opening, which may also polarize public response.	Ashlar blocks salvaged from the bridge abutments could be used as decorative elements at new bridges or to face the top of the U-section between bridges. Excess blocks would be stockpiled for later use on Town projects with the approval of the VTrans HPO. The design of railing replacement (crash-rated railing) would be approved by VTrans HPO.	ADVERSE EFFECT - BRIDGES & RETAINING WALLS Complete removal of both historic bridges and removal or burial of retaining walls. BENEFICIAL EFFECT - VILLAGE GREEN Reestablishment of approximate limits of pre-railroad Village Green.	Ashlar blocks salvaged from the bridge abutments could be used as decorative elements in the reestablished greenspace and as practical means of resolving site grading challenges (e.g., benches). Excess blocks would be stockpiled for later use on Town projects with the approval of the VTrans HPO. A tunnel would allow for the reestablishment of the approximate extent of the Village Green before railroad construction. Interpretative plaques could be erected in the reestablished greenspace. Public use of the Village Green would be enhanced, with associated enhanced opportunities for historic interpretation.
Rutland Railroad Historic District	ADVERSE EFFECT - ABUTMENTS AND RETAINING WALLS Adverse effect through continued deterioration of retaining walls and abutments.		ADVERSE EFFECT - ABUTMENTS AND RETAINING WALLS The extensive modification of retaining walls via application of grout and/or catch fence would affect the historic integrity of the walls, as would modification to abutments via tie-backs. ADVERSE EFFECT - CONTEXT The appearance and context of the abutments and retaining walls would be altered as they would lie roughly 6 feet above the track.		Same as Rehabilitation, with additional loss of historic fabric by removal of retaining walls at new bridge locations.		ADVERSE EFFECT - ABUTMENTS AND RETAINING WALLS Complete removal of abutments for both historic bridges and removal or burial of retaining walls. ADVERSE EFFECT - CONTEXT The appearance and context of new track may be perceived as inconsistent with the history of the RRHD. Vegetation management and routine clearing would also affect the viewshed of the tracks, which may be appealing to some onlookers and unappealing to others.		ADVERSE EFFECT - ABUTMENTS AND RETAINING WALLS Complete removal of abutments for both historic bridges and removal or burial of retaining walls. ADVERSE EFFECT - CONTEXT Some may consider the loss of the view of the tracks between bridges to be an adverse effect, though public	

5.2.2 Rehabilitation Alternative

Effects

As discussed in Section 4.2.2, the degree of excavation required to achieve the vertical clearance required by State statute would compromise the structural integrity of the foundations for the existing bridge abutments and retaining walls unless extraordinary engineering measures were incorporated into the design. Such measures would include excavation beneath the abutments and retaining walls and the installation of temporary stabilization, the installation of foundations under these features (either reinforced concrete or plain concrete poured behind a new retaining wall), and tie backs to augment horizontal stability. The construction of each of these measures is prohibitively expensive and time consuming; they are incompatible with the constructability requirements of the Project, which mandate that the track be reopened for daily rail service.

Even if such measures were carried out, the reincorporation of the 19th century stone abutments and unconsolidated rubble retaining walls into a Project with a design life target of 75 years would present unreasonable risk for Project longevity and safety. The finished elevation of the rubble retaining walls would lie roughly 5 feet higher than existing conditions, presenting a greater risk for rail operations as these materials continue to weather and spall onto the tracks. Accordingly, the rubble walls would have to be grouted, removed and replaced, or some means of catch fencing installed. Because drainage infrastructure must be installed at depth and along the east side of the rail corridor, preserving the eastern retaining wall would not be possible.

The stone walls would require reinforcement with steel tiebacks behind the stone masonry to resist lateral loading for the increased wall depth and seismic events. This would require approximately 50-75 feet of excavation along the streets behind the walls for safe working areas, removal of existing material, placement of tiebacks, and installation of structural fill.

The preservation of all existing bridge components also would not be possible. To achieve the design alignment and necessary horizontal clearance through the Project area, the concrete columns under one or both bridges could not remain. This would remove a portion of the historic fabric of the bridges and alter their visual appearance. The appearance and context of the stone abutments and retaining walls would also be altered, as they would rest atop a new foundation some distance above the active track. The rehabilitation would require replacement of the top 2-3 courses of the stone walls with new bridge seats to receive the new superstructures. This alternative requires significant excavation below and behind the existing walls that would increase the area excavation area by as much as 5 times as much as the replacement alternatives which will require significant disruption to downtown businesses adjacent to the bridges as well as loss of access to the Battell Block driveway for extended periods of time.

The degree of deterioration of the bridge deck and superstructure precludes rehabilitation; these features would have to be replaced in their entirety. As such, and because the substructures would likely require extensive alterations to make them compatible with the target design life of the Project (e.g., tie backs, concrete foundations), the Rehabilitation Alternative would contravene the Secretary of the Interior's Standards for Rehabilitation. Therefore, the Rehabilitation Alternative would have an adverse effect on resources determined to be eligible as contributing resources to the MVHD and RRHD. The visual alteration of the railroad corridor (i.e., removal of piers, lowering of track, installation of foundations for abutments and retaining walls, installation of grouting or catch fencing at rubble retaining walls) would have an adverse effect on the RRHD.

Potential Mitigation

Mitigation opportunities for the Rehabilitation Alternative include using concrete forms to achieve the appearance of stone ashlar construction on the face of the foundations required to support the stone abutments and retaining walls. Existing railings would be replaced with crash-tested railing, the selection and design of which would be approved by the VTrans Historic Preservation Officer (HPO). This mitigation approach does not provide a substantial offset for adverse impacts.

Summary

The degree of alteration to contributing resources required for the Rehabilitation Alternative would be inconsistent with the Secretary of the Interior's Standards for Rehabilitation. Furthermore, rehabilitation is not practical given the advanced state of bridge deterioration and extraordinary engineering and construction costs necessary to avoid impacts to contributing resources when track is lowered (e.g., maintain retaining walls and abutments intact). Impacts to contributing resources would be inevitable given the Project setting and existing bridge conditions. Mitigation opportunities are limited and do not offer a substantial offset for adverse impacts.

5.2.3 Build on New Location (Roadway)

Effects

Altering the alignment of either the Main Street or Merchants Row roadway to accommodate two new bridges would have adverse effects on a variety of resources. Shifting the Main Street roadway alignment to the south is not possible because of the proximity of St. Stephens Episcopal Church to both Main Street and the Main Street Bridge. This alignment would also take land from the Village Green, which includes Triangle Park. Both the Church and the Village Green are contributing resources to the MVHD. Shifting the Main Street alignment to the north is not possible due to conflicts with existing structures, most of which are also listed as contributing to the MVHD and include the Horatio Seymour House/Community House, the U.S. Post Office, the Beckwith

Block, the National Bank of Middlebury, 34-38-40-42 Main Street, and 44 Main Street.

Shifting Merchants Row to the north would require a strip taking of the Village Green and the loss of Triangle Park. A southerly shift in Merchants Row is not possible due to conflicts with other listed buildings, including the Battell Block, Bourdon Insurance Company Building, and Memorial Baptist Church.

Realigning either Main Street or Merchants Row would have adverse effects on numerous resources contributing to the MVHD. The construction of the new bridges would require demolition and/or burial of the rubble retaining walls between the existing bridges, resulting in an adverse effect on the RRHD.

Potential Mitigation

This alternative offers little in the way of mitigation to offset the degree of effect, especially to the MVHD.

Summary

As described above and in Section 4.2.3, the Build on New Location Alternative is not feasible for a number of reasons, including ROW acquisition, high degree of building demolition or takings of public space, traffic and access management, and the need to adjust the horizontal rail alignment to meet AREMA and other requirements. If this alternative was feasible, it would involve the highest degree of effect on historic resources of any of the action alternatives. The impacts to contributing resources would far outweigh the benefit of retaining the deteriorating bridges in situ. The retained bridges would require ongoing maintenance and repair in order to provide limited function for activities such as pedestrian access, which could not be carried out without affecting the historic fabric of the bridges themselves (see preceding discussion under regarding the Rehabilitation Alternative). Because the new bridges must achieve the increased vertical clearance, their installation parallel and immediately adjacent to the existing bridges would require the same degree of excavation, foundation, and stabilization work described for the Rehabilitation Alternative, with the same adverse effects on the structures' historic fabric. Mitigation opportunities would be limited to the installation of interpretive signage regarding the two bridges.

5.2.4 Two Bridge Alternative

Effects

The construction of two replacement bridges would have an adverse effect on the MVHD and RRHD via the following actions:

- the removal of historic fabric, including the entirety of both existing bridges (i.e., bridge deck, superstructure, substructure, and railings);
- the retaining wall along the western side of the Project corridor would be buried in situ, with the one along the eastern side removed; and

- the installation of crash-tested railing around the perimeter of the track opening, which may result in a negative aesthetic impact on the Village Green.

The construction of two replacement bridges would have an adverse effect on the RRHD via the following actions:

- the viewshed of the track would remain less variable due to requirements for vegetative management (i.e., cycles of scrub-shrub and tree regeneration and cutting would be discontinued), perhaps appealing to some onlookers and unappealing to others.

Potential Mitigation

Mitigation opportunities for the Two Bridge Alternative include the following:

- ashlar blocks salvaged from the eastern bridge abutments could be used as decorative elements at new bridges or to face the top of the U-section between bridges (if feasible from an engineering standpoint);
- excess blocks would be stockpiled for later use on Town projects with the approval of the VTrans HPO; and existing railings would be replaced with crash-tested railing, the selection and design of which would be approved by the VTrans HPO.

The final configuration of the ends of each bridge fascia will require close coordination with the VTrans HPO for approval. These areas may terminate parallel to the roadway centerline or perpendicular to the railroad corridor based on final concepts developed.

Summary

The Two Bridge Alternative meets the Project's Purpose and Need. This alternative most closely approximates current conditions in that it maintains separate bridges with a section of intervening open, depressed track. However, based on public input during the Alternatives Presentation Meeting held on 6/4/13, public support for the Two Bridge Alternative is considerably less than for the Tunnel Alternative (discussed below). In addition, mitigation for adverse impacts to historic resources is relatively constrained relative to the Tunnel Alternative. The use of crash-tested railing around the track opening between bridges and the requirement to manage vegetation on the sideslopes leading to the tops of the retaining wall may result in potential aesthetic negative impacts to the Village Green that are not incurred by the Tunnel Alternative.

5.2.5 Tunnel Replacement Alternative

Effects

Impacts associated with the Tunnel Alternative are similar to those joint impacts on the MVHD and RRHD discussed for the Two Bridge Alternative. Impacts exclusive to the RRHD would be:

- the existing view of the tracks between the two bridges would be lost, resulting in a potential adverse impact.

Potential Mitigation

Mitigation opportunities for the Tunnel Alternative include the following:

- tunnel construction would allow for the construction of useable green space above the active track, in effect reestablishing the extent of the original Village Green before the construction of the railroad;
- ashlar blocks salvaged from the eastern abutments of both bridges would be used as structural and decorative elements in the new green space, providing a practical means of achieving the necessary cover and site grading above the tunnel and a functional and tactile interpretive element to convey the importance of the railroad to park visitors (see **Appendix 4** Tunnel renderings);
- the new green space provides an opportunity to install interpretive signage or plaques;
- excess ashlar blocks would be stockpiled for later use on Town projects with the approval of the VTrans HPO; and existing railings would be replaced with crash-tested railing, the selection and design of which would be approved by the VTrans HPO.

The final configuration of the ends of each tunnel fascia will require close coordination with the VTrans HPO for approval. These areas may terminate parallel to the roadway centerline or perpendicular to the railroad corridor based on final concepts developed.

Summary

The adverse effects that would result from the Tunnel Alternative are comparable to those for the Two-Bridge Alternative. However, by reestablishing the approximate former extent of the Village Green, the Tunnel Alternative offers impact mitigation that is superior to the Two Bridge Alternative. In addition, public support for the Tunnel Alternative as recorded during the Alternatives Presentation Meeting is considerably stronger than for the Two Bridge Alternative.

5.3 Preliminary Section 4(f) Evaluation

Based on pre-design coordination with the VTrans HPO and the FHWA Environmental Program Manager, either Replacement Alternative is considered eligible for Section 4(f) approval via the *Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges* (Bridge Use PA). Should any use of a qualifying Section 4(f) resource(s) outside of the Project ROW be required (e.g., permanent easements, fee acquisitions, conversions to transportation use) and providing that there are no adverse effects from the takings, a separate Section 4(f) *de minimis* evaluation would be required. If adverse impacts are associated with ROW takings, additional

Section 4(f) evaluations would be required. At this point, the amount of ROW taking required for the Project has not been confirmed but is expected to be limited, if at all.

The following discussion constitutes a preliminary Section 4(f) evaluation for the two Replacement Alternatives per the guidelines of the Bridge Use PA.

5.3.1 Use

Even though the Main Street and Merchants Row Bridges have been determined to be contributing resources to the MVHD,

> "*…they must nevertheless perform as an integral part of a modern transportation system. When they do not or cannot perform, they must be rehabilitated or replaced in order to assure public safety while maintaining system continuity.*"[2]

The Bridge Use PA is for those actions that would "use" a bridge that is eligible for listing on the National Register when the action would impair the historic integrity of the bridge either by rehabilitation or demolition. As presented in the preceding section, both the Rehabilitation Alternative and both Replacement Alternatives would indeed result in an impairment of the historic integrity of both the Main Street and Merchants Row Bridges.

5.3.2 Applicability of the Bridge Use PA

The Bridge Use PA is applicable to the Project as long as it meets the following guidelines:[3]

1. The bridge is to be replaced or rehabilitated with Federal funds.
2. The Project will require the use of a historic bridge structure which is on or is eligible for listing on the National Register of Historic Places.
3. The bridge is not a National Historic Landmark.
4. The FHWA Division Administrator determines that the facts of the Project match those set forth in the sections of this document labeled Alternatives, Findings, and Mitigation.
5. Agreement among the FHWA, the State Historic Preservation Officer (SHPO), and the Advisory Council on Historic Preservation (ACHP) has been reached through procedures pursuant to Section 106 of the NHPA.

Points 1 through 3 are valid for the Project. Points 4 and 5 are pending additional coordination with the FHWA and VTrans HPO.

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[2] *Programmatic Section 4(f) Evaluation and Approval for FHWA Projects that Necessitate the Use of Historic Bridges.* Federal Highway Administration.
[3] ibid

5.3.3 Alternatives

The Bridge Use PA requires that the following alternatives be evaluated:

1. Do nothing.
2. Build a new structure at a different location without affecting the historic integrity of the old bridges, as determined by procedures implementing the National Historic Preservation Act (NHPA).
3. Rehabilitate the historic bridges without affecting the historic integrity of the structure, as determined by procedures implementing the NHPA.

5.3.4 Findings

No Build (Do Nothing)

The No Build Alternative is not feasible and prudent because it would have an adverse effect on the historic integrity of both the Main Street and Merchants Row Bridges through the continued degradation of their substructure and superstructure and the iterative approach to repair work. The No Build Alternative does not correct the situation that causes the bridges to be considered structurally deteriorated, which can lead to sudden collapse and potential injury or loss of life. Normal maintenance cannot address the advanced state of deterioration. The existing railings on both bridges do not meet current codes and represent a public safety concern.

Rehabilitation

Rehabilitation of either the Main Street or Merchants Row Bridge is not feasible and prudent because both bridges are so structurally deficient that they cannot be rehabilitated to meet minimum acceptable load or clearance requirements without affecting the historic integrity of the bridge.

See Section 5.2.2 for additional information on adverse effects to historic resources associated with the Rehabilitation Alternative.

Build on New Location

The Build on New Location Alternative is not feasible and prudent for a number of reasons. The bridges are already located at the only feasible and prudent site. To build new bridges on new roadway alignments would result in extraordinary bridge and foundation engineering (for both the new and historic bridges), and would be incompatible with the accelerated construction timeframe. The required roadway alignments would result in adverse effects to the MVHD and RRHD. Roadways alignments inside of the current alignments would take a considerable portion of the Village Green and all of Triangle Park, resulting in impacts to downtown Middlebury's signature park space. The historic bridges would require ongoing maintenance and repair in order to provide any limited function for pedestrian access, which could not be carried out without affecting the historic integrity of the bridges themselves. The historic bridges would continue to present a safety hazard via concrete spalling onto the railroad tracks.

See Section 5.2.3 for additional information on adverse effects to historic resources associated with the Build on New Location Alternative.

5.3.5 Measures to Minimize Harm

In accordance with the requirements of the Bridge Use PA, the replacement of the Main Street and Merchants Row Bridges must take all measures to minimize harm. These include:

1. The FHWA must ensure that, in accordance with the Historic American Engineering Record (HAER) standards, or other suitable means developed through consultation, fully adequate records are made of the bridge;
2. The existing bridge is made available for an alternative use, provided a responsible party agrees to maintain and preserve the bridge; and
3. Agreement among the VTrans HPO, Advisory Council on Historic Preservation (ACHP), and FHWA is reached through the Section 106 process of the NHPA on measures to minimize harm and those measures are incorporated into the Project.

Measures to minimize harm include those mitigation measures discussed in Section 5.2.4 and 5.2.5. for the Two Bridge and Tunnel Replacement Alternatives, respectively.

6.0 Recommendation

Based on the outcome of the alternatives analysis and in consideration of the Project's Purpose and Need, it is recommended that the No Build, Rehabilitation, and Build on New Location Alternatives be eliminated from further consideration. Of the two Replacement Alternatives, the Tunnel Alternative is recommended as the Preferred Alternative for the Project. The considerations made to arrive at these conclusions are described below.

Elimination of the No Build Alternative is recommended because of its non-compliance with the Project Purpose and Need. As identified in the analysis, this alternative does not improve safety or security nor does it establish structures with the required load capacity to meet current design guidelines.

Elimination of the Rehabilitation Alternative is recommended because the extent of the necessary alterations would be extraordinary and would result in a structure that would consist of approximately 80 percent new components that are similar to those proposed for the Replacement Alternatives but with significantly higher costs and increased traffic, property, and business impacts relative to the Replacement Alternatives. To attempt to retain the rehabilitated bridge abutments and rubble retaining walls with complex, risk-inherent retrofits and substantial substructure modifications would result in inferior engineering performance and greater costs. These considerations, coupled with constructability conflicts, render the Rehabilitation Alternative neither feasible nor prudent.

Elimination of the Build on New Location Alternative is recommended as the extent of the impacts on Downtown Middlebury and associated properties and existing historic structures and districts renders this alterative neither feasible nor prudent.

In comparing the two remaining Replacement Alternatives it is recommended that the ***Tunnel Alternative*** be selected as the Project's Preferred Alternative based on the following criteria:

- Overall impacts – impacts for the two Replacement Alternatives are effectively equal.
- Costs – conceptual cost estimates are within 10% using a 20% contingency.
- Public support – tremendous support exists for replacement with a tunnel.
- Community benefits – reconnecting green space downtown provides new useable areas for public recreation and events.
- Potential mitigation – opportunities to mitigate for adverse effects on historic resources are greater for the Tunnel Alternative, including reestablishment of the approximate limits of the Village Green before railroad construction; reuniting the Village Green with Triangle Park. The reestablished green would also provide an opportunity to install interpretive signage or placards acknowledging the history of the railroad and its importance to Downtown Middlebury. Ashlar stone blocks from the bridge abutments could be used for seating walls and park benches.
- Selectboard support – the Town supports the Tunnel Alternative over the Two Bridge Alternative (see **Appendix 9**).
- Aesthetics – the additional green space over an open trench provides more visual appeal.
- Drainage/Ponding – Covering the area between the two bridges will aid in mitigating surface drainage and rainfall problems that result in ponding on the tracks at the low point between the bridges.
- 2012 Town Plan – Reconnecting the two spaces is outlined in the Town Plan to "…close up the chasm that exists in the downtown area…".
- 2012 Town Plan – The Town Plan also recognizes the importance of encouraging the "tradition of historic investments in buildings, greens, monuments and other infrastructure within the Historic District."
- Community Character and Historic – Improvement of the function of the Village Green area by providing a new park area for viewing a high percentage of the Town and historic district's most outstanding architectural and historical structures that face it from all three sides.
- Safety – Less exposed trench area to maintain for safety with crash-tested guardrails and safety handrails.
- Noise – Reduces noise pollution caused by freight trains passing through the center of Downtown.
- Aesthetics – Improves aesthetic surroundings of the property adjacent to the historic St. Stephens Episcopal Church by enclosing the railroad trench.
- Design Efficiency – Minimal increase in Project cost due to readily available fill material and already created precast concrete form-work for top of tunnel pieces that are similar configuration to bridge elements.

In conclusion, it is recommended that the ***Tunnel Alternative*** be selected as the Preferred Alternative and advanced to the final design and permitting phase.

7.0 Appendices

Appendix 11: Purpose and Need

Appendix 12: Project Limits Aerial Graphic

Appendix 13: Determination of Eligibility for Historic Resources

Appendix 14: Tunnel Renderings

Appendix 15: Railroad Track Profile Changes

Appendix 16: Flood Elevations and Track Profile Memorandum

Appendix 17: Order-of-Magnitude Cost Estimates

Appendix 18: Public Survey Results

Appendix 19: Town's Letter of Support

Appendix 20: Digital Copy of the Alternative Analysis Report

1

Purpose and Need

Project Purpose

The Purpose and Need for the Middlebury Project was developed based on a wealth of available information including bridge inspection reports completed by the Vermont Agency of Transportation (VTrans), technical data, and previously completed conceptual plans. This Purpose and Need statement is consistent with the goals and recommendations of the Middlebury 2012 Town Plan and the 2011 Addison County Regional Plan.

The purpose of the Middlebury WCRS(23) Bridge Project has been defined in accordance with the requirements of NEPA, CEQ Regulations 40 CFR Part 1500-1508, and FHWA's Technical Advisory T6640.8A as follows:

- To address the structural deficiencies and existing pedestrian facilities of two roadway bridges in downtown Middlebury where Main Street (VT 30/ TH 2 Bridge 102) and Merchants Row (TH 8 Bridge 2) span the Vermont Railway, Inc. (VTR) track.

Project Need

The Project Need is defined by the concerns and deficiencies identified in the following areas:

Structural Condition of Bridges

The current bridges at Main Street and Merchants Row were constructed between 1920 and 1921. Both are two-span concrete-encased steel beam bridges. The Merchants Row bridge is supported by granite ashlar abutments and concrete-encased steel bridge seats. The north sidewalk and travel lanes of the Main Street Bridge are supported similarly, with the south sidewalk supported by a concrete abutment. For both bridges, the approach span is a concrete T-beam construction and the main approach is a concrete slab reinforced with steel rails (i.e., "rail top" span). The ends of the approach and main spans are supported by a concrete-encased steel pier. Bridge railings consist of three cast iron pipe or channel rails on steel posts.

For over twenty-five years, bi-annual VTrans bridge inspection records have chronicled the ongoing deterioration of both bridges. Concrete cracking, delamination, and spalling have occurred on all bridge components with particular deterioration noted on the fascias. Embedded steel reinforcement is exposed in a variety of locations,

especially at the fascias, the ends of the pier caps, and in the flanges of the approach spans under the sidewalks. Heavy efflorescence is common on the soffits of both bridges, indicating leakage through the deck. In April 1997, a hole in the sidewalk of the Merchants Row bridge was reported. Inspection reports from 1998 to the present have noted that full depth holes can occur at any location in the Merchants Row bridge, and are most likely to occur under the sidewalks and parking areas. The 1986 bridge inspection report for this same bridge notes a hole in the soffit up to the steel mesh of the bridge decking. At present, the mesh is exposed in multiple locations on the Merchants Row bridge.

Inspection reports from 1994 (Merchants Row) and 1995 (Main Street) recommended bridge replacement. Both bridges have been on the State Bridge Program's Candidate list since funding for preliminary engineering was established in March 1999.

Rail and Pedestrian Safety

In 2008, VTR informed VTrans that spalling concrete from the bridges was falling onto the tracks and passing trains, presenting a safety concern. In response, VTrans issued a Critical Maintenance Report. This report noted that the safety concern extends beyond VTR operations to pedestrian traffic on the sidewalks of the bridges. VTrans recommended cleaning and patching or some type of safety netting to catch debris. The lack of sufficient vertical clearance precluded the installation of a safety net, leaving concrete patching as the only measure to address this problem. While such patching has been carried out over the years, ongoing deck saturation and the age of the structures render these measures as only short-term solutions. Concrete continues to spall from both bridges.

The deterioration of the fascias has compromised the footings of the support posts for the sidewalk-mounted railings. Some of these bases are cracked or rusted through. Railing couplings are cracked and sections of railing are missing. Between 2008 and 2010, chain link fencing was added to the railings to improve safety conditions. However, the integrity of the support posts remains compromised and the substandard bridge railings do not meet current code requirements.

Load Rating

Though VTrans' biannual inspections include a visual assessment for overstressing due to live loads, no design or construction plans are available for either bridge. This makes a more formal determination of the actual load capacity rating impossible as the internal size and

configuration of steel reinforcement in concrete members is unknown. This leaves the current load capacity of the bridges in question.

Consequences of Bridge Failure

Because of the age of the bridges and the ongoing structural deterioration, a number of bridge components are at risk of failure. Bridge failure may affect the sidewalks or travel lanes of the bridges or both, necessitating partial or complete access restriction. Unplanned bridge closures would have multiple impacts.

The failure of one or both bridges and the resulting unplanned interruption of regular traffic routes could increase the response time for emergency services. Because the Middlebury Fire Department and Police Station are both located north of Main Street and east of Otter Creek, the response time for an emergency west of Otter Creek (including access to Middlebury College and Porter Hospital) could be extended should first responders need to use the more distant Cross Street Bridge. The Cross Street Bridge also would likely be experiencing more trips due to its use as a bypass, exacerbating delays as first responders navigate through traffic.

Because there would be a pressing need to quickly repair the failed structure(s), there may not be sufficient time to prepare a comprehensive traffic management plan and disseminate it to the public. Furthermore, the public would have less time to prepare for changes in the transportation network relative to a planned bridge replacement project. These constraints may result in impacts to local business access, transit routes, and commuter patterns and delays may be lengthened.

VTR operations, which include daily trips between Rutland and Burlington, may be adversely affected if bridge failure resulted in a decrease in railroad clearances and/ or track fouling. VTR's daily freight deliveries to points north include significant volumes of diesel fuel to Burlington and grain to New Haven. Both locations only have one day storage capacities for these goods. Any disruption of daily deliveries may have significant economic impacts for farmers, consumers, and businesses in Addison and Chittenden Counties. The minimum length of time for a detour trip from Rutland to Burlington would be two days and most likely longer as it involves other railroad operators. Any detour concept for VTR freight would involve freight transfer to the Green Mountain Railroad Corporation (GMRC) in Rutland to travel southeast to Bellows Falls, where it would be transferred to another entity with the New England Central Railroad (NECR). The freight would then head north to the White River Junction NECR yard where it may stop for

additional train set building before eventually moving north to the St. Albans NECR yard. After arriving in St. Albans, freight could be routed to Burlington based on NECR's southbound freight schedule.

Because emergency bridge repairs would need to be carried out expeditiously, the resulting structures would likely not be capable of addressing the desired railroad clearances and documented drainage problems in the area between the existing bridges. The construction of temporary bridges to address unanticipated bridge failure would result in higher overall project cost and additional disruption to downtown businesses and regional traffic versus planned bridge replacement.

Considerations for Freight Rail

Vermont statute 5 V.S.A. §3670 requires that any new bridge over a railroad track adhere to the clearances set forth in the American Railway Engineering and Maintenance-of-Way (AREMA) Manual for Railway Engineering, as in effect at the time work begins. The Vermont State Design Standards incorporate this requirement as follows:

> *Structures over railroads should provide a minimum vertical clearance of 23 feet over both rails, unless otherwise provided in a variance agreement entered into by the VAOT, the railroad and any affected municipality, and approved by the Transportation Board in accordance with 5 VSA, Section 3670. Where "double-stacks" are to be accommodated on the railroad, an absolute minimum vertical clearance of 20.75 feet will be required.*

The FHWA Memorandum entitled "Guidelines for the Design and Construction of Grade Separation Highway Structures over or under Railroads," dated April 16, 2013, includes similar reference to AREMA specifications, as well as those of the Association of American Railroads, and the American Association of State Highway and Transportation Officials (AASHTO) Load and Resistance Factor (LRFD) Bridge Design Specifications.

The vertical clearance of the Main Street and Merchants Row bridges are 17 ft. 10 in. and 17 ft. 8.5 in. at the rail (ATR), respectively. Accordingly, modified or full double-stacked rail cars currently cannot pass under either bridge. This constraint represents one of only two remaining barriers to allowing double-stack freight car height between Burlington and Rutland (the other being a bridge in Proctor, Vermont). Existing horizontal clearances at both Middlebury bridges is also substandard and represents the limiting horizontal clearance for the entire line.

In 2005, VTrans developed conceptual plans for bridge replacement that involved raising the grade of the bridges to achieve the necessary vertical clearance. Though the concept minimized superstructure thickness by using pre-stressed concrete panels, raising the bridge grade required raising the grades of the approaching roadways by several feet. Because of the proximity of the downtown buildings and drives, the concept required either rebuilding storefronts and constructing new entrances or introducing walls and split level bifurcated sidewalks. The proposed concept carried forward by VTrans included the split sidewalks, primarily because of the relative expense of rebuilding storefronts. The Town of Middlebury rejected the concept because of concerns regarding impacts to property values, public accessibility, parking, economic development, aesthetic and architectural impacts, drainage concerns, and quality of life in the downtown core. Accordingly, the alternatives for bridge replacement developed for the current project must maintain existing bridge and roadway grades with only minimal changes to the grades, which can only be achieved by lowering the grade of the railroad under both bridges.

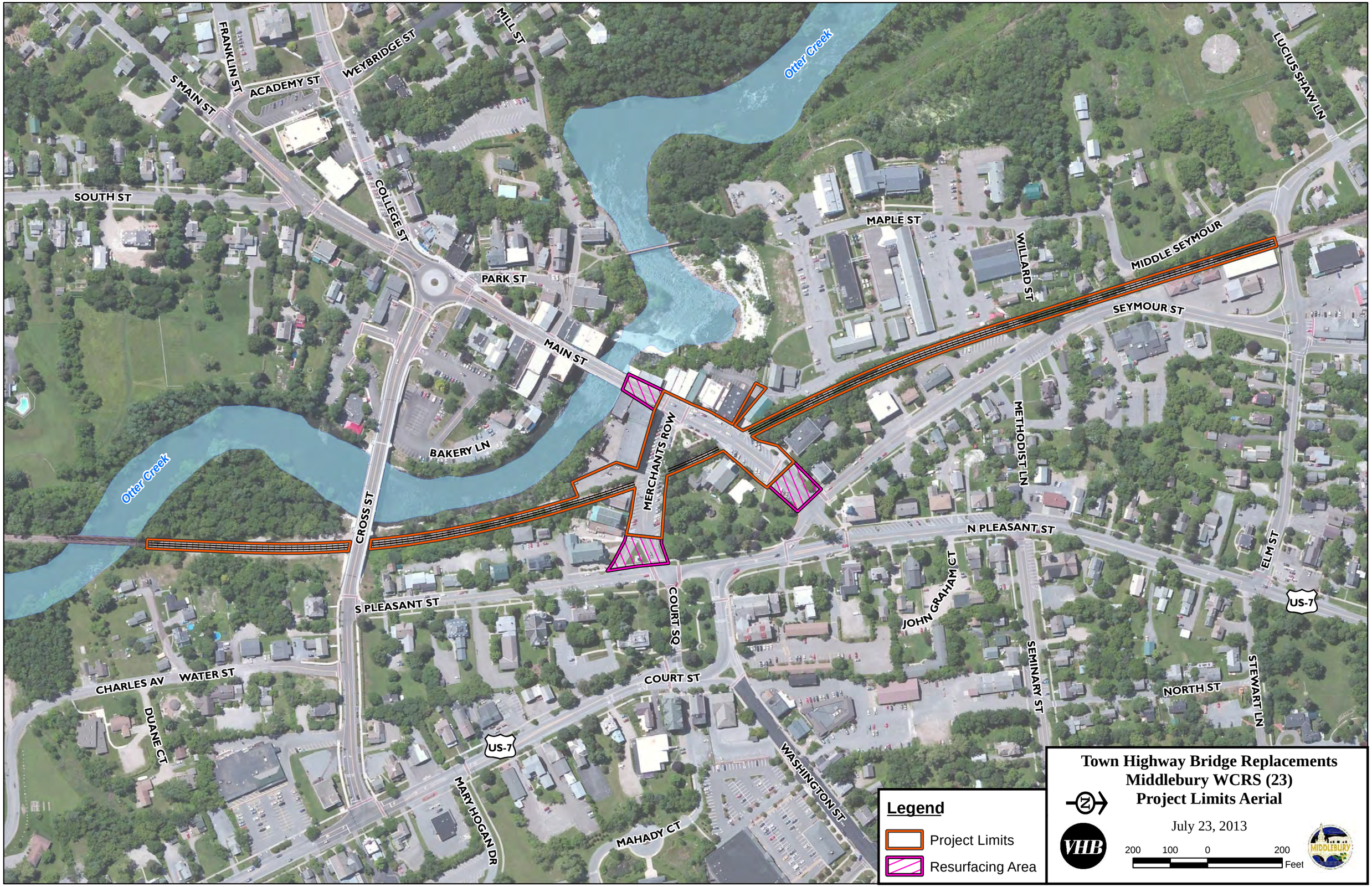
Rail Operations and Public Safety

Deteriorating rubble walls between the Merchants Row and Main Street bridges represent an ongoing maintenance issue for both the State of Vermont and VTR. Localized wall failures have occurred and ongoing monitoring and repair are required. Vegetation on the sloped banks above the rubble walls and below street level requires periodic clearing so that vegetation does not foul the track or cause bank failure by excessive root growth.

The submerged corridor of the of the VTR tracks between the Main Street and Merchants Row bridges contributes to stormwater runoff collecting on the track. This is compounded by the fact that runoff from the adjoining Village Green cascades into the trench on its east side and that this stretch of track profile is depressed within the bridge limits. The project improvements would include plans for routing and control of runoff from the Village Green, thereby improving track conditions. Though the trench is currently separated from the street and park level due to fencing, these barriers present a modest physical deterrent against track access. Accordingly, having an open trench in the downtown core presents some degree of personal safety concern. Discontinuing such access by providing improvements that implement more robust limits on public access would result in improved rail operations and public safety benefits.

2

Project Limits Aerial Graphic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NORTH ST
STEWART LN
DUANE CT
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Project Limits
Resurfacing Area
Town Highway Bridge Replacements
Middlebury WCRS (23)
Project Limits Aerial
July 23, 2013
VHB
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MIDDLEBURY

3

Determination of Eligibility for Historic Resources

April 19, 2013

Ref: 57603.00

Scott Newman, Historic Preservation Officer
Vermont Agency of Transportation
One National Life Drive
Montpelier, VT 05633-5001

Re: Middlebury Bridges Replacement Project – Middlebury WCRS (23)
Determination of National Register Eligibility for Various Structures and the Rutland Railroad

Dear Scott:

Vanasse Hangen Brustlin, Inc. (VHB) is assisting the Town of Middlebury, Vermont (the Town) with design and environmental permitting services for the Middlebury Bridge Replacement Project (the Project). The Project proposes the replacement of two structurally deficient and rapidly deteriorating roadway bridges in downtown Middlebury where Main Street (VT 30 / TH 2 Bridge 102) and Merchants Row (TH 8 Bridge 2) span the Vermont Railway, Inc. (VTR) track, formerly called the Rutland Railroad (see Figure 1, Site Location Map).

The purpose of this letter report is to present information regarding the eligibility of several structures and the Rutland Railroad corridor within the Project limits for listing in the National Register of Historic Places (National Register) and to obtain your agreement on the eligibility recommendations provided. The resources discussed that could be affected by the project are:

1) the two bridges that are proposed for replacement, which date to 1921;
2) the railroad corridor retaining walls between and beyond the two bridges;
3) the Lazarus Building, located on the north side of Main Street, immediately northwest of the Main Street bridge, between the railway and Printer's Alley, which may be the subject of a separate project but is within close proximity to the Main Street bridge; and
4) the Rutland Railroad corridor, which has already been determined eligible as a historic district, but which was not mentioned in the National Register nomination for the Middlebury Village Historic District, in which it partially lies.

Lastly, this report also presents information on the evolution of the Middlebury Village Green adjacent to the two bridges, as Project alternatives currently in development include the use of a tunnel, which would allow for repurposing of the current railroad trench between bridges.

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North Ferrisburgh, Vermont 05473
802.497.6100 ▪ FAX 802.425.7799
www.vhb.com

At the end of this report, your agreement with the National Register eligibility recommendations provided by VHB is requested.

National Register Eligibility of the Main Street Bridge (Bridge 102) and Merchants Row Bridge (Bridge 2)

Background Information

Both the Main Street and Merchants Row bridges are located within the Middlebury Village History District (MVHD), which was originally listed in the National Register in 1976 (Roomet 1976). This original nomination did not include the bridges in the list of contributing and non-contributing resources, although the 1892 stone Main Street Bridge over the Otter Creek is noted in the nomination as one of two "outstanding historical components within the Middlebury Village Historic District." The 1893 metal Warren through truss railroad bridge over Otter Creek just south of the Cross Street Bridge is the only other bridge called out within the MVHD (#116 in the nomination).

The current bridges at Merchants Row and Main Street were constructed between 1920 and 1921. They were previously referred to as Bridges 240 and 241, respectively, which are the VTR bridge numbers. They are referred to herein as Middlebury Town Highway Bridges 2 and 102, respectively. Both are two-span concrete-encased steel beam bridges. For both bridges, the approach span is a concrete T-beam construction and the main span is a concrete slab reinforced with steel rails (i.e., "rail top" span). The ends of the approach and main spans are supported by a concrete-encased steel pier. Concrete cracking, delamination, and spalling have occurred on all bridge components with particular deterioration noted on the fascias. Embedded steel reinforcement is exposed in a variety of locations, especially at the fascias, the ends of the pier caps, and in the flanges of the approach spans under the sidewalks. Heavy efflorescence is common on the soffits of both bridges, indicating leakage through the deck.

Both bridges are supported by granite ashlar abutments laid such that approximately 11-12 regular courses are visible above ground surface (Photos 8, 9 and 21). Individual stones are typically 1.6 feet high by 5 to 8 feet long, though blocks as short as 2 feet are present. The abutments clearly supported the previous wood stringer bridges, based not only on their earlier appearance, but because the construction documentation from 1921 for both bridges makes no mention of the installation of masonry abutment materials or labor for same (Rutland Railroad Company 1921a, b).

The ashlar abutments likely date to the late 19th century. The ashlar construction is consistent with stone abutments constructed by many New England railroads during the late 19th century, often as the original abutments reached the end of their lifespan or needed to be rebuilt to accommodate larger rail cars. A report prepared by Hartgen Archaeological Associates (HAA) in 2000 for the proposed replacement of the Main Street bridge stated that "the railroad caused the bridges to be raised three times between 1849 and 1907" (HAA 2000, p. 6). The stone abutments likely date from this time period, and are most likely ca. 1880-1890. The reason(s) for raising the bridges is (are) not noted in the Hartgen report. It is presumed that the bridges were raised to accommodate taller, and likely larger, railroad cars as the 19th

century progressed, since the railroad corridor is located in a trench cut through Middlebury's center. Generally, the stone abutments are intact, especially at the Merchants Row bridge, and may have served at least two earlier wood trestles at both locations.

At the Merchants Row bridge, the abutment walls step down and outward to the ground on the north side, with the bottom stone courses extending approximately 10 to 20 feet farther than the uppermost courses; the uppermost courses do not extend much farther than the width of the bridge superstructure. At the south end of the bridge, the ashlar abutments continue into the ashlar retaining walls; the south end of the west abutment is also stepped, but extends approximately 80 feet beyond the bridge (Photo 2). It is likely that the ashlar abutment walls of the Main Street Bridge exhibited a similar stepped pattern at the edges. However, as part of the 1921 bridge construction, the stone abutments of the Main Street bridge were extended to the south for approximately 10 feet using board-formed plain concrete (Figure 21, Photos 18 to 21). The concrete was poured in direct contact with the stone and partially covers the end face of the abutment. Board-formed concrete is a common early 20th century construction method and dates to the 1920-1921 construction of the current bridges; the same board-formed concrete is used for the arched concrete ribs of the superstructure of both bridges, which raised the elevation of the deck about one foot to accommodate taller rail cars (Rutland Railroad Company 1921e).

The Main Street bridge abutments were also extended to the north, though it appears that the existing rubble retaining walls were incorporated into these extensions. Concrete patching here was applied on top of the existing materials for reinforcement (Photos 23 and 23). There is no such concrete extension or repair work on the Merchants Row bridge abutment. The concrete portions of the Main Street abutments are not as well preserved as the stone portions, and the joints between the two materials are showing signs of wear. The concrete patching is relatively uneven in application, and shows modifications such as subsequent mortar applications. Much of the concrete patching likely dates to the late 20th century, as connection points between the ashlar and the adjoining rubble retaining walls failed. Subsequent concrete repairs and/or the addition of rubble retaining walls at both bridges have largely obscured or replaced the original end faces of the stone abutment walls.

Steel-reinforced concrete bridge seats were added at the top of the stone abutments to accommodate the higher height of the new bridges. The bridges retain their original pipe railings, which line both sides of the streets; a series of photographs of the railroad line taken in 1963 show one other similar bridge at Elm Street (VTR Bridge 241A) in the Middlebury area with the same pipe railing (Figure 24, Poulin Collection).

The Main Street and Merchants Row bridges, along with VTR Bridge 241A and possibly others along the railroad corridor, may have been built with funding provided by the federal government to repair their lines after two years of federal operation during World War I (1918-1920) (Shaughnessy 1997, p. 125).

Determination of Eligibility

A 2000 memo from Scott Gurley, Historic Preservation Specialist with the Vermont Agency of Transportation (VTrans), to Emily Wadhams, State Historic Preservation Officer (SHPO) discussed the eligibility of the bridges and noted that they did not display any significant engineering technology and were difficult to view from the streets. Mr. Gurley stated that "for this reason" (presumably the difficult of seeing them from public ways) the bridges were not included as contributing structures in the MVHD nomination. He considered the bridges to be contributing resources because they were centrally located within the MVHD, retained integrity, and displayed modest historic detail that contributed to the character of the MVHD. He further noted that the stone abutments and the metal railings were the character-defining elements of the bridges and that the decks and the support columns had "minimal historic significance" (VTrans 2000).

The two bridges date to 1921 (Rutland Railroad Company 1921a,b) and were over 50 years old at the time the nomination was prepared. However, it would appear that they were not included in the MVHD nomination due to the fact that they were not as visible as the other resources within the district, as they carried Main Street and Merchants Row over the railroad line (which was noted by Scott Gurley in his 2000 memo), and are quite small. They also may have been excluded because their simple concrete construction was not considered as attractive as the more prominent and older Warren through truss railroad bridge that is included as a contributing resource.

The original nomination does not mention the construction and operation of the Rutland Railroad through Middlebury as a factor in the growth or significance of the MVHD, nor does the addendum nomination prepared in 1980, which added properties to the south of the east and west of the southern boundary of the MVHD (DeLaittre, 1980). The railroad was constructed through the village in 1849, with the line somewhat paralleling Otter Creek and constructed within a trench cut through the center of the village. Otherwise, the line was mostly at grade with the surrounding area in the northern and southern segments of the line in the Middlebury area. The village had both a passenger and freight station, although these were located south and north of the village center (Old Depot grounds were south), respectively, due to the presence of the railroad cut through the village center and lack of available space. The railroad line undoubtedly shipped many of the village's products of marble, wool, and other numerous industrial products, which in the early 19th century was the state's most populous town. The Hartgen report notes that

> "with the growth of the sheep industry in Vermont, Middlebury was in an advantageous position to supply finished woolen cloth for shipment. *However, the completion of the Champlain Canal in 1823 and introduction of the railroad in 1849 drew business away from the village and brought in cheaper goods from outside* (HAA 2000, p. 3 – italics added).

The bridges are recommended eligible for the National Register as contributing resources to the MVHD and the RRHD as they are early 20th century elements of a still thriving industrial town and railroad and are representative of the modest bridges erected by the Rutland

Railroad to modernize and continue their operations in the early 20th century. The most important components of the two bridges, as noted in the 2000 memo by Scott Gurley to Emily Wadhams, are the railings and the late 19th century stone abutments; the bridge decks and the support columns are not considered significant elements.

National Register Eligibility of Railroad Retaining Walls

Background Information

The retaining walls that line the railroad corridor in the Project area are comprised of a variety of material types. The pattern of construction and material composition appear to be consistent with what is known about the original construction of the railroad trench and subsequent modification efforts. Based on the evidence presented in historic maps and through field observation, it is clear that the walls are not the product of a single period of construction. As previously mentioned, there were likely three major episodes of construction in the railroad corridor within the Project area: the original 1849 construction, late 19th century (ca. 1880-1890) bridge/abutment replacement, and 1920-1921 construction of the current Merchants Row and Main Street bridges. Figure 2 shows the location of the specified sections used in the following description of wall components. Figures 3 and 4 show the locations of 45 photographs provided to illustrate the current appearance of the walls, as well as other structures discussed in this letter.

Original 1849 Construction

The original 1849 construction of the railroad through the center of Middlebury resulted in a large trench cut through the Village Green and under Merchants Row and Main Street. The trench provided a separated grade at these streets, which was safer, and hid the presence of the railroad from many areas of the village. The extant rubble walls appear to date from the construction of the railroad or shortly after, which is supported by indications of stone walls along the corridor through central Middlebury on late 19th century maps. Based on the 1885 and 1892 Sanborn maps (Figures 8 and 10), it appears that stone retaining walls were in place in 1885 on both sides of the corridor north of Main Street. A lithograph showing a bird's eye view of Middlebury in 1886 shows a stone wall on the eastern side of the corridor north of Main Street (Figure 9, Burleigh 1886). South of the Merchants Row Bridge, the Sanborn maps indicate an 18-foot high "bank wall" was present on the eastern side of the corridor, with no specification for the western side. It is unclear if the term "bank wall" represents a wall of stone construction or otherwise. Between the Main Street and Merchants Row bridges, the Sanborn maps indicate only a 15-foot high "bank" on both sides of the corridor. This "bank" may refer to the sloped earth above the rubble walls at the base of the current retaining wall. Later Sanborn maps do not specify walls or other features between the two bridges.

Current Wall Configuration and Evidence of Past Modifications

Because the landscape slopes to the west and narrows in this direction, the total length of the rubble walls is longer along the eastern side of the railroad corridor. The eastern wall commences at a location approximately 120 feet north of the Main Street bridge and terminates

approximately 240 feet south of the Merchants Row bridge. The western wall commences at a location approximately 80 feet north of the Main Street bridge and terminates approximately 170 feet south of the Merchants Row bridge.

The walls are primarily dry-laid rubble, though portions show evidence of original construction or subsequent rebuilding using cement mortar, especially at the extreme northern end of the walls (Photos 27 to 30). The walls start at a height similar to that of the abutments near the bridges and taper off in height with distance from the bridges.

South of Merchants Row

The retaining wall on the east side of the corridor south of Merchants Row consists primarily of granite blocks and limestone that ranges in size from less than 1 foot by 1 foot to up to roughly 1.5 feet high by 3 feet long (Photos 1, 4 to 6). This wall appears to have been dry laid originally, but has been extensively patched with cement mortar post construction. The height of the wall ranges from roughly 5 feet at the southern end to roughly 12.5 feet at the contact with the ashlar abutment. The eastern wall is in good condition with one instance of localized toppling near the southern end. Multiflora rose and other herbaceous plants are present (Photo 4). Overhanging vegetation likely obscures the view of portions of the wall during the growing season.

The western retaining wall south of Merchants Row consists of the same granite ashlar blocks as the bridge abutments, and were likely completed as part of a single project, ca. 1880-1890. The western retaining wall is in good condition.

Retaining Walls Between Bridges

The material composition of the individual components of the retaining walls between the two bridges varies considerably relative to the walls north of Main Street and south of Merchants Row. Materials used for the original construction appear to be dry-laid fieldstone having an appreciable range of sizes from less than 1 foot to over 3 feet in length (Photos 11 to15). In some areas, it is evident that repairs and/or wall augmentation used materials different from that of the original construction. Cut marble blocks and clay drainage tile (Photo 17) are two examples of materials used in these efforts. Because of the variable material composition and size, these walls are best characterized as rubble retaining walls. Most of these walls are intact and in fair to good condition, with some later patching and reconstruction confined to specific locations rather than along the entire extent. However, occurrences of more recent wall failure and slumping were noted on the east wall. The heterogeneity of the walls and the fact that wall repairs and augmentations partially bury the bridge abutments (Photos 14, 15, 17 to 19) indicates that the area has been subject to iterative maintenance to correct wall or bank failures.

The east retaining wall is approximately two feet tall and the west wall is approximately six feet tall. The retaining wall is topped by banked land that extends up to street level, marked by scrubby vegetation and small to moderate sized trees. The vegetation between the two bridges extends up the fences at street level (Photo 15 to16), likely obscuring views down to the railroad right-of-way during the growing season, similar to the limited visibility of the

retaining wall south of the Merchant's Row bridge. Evidence of overland stormwater runoff and seepage discharge was observed at locations on the east retaining wall and ponding between the east and west walls was noted.

North of Main Street

The retaining walls north of Main Street are composed primarily of large fieldstone blocks, though smaller (less than one foot long) components are present (Photos 24 to 31). The shorter west wall appears to be in good condition and generally lacks post-construction patching. However, the east wall (west of the Post Office) has experienced bulging in the past such that tiebacks and cement mortar have been applied at the northern half of the wall (Photos 28 and 30). Wall displacement is thought to have resulted in one instance of municipal water line damage behind the wall when the embedded line was pulled apart.

Retaining Wall at St. Stephen's Episcopal Church

Although focused on a small area within the Project limits, the more recent concrete block retaining wall on St. Stephen's Episcopal Church property closer to street level is the latest episode of changes to the railroad retaining walls (Photos 16 and 17). The church building was erected in 1827 near the west end of the Village Green. It was this green that was cut through to build the railroad trench; an undated late 19th century stereopticon photograph and a ca. 1870 photograph show how close the walls of the cut were to the church (Figures 11 and 12). The ca. 1870 photograph of the church shows a simple open railing, and what appears to be a stone retaining wall below the railing in the upper half of the railroad corridor's wall where the current concrete retaining wall is located. Later 19th and early 20th century photographs have not been extensively researched to determine other changes to this area, but it is likely that other walls, railings, or fences have been built here since the time of the ca. 1870 photograph.

Determination of Eligibility

The retaining walls and abutments along the railroad corridor in central Middlebury exhibit a high degree of integrity. Various construction campaigns undertaken by the railroad are clearly readable in the various materials and construction methods. As such, the walls and abutments along the corridor are considered contributing resources to the National Register eligible RRHD. Although the retaining walls and the abutments are not a commonly viewed element within the MVHD, these walls are located within its boundaries and are physical reminders of the railroad construction and subsequent improvements to the corridor in the late 19th and the 20th century. Therefore, all retaining walls other than the more recent one at the St. Stephen's Episcopal Church are considered contributing resources to the MVHD.

National Register Eligibility of the Lazarus Building

The Lazarus Building is on the north-west side of Main Street adjacent to the Main Street Bridge over the railroad line. The building would not be directly affected by the Project, but may be affected by a future Town-sponsored project. Accordingly, this section of the memo

provides information about the building as it has not previously been officially evaluated for its National Register eligibility.

The Lazarus Building appears to date to the mid-to late 1960s (Photos 38 to 43). A photograph of the Main Street bridge, dated 1963 (Figure 22, Poulin Collection), still shows the wood-frame Italianate building that preceded the current one-story building on this site. The wood-frame Italianate building was at this location since at least 1885 (Figure 8, Sanborn Map), although an earlier wood-frame building with a T-shaped footprint was located here prior to 1885.

The current building is a one-story building with a long rectangular footprint and asymmetrical front gable roof. The presumably wood-frame building is sided with vertical aluminum siding and brick veneer with two large single-pane storefront windows on the front that flank the central entrance that contains two separate doors and is topped with a Neo-Colonial Revival broken pediment. A photo taken of and from the railroad line in 1971 or 1972 shows a sign on a pole at the sidewalk in front of this building that reads "Lazarus Department Store," which is similar in style to the Neo-Colonial broken pediment over its central entrance (Figure 26, Poulin Collection).

In the mid-1970s, when the MVHD nomination was prepared, the building was approximately 10 years old, presuming a mid-to late 1960s construction date. Although the current building was present in the mid-1960s, it was not mentioned at all in the nomination, even as a non-contributing resource. The building is still less than 50 years old in 2013 and therefore is recommended to be a non-contributing resource within the MVHD, due to its age. Additionally, the building is one of very few new structures in the historic district, which is predominantly composed of 19th century buildings, mainly dating to the early part of that century. The nomination's statement of significance does not address mid-20th century buildings as far as the district's significant association with events, individuals, or architecture; its focus is on the 19th century events and numerous residences and commercial buildings that are associated with this period. Therefore, even after the building attains 50 years of age, it would not be considered a contributing resource within the district unless a new statement of significance that addresses the significance of the mid-20th century architecture and events was prepared and accepted. Evaluated individually, the building displays no architectural significance or association with significant events or individuals that would result in its individual eligibility for the National Register.

National Register Eligibility of the Rutland Railroad

The railroad corridor that runs through the center of Middlebury was originally built by the Rutland & Burlington Railroad in 1849, and re-named the Rutland Railroad in 1867. The railroad has been determined eligible for the National Register of Historic Places by VTrans (Newman, communication to Walsh, January 30, 2013). As noted above in the discussion of the National Register eligibility of the two 1921 railroad bridges, the railroad line was not mentioned in the National Register nomination of the MVHD. However, the nomination included the Shingle Style Middlebury Railroad Station on Seymour Street (#257), which was

noted as an outstanding architectural component of the district and the 1893 metal Warren through truss bridge over Otter Creek (#116). A third structure at 33 Seymour Street is likely also be railroad-related (#258). It is described as "a 1-story subsidiary building to the north of the railroad station, which is essentially a copy of its neighbor (the railroad station) without the cupola."

A walking tour brochure of Middlebury noted that the railroad did increase shipping opportunities for the village's numerous prominent industries. However, it also caused cheaper competitors to supply goods to the village, which led to the diminution of these older industries (Andres 2005, The Village Tour, p. 7). Although the railroad's contributions to the village are not enumerated in the MVHD nomination, the railroad had an important role in the village's history and physical development and appearance. The railroad appears to have changed the dynamics of the early 19th century industrial history of the village and caused a significant change in the appearance of the village. In addition to the railroad trench cut through the village center is the construction of the adjacent railroad-related buildings, including the station, an ancillary building next to it, the 1893 Warren through truss bridge, and the addition of the Merchants Row and Main Street bridges, subsequently followed by the raising of the bridges' height four times. The Rutland Railroad Corridor is therefore recommended as a contributing resource to the Middlebury Village Historic District, in addition to its previously determination as a National Register–eligible historic district.

Middlebury Village Green /Triangle Park

The roughly triangular-shaped green space, which is named the Middlebury Village Green, through which the Rutland Railroad was cut for its construction in 1849, was one of several greens in Middlebury, although it is the largest. The green was donated to the village by Gamaliel Painter in the 1790s and according to the MVHD nomination is "the physical and functional center of the town" (Roomet 1976, Sec. 7, p. 35). The nomination lists the green as a contributing resource (#95).

The entire extent of the original triangular green is only depicted on a map prepared in 1888 that showed the village layout in 1814, prior to the Rutland Railroad's construction (Figure 5, Brainerd map). The rest of the historic maps that were examined all date after the railroad's construction in 1849, but the 1888 map depicting this area as it appeared before the railroad confirms that the land on both sides of the railroad cut was a single open parcel prior to the railroad's construction.

The appearance of the green on the east side of the railroad cut changed minimally over time, based on visual evidence provided by historic photographs and maps (Figure 16). The eastern component was never built upon except for the 1827 construction of St. Stephen's Episcopal Church in the original center section of the green; a more recently constructed bandstand is also located here.

On the west and smaller section of the green, west of the railroad cut, a commercial building stood here as early as 1853 (Figure 6, Presdee & Edwards map). It appears the same building, identified as the Allen Block on the 1871 map (Figure 7, Beers map) and also shown on the

1885 Sanborn (Figure 8), burned in the 1891 fire (Figure 13, 1891 photograph showing the aftermath). The 1892 Sanborn shows no building here, but does still note a "reservoir" on the site that was also on the 1885 Sanborn map (Figure 10). The western area, known as Triangle Park, was improved in 1908 by Joseph Battell and the Century Club with a three-tiered cast iron fountain carried by figures of cranes (Figure 17). Increasingly unpopular because its wind-driven spray would dampen the interiors of open cars parked around it, the fountain was dismantled by the town in 1938 and sold for scrap. Another fountain was placed in the park by the Middlebury Garden Club at the time of the national bicentennial in 1976 (Andres 2005, The Village Tour, p. 8).

Very truly yours,

VANASSE HANGEN BRUSTLIN, INC.

Rita Walsh

Rita Walsh
Senior Preservation Planner

RW/dbk
Attachment/Enclosure

cc w/encl: William Finger, Local Project Manager, Town of Middlebury

\\VHB\proj\Vermont\57603.00\reports\Determination of Effect\2013-04-19_Middlebury_WCRS(23)_Determination_of_Eligibility.docx

BKETTERLING@VHB.COM

Agreement on National Register Eligibility

Please sign and date below if you agree with the five National Register eligibility recommendations provided by VHB.

Main Street TH2 Bridge 102

VHB National Register Eligibility Recommendation – contributing to the National Register-listed Middlebury Village Historic District and to the National Register-eligible Rutland Railroad Historic District

Agree: _____

APPROVED
HISTORIC PRESERVATION OFFICER
VT AGENCY OF TRANSPORTATION
BY: _____ DATE: 6/19/13

Merchants Row TH 8 Bridge 2

VHB National Register Eligibility Recommendation – contributing to the National Register-listed Middlebury Village Historic District and to the National Register-eligible Rutland Railroad Historic District

Agree: _____

APPROVED
HISTORIC PRESERVATION OFFICER
VT AGENCY OF TRANSPORTATION
BY: _____ DATE: 6/19/13

Railroad corridor retaining walls

VHB National Register Eligibility Recommendation – contributing to the National Register-listed Middlebury Village Historic District and to the National Register-eligible Rutland Railroad Historic District

Agree: _____

APPROVED
HISTORIC PRESERVATION OFFICER
VT AGENCY OF TRANSPORTATION
BY: _____ DATE: 6/19/13

Lazarus Building, Main Street

VHB National Register Eligibility Recommendation – not a contributing resource to the National Register Middlebury Village Historic District, nor is the building individually eligible.

Agree: _____

APPROVED
HISTORIC PRESERVATION OFFICER
VT AGENCY OF TRANSPORTATION
BY: _____ DATE: 6/19/13

Rutland Railroad Corridor/Historic District

VHB National Register Eligibility Recommendation – contributing to the National Register-listed Middlebury Village Historic District

Agree: _____

APPROVED
HISTORIC PRESERVATION OFFICER
VT AGENCY OF TRANSPORTATION
BY: _____ DATE: 6/19/13

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_____. 1921b. Roadway Completion Report. A.F.E. No. 583. Bridge #241 (Main Street). Unpublished accounting record, VTrans Rail Program, Montpelier, Vermont. 2 pages.

_____. 1921c. Record of Property Changes. A.F.E. No. 582. Bridge #240 (Merchants Row). Unpublished accounting record, VTrans Rail Program, Montpelier, Vermont. 1 page.

_____. 1921d. Record of Property Changes. A.F.E. No. 583. Bridge #241 (Main Street). Unpublished accounting record, VTrans Rail Program, Montpelier, Vermont. 1 page.

_____. 1921e. General Elevation. A.F.E. No. 583. Bridge #241 (Main Street). Unpublished accounting record, VTrans Rail Program, Montpelier, Vermont. 1 page.

_____. n.d. General Elevation and Cross Section of [obscured text], New Bridges Nos. 240 and 241 at Merchants Row [obscured text], Middlebury, VT. Unpublished plan sheet, VTrans Rail Program, Montpelier, Vermont. 1 page.

Sanborn Map Company 1885 Middlebury, Vermont, plate 2, New York, NY.

____. 1892 Middlebury, Vermont, plate 5, New York, NY.

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Sheldon Museum Collections

General Collection – Maps:

- 1853 Map of Village of Middlebury (Research Room)
- 1814 Brainerd Map of Town of Middlebury, prepared by Ezra Brainerd, 1888 (Map Folder 1A1)

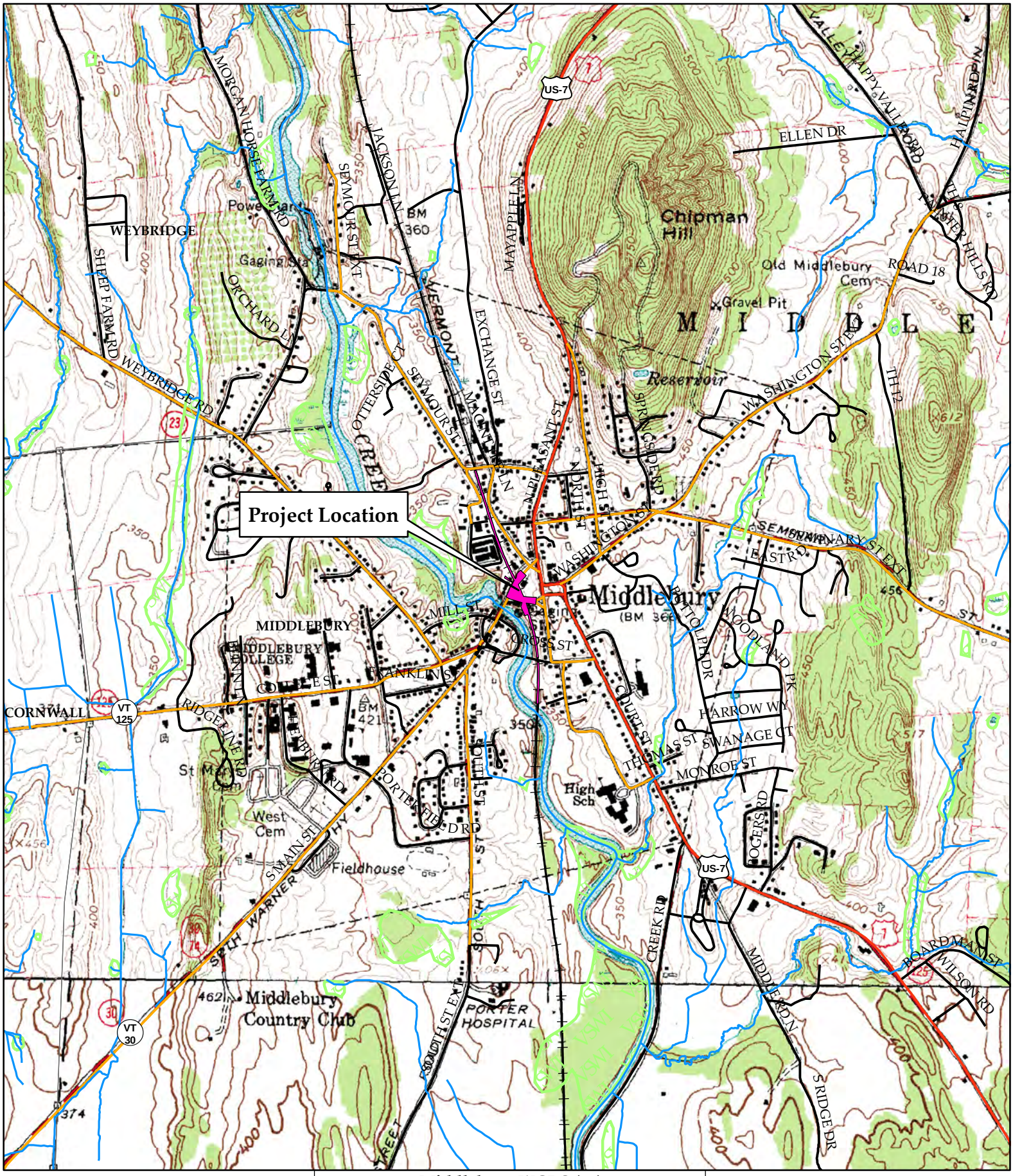
General Collection – Photographs:

- View of Project Area, c. 1900
- View of Project Area, c. 1905
- View of Project Area, c. 1910
- View of locomotive at Main Street bridge, c. 1939
- View of Project Area, c. 1940
- Aerial View of Project Area, Post-1963

Vermont Agency of Transportation (VTrans). 2000. Memorandum from VTrans Historic Preservation Specialist Scott Gurley to SHPO Emily Wadhams regarding Historic Buildings, Structures, Sites and Districts associated with Middlebury BRF 0161(9)SC and BRF 5900(4)SC. April 14, 2000. 2 pages and 1 map.

Vermont Agency of Transportation (VTrans). 2013. Personal communication from VTrans Historic Preservation Officer Scott Newman to VHB Senior Preservation Planner Rita Walsh, January 30, 2013.

FIGURES



Legend

- Project Limits
- Railroad
- County Boundary
- Town Boundary
- Stream (VHD 2010)
- VSWI Wetland

Roads

- Interstate
- US Highway
- Vermont State Highway
- Town Road

Prepared by: MJS

Middlebury WCRS (23)
Main St. & Merchants Row Bridge Replacement
Middlebury, Vermont
Figure 1: Site Location Map

April 19, 2013

1,600 800 0 1,600 Feet

Sources: Background: USGS Topographic Quadrangle (Middlbury 1983, Cornwall 1972); Project Limits digitized by VHB (2013); Railroad by VTrans (2003); Roads by VTrans (2011); VHD Streams, Wetlands,Town and County Boundaries from VCGI (2010).

VHB Vanasse Hangen Brustlin, Inc.

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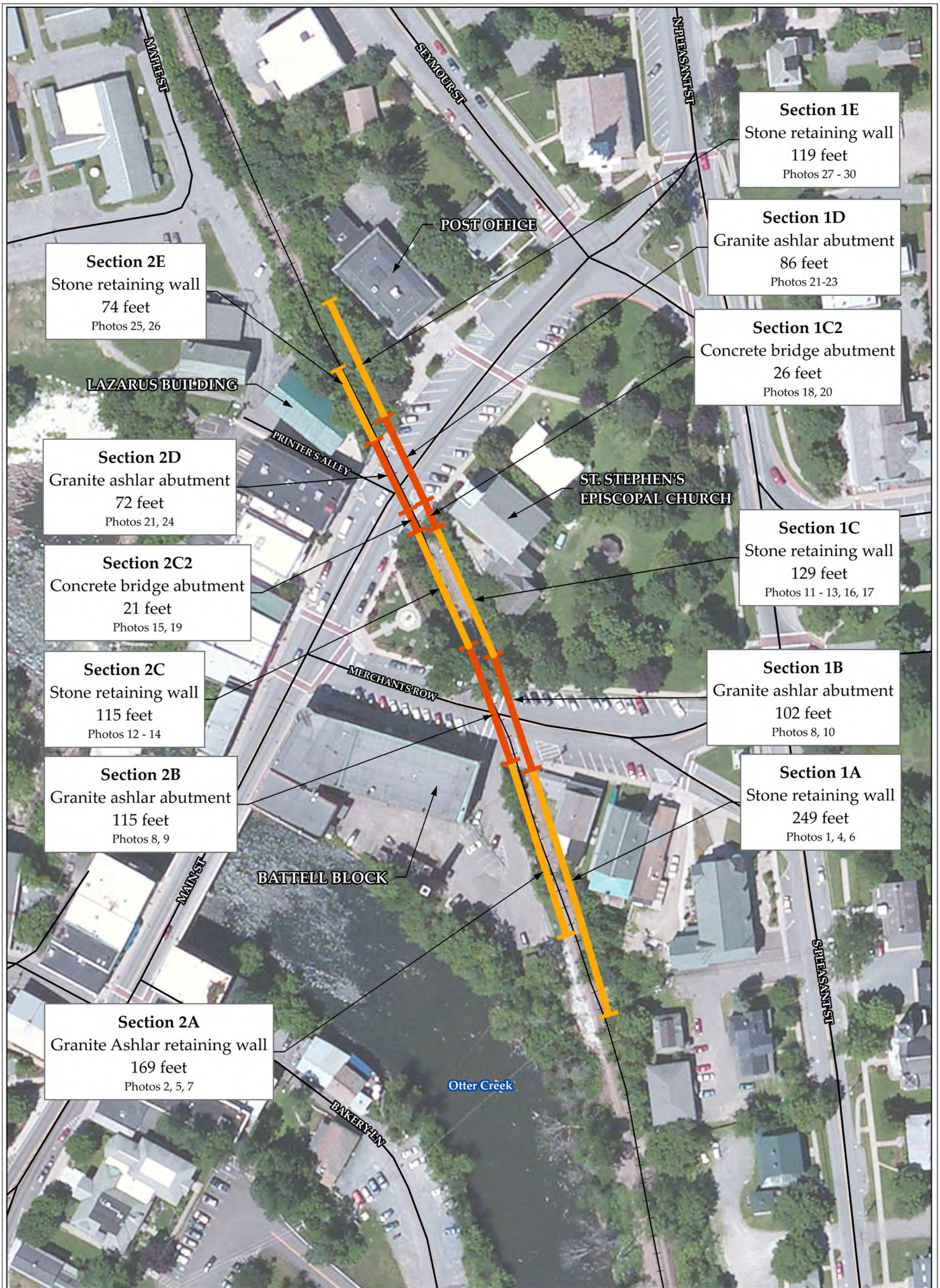

Legend

Wall Segments

- Retaining Walls
- Abutments
- Railroad
- Roads

Prepared by: MJS

Middlebury WCRS (23)
Main St. & Merchants Row Bridge Replacement
Middlebury, Vermont
Figure 2: Wall and Abutment Characterization

April 15, 2013

80 40 0 80 Feet

Sources: Background - Bing (2011); Roads by VTrans (2011); Railroad by VTrans (2003); Wall segments digitized by VHB (2013).

Vanasse Hangen Brustlin, Inc.

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POST OFFICE

SEYMOUR ST

LAZARUS BUILDING

PRINTER'S ALLEY

ST. STEPHEN'S EPISCOPAL CHURCH

MERCHANTS ROW

MAIN ST

BATTELL BLOCK

44 42 41 43 39 40 38 45 12 36 34 15 16 37 17 35 11 33 13 2 1 32 3 7

Legend

Photograph Orientation

Railroad

Roads

N

Middlebury WCRS (23)
Main St. & Merchants Row Bridge Replacement
Middlebury, Vermont
Figure 3: Locations for Photographs Taken from Street Level and Photographs of Buildings

April 19, 2013

40 20 0 40 Feet

Sources: Background - Bing (2011); Roads by VTrans (2011); Railroad by VTrans (2003); Photograph Orientation digitized by VHB (2013).

VHB Vanasse Hangen Brustlin, Inc.

Prepared by: MJS

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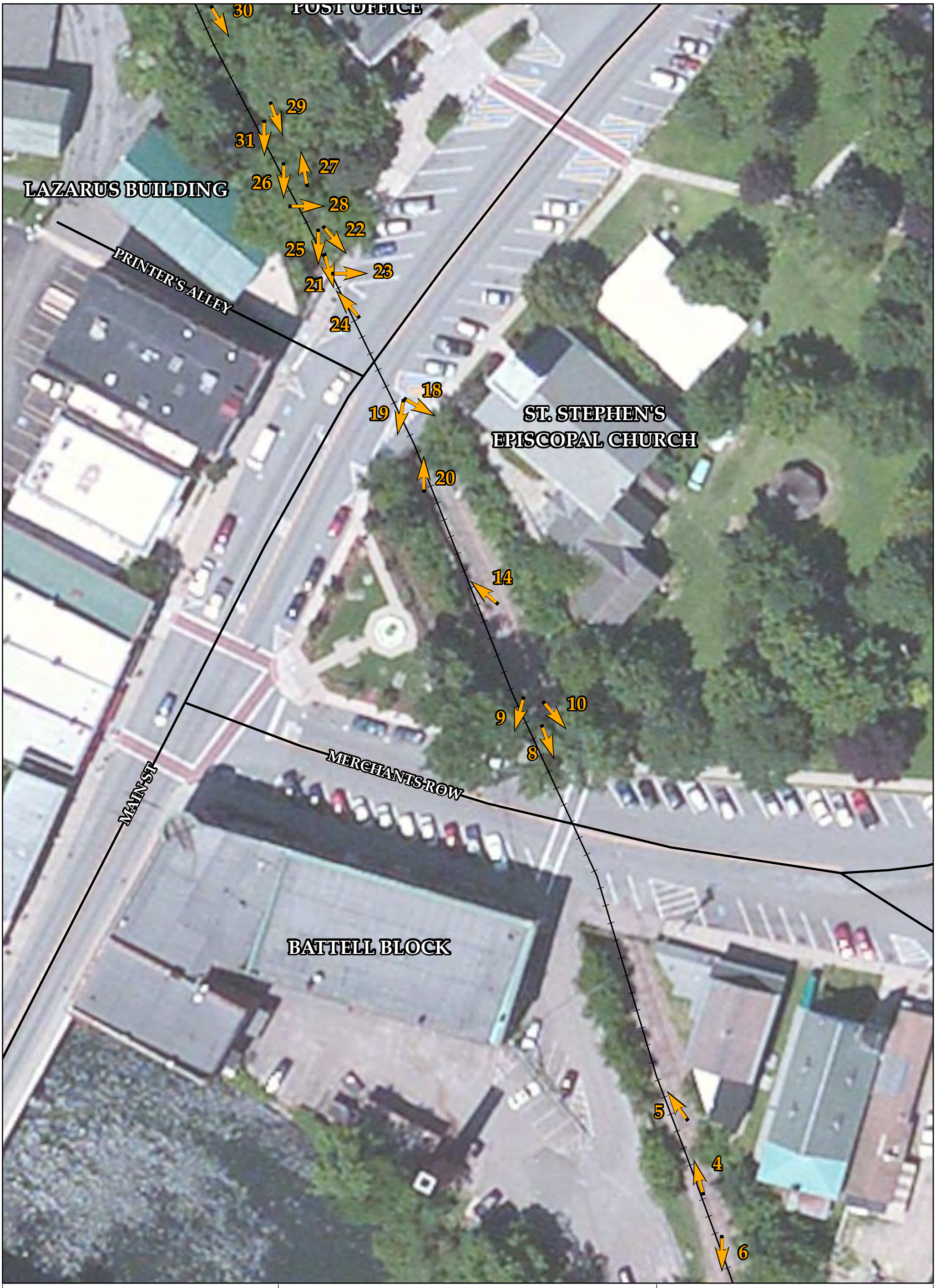

Legend

Photograph Orientation

Railroad

Roads

N

Middlebury WCRS (23)
Main St. & Merchants Row Bridge Replacement
Middlebury, Vermont
Figure 4: Locations for Photographs Taken from Railroad Right-of-Way

April 19, 2013

40 20 0 40 Feet

Sources: Background - Bing (2011); Roads by VTrans (2011); Railroad by VTrans (2003); Photograph Orientation digitized by VHB (2013).

VHB Vanasse Hangen Brustlin, Inc.

Prepared by: MJS

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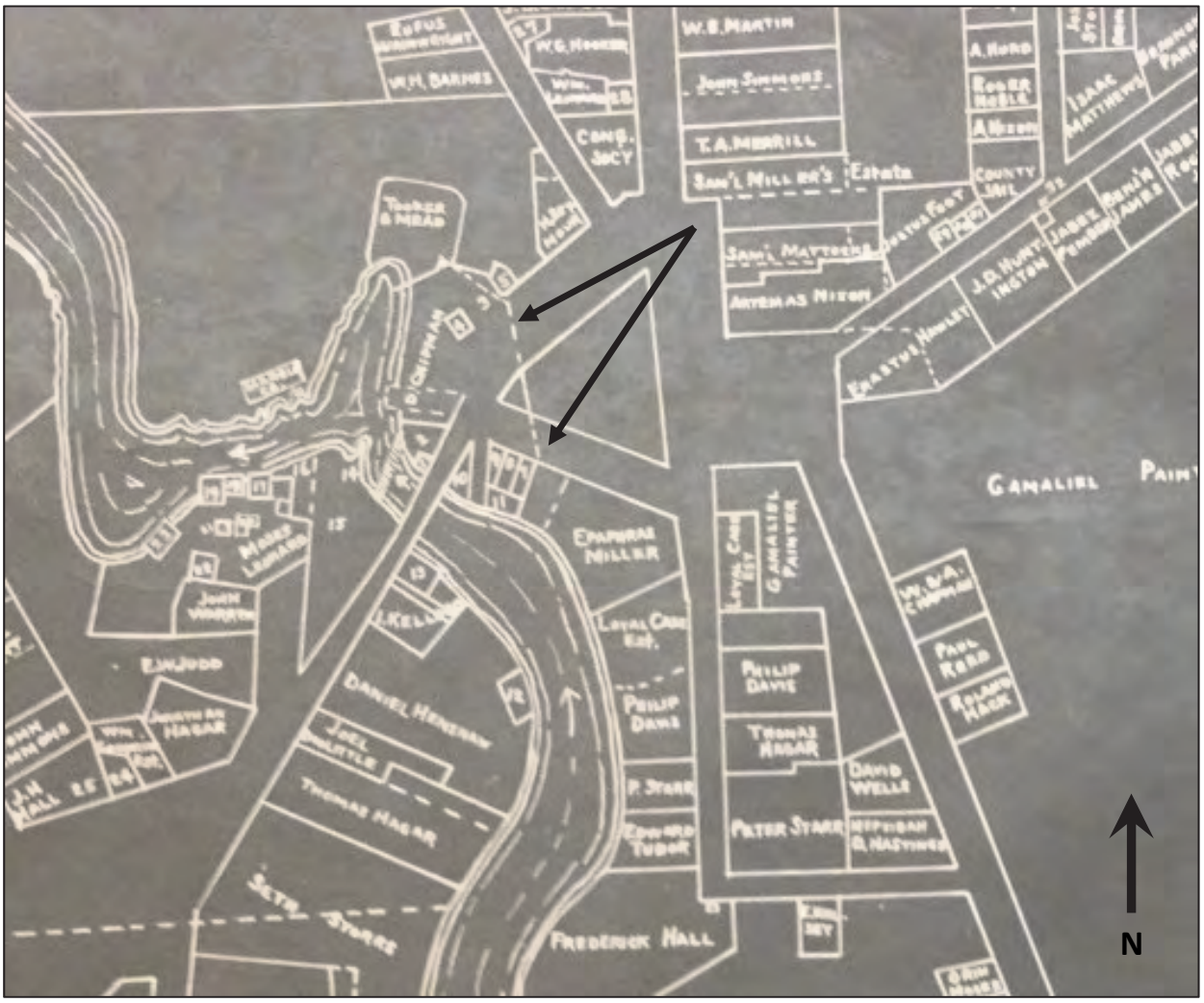

Figure 5. 1814 Brainerd map of Town of Middlebury, VT. Prepared 1888 by Ezra Brainerd. Henry Sheldon Museum of Vermont History archives, Middlebury, VT collection, accessed March 2013.

Arrows indicate approximate locations of current bridges.

Figure 6. 1853 Presdee & Edwards map of the village of Middlebury, VT, (New York: Presdee & Edwards). Vermont Collection at Middlebury College Library online collections, accessed April 2013, http://middarchive.middlebury.edu/cdm/singleitem/collection/vtmaps/id/3/rec/49.

Arrows indicate locations of current bridges.

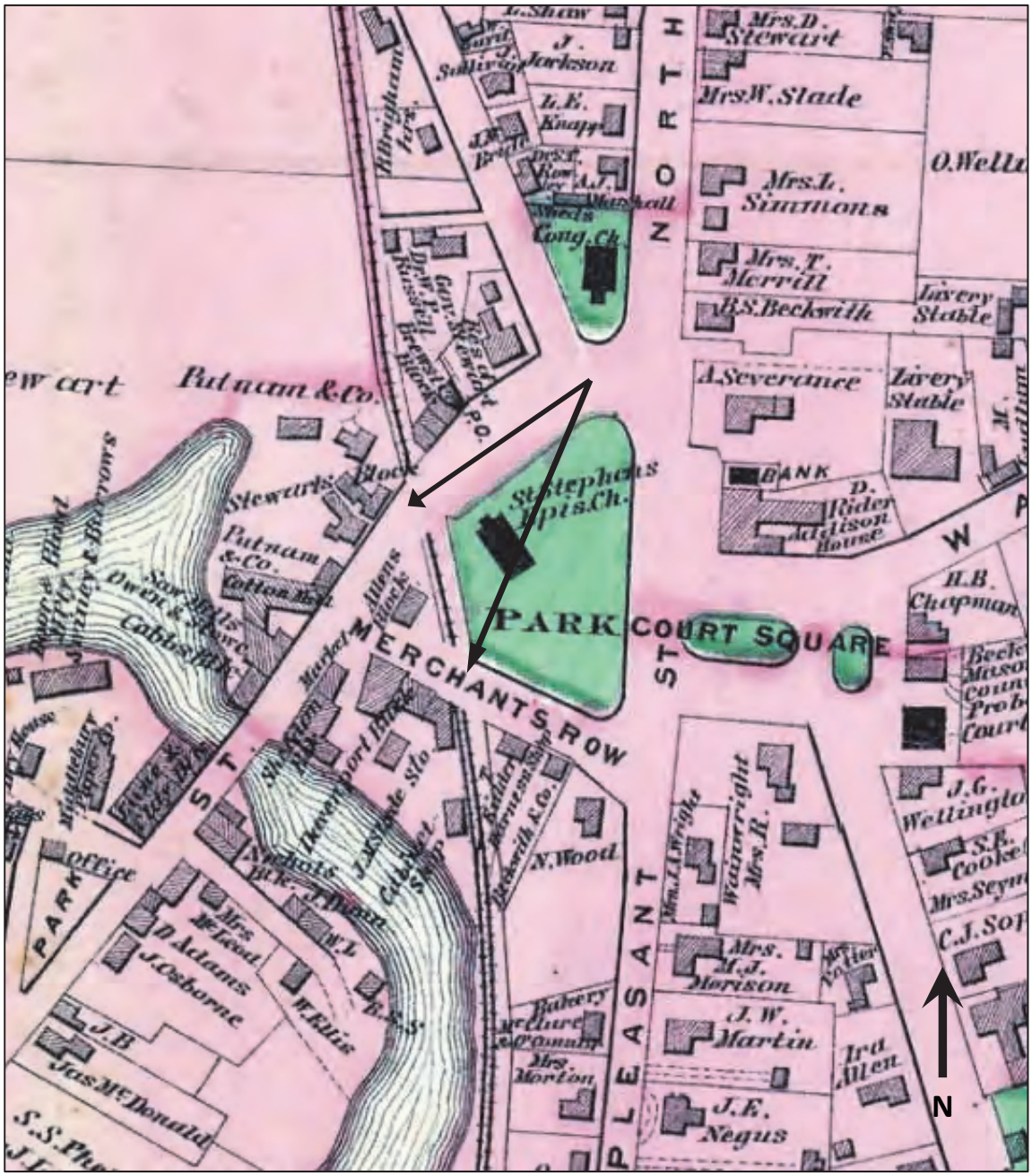

Figure 7. 1871 Beers Atlas of Addison County, VT, "Middlebury," (New York: F.W. Beers & Co.) http://www.ancestry.com, accessed March 2013.

Arrows indicate locations of current bridges.

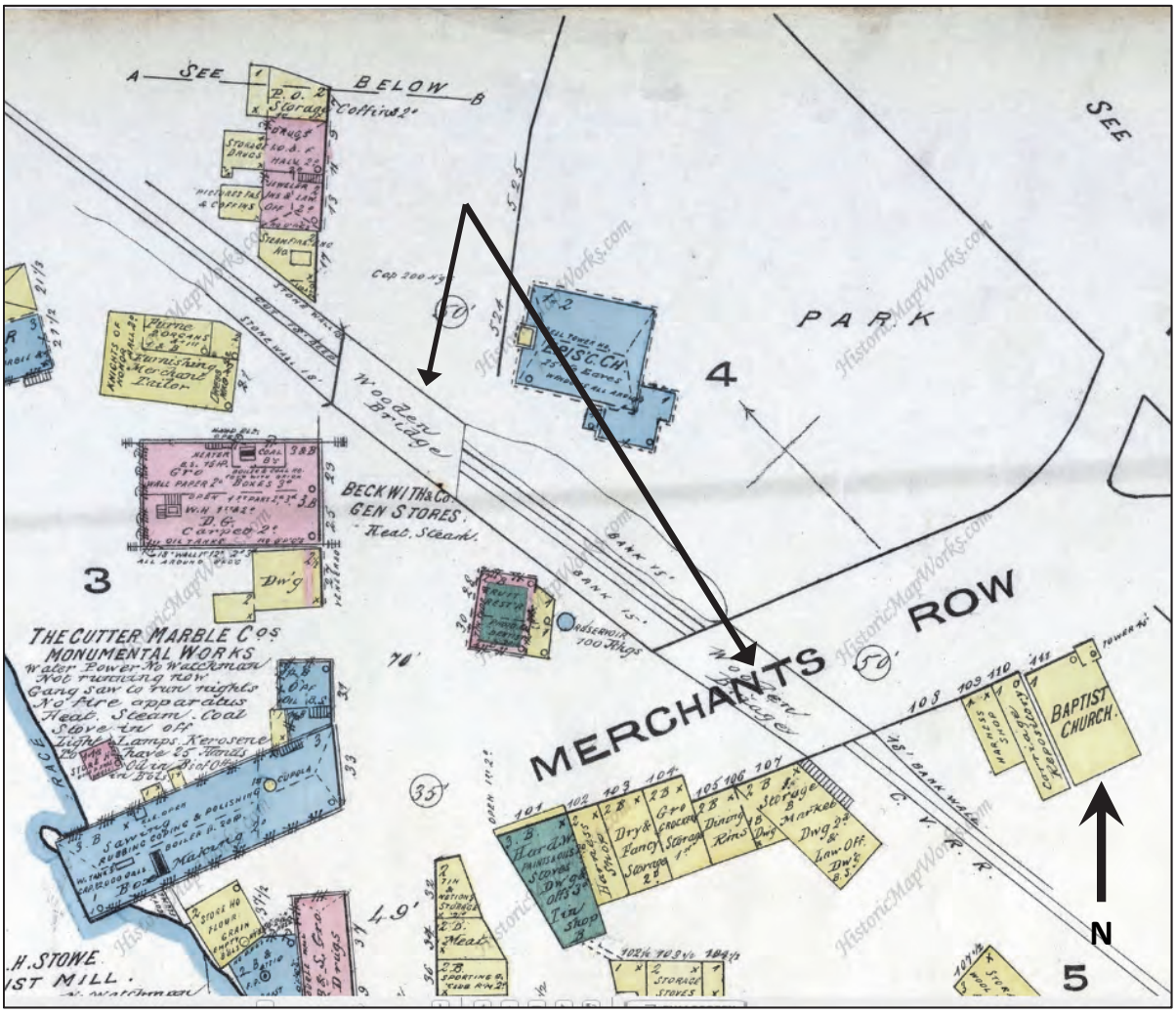

Figure 8. 1885 Sanborn Fire and Insurance Map of Middlebury, Plate 2.
http://www.historicmapworks.com, accessed March 2013.

Arrows indicate locations of current bridges.

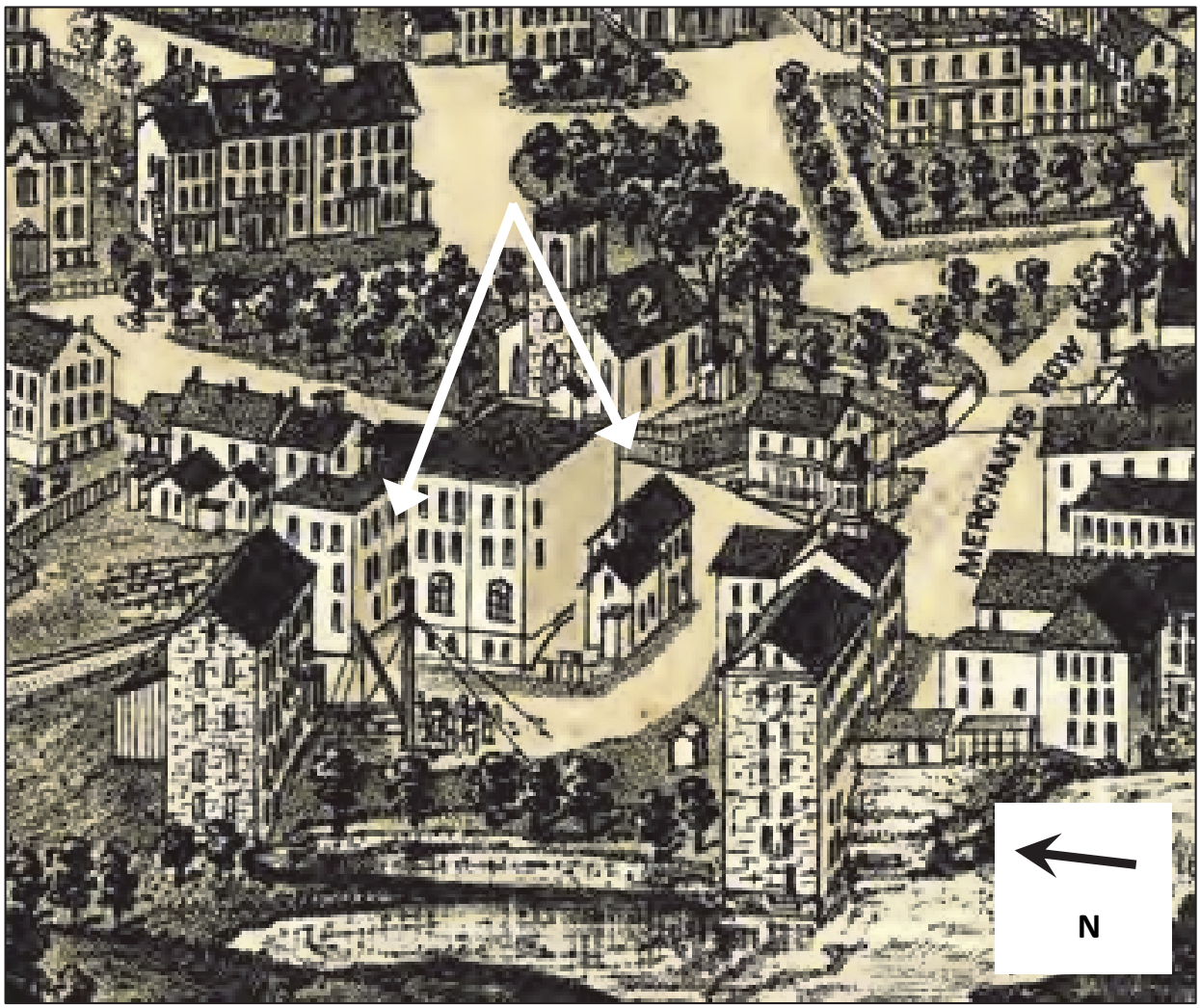

Figure 9. 1886 Burleigh birds-eye view, "Middlebury, VT", (Troy, NY: L. R. Burleigh). http://www.historicmapworks.com, accessed March 2013.

Arrows indicate locations of current bridges (Main Street Bridge hidden by building).

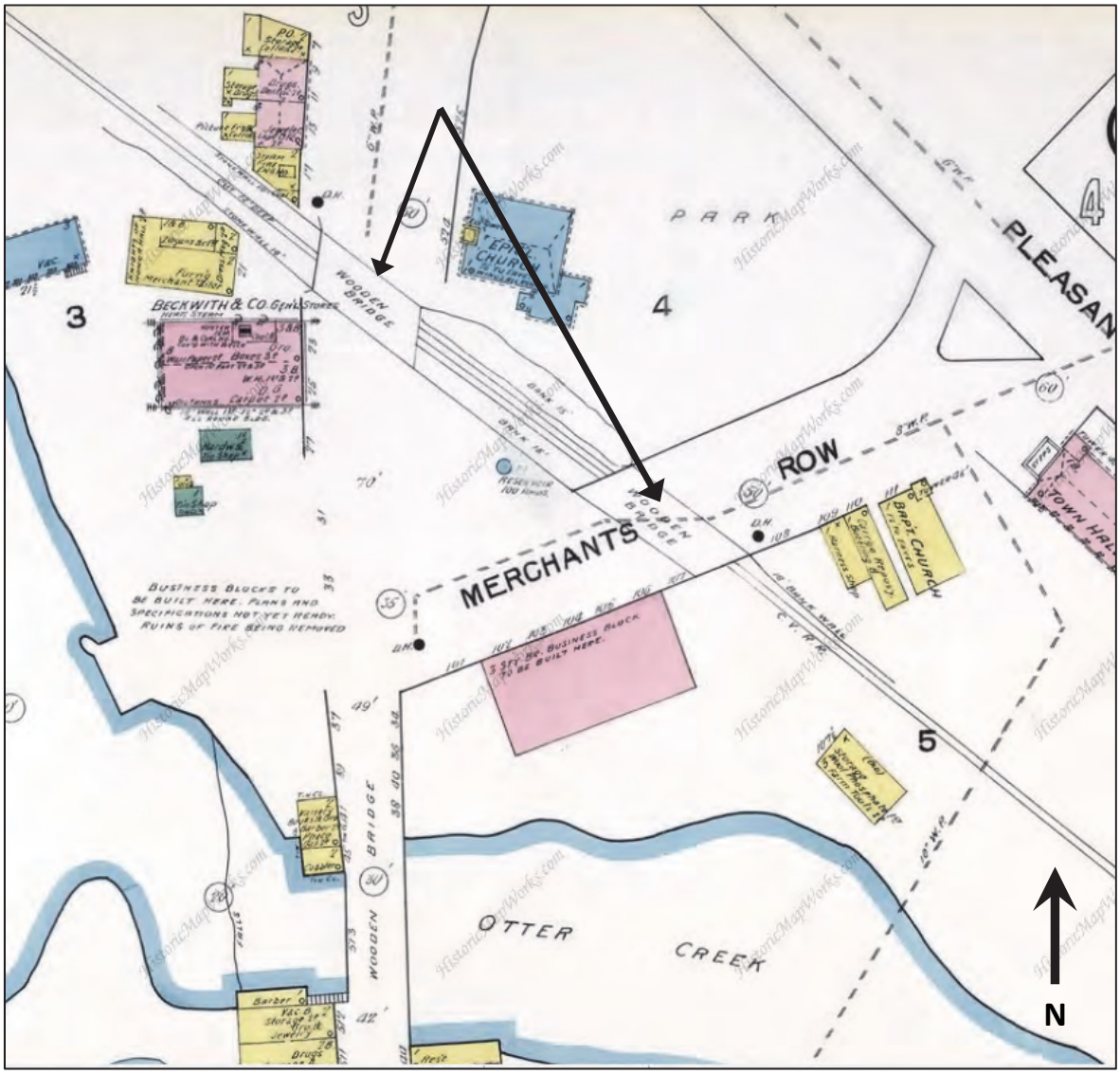

Figure 10. 1892 Sanborn Fire and Insurance Map of Middlebury, Plate 2.
http://www.historicmapworks.com, accessed March 2013.

Arrows indicate locations of current bridges.

Figure 11. View of St. Stephen's Episcopal Church, c. 1870. Glenn M. Andres, "A Walking History of Middlebury," (Middlebury, VT: Middlebury Bicentennial Committee); rev. 1997 by Greg Pahl (Middlebury, VT: Henry Sheldon Museum of Vermont History). Vermont Collection at Middlebury College Library online collections, accessed April 2013, http://midddigital.middlebury.edu/walking_history/village_tour/page_6.html.

Figure 12. View of St. Stephen's Episcopal Church, late 19th century. Vermont Collection at Middlebury College Library online collections, accessed April 2013, http://midddigital.middlebury.edu/SharingVTHistory/Stereopticon/Middlebury/images/MID0004.jpg.

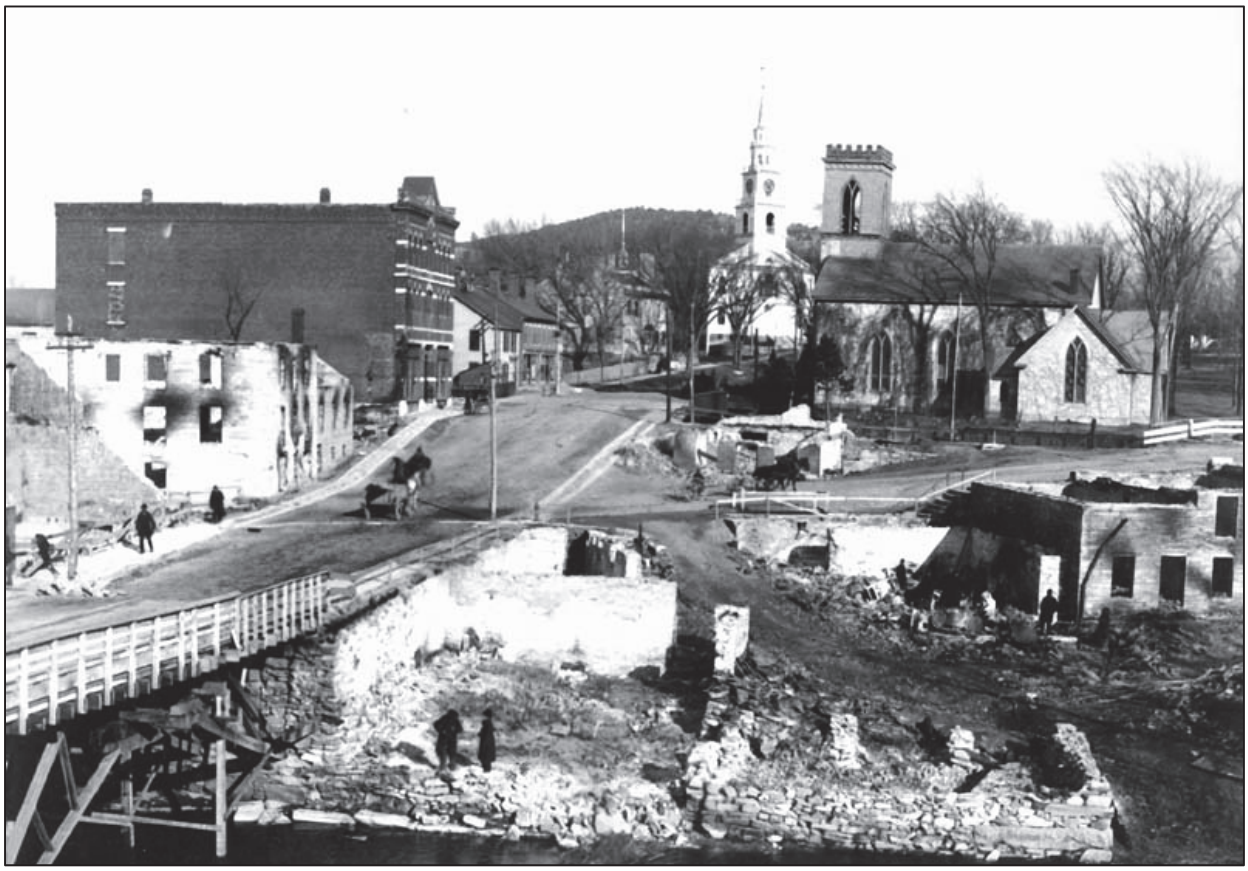

Figure 13. View of Project area after 1891 fire, St. Stephen's Episcopal Church on right, Duclos Building in left background. Note remains of Allen Block in current location of Triangle Park. Vermont Collection at Middlebury College Library online collections, accessed April 2013, http://midddigital.middlebury.edu/SharingVTHistory/Photographs/Middlebury/images/MID0012.jpg.

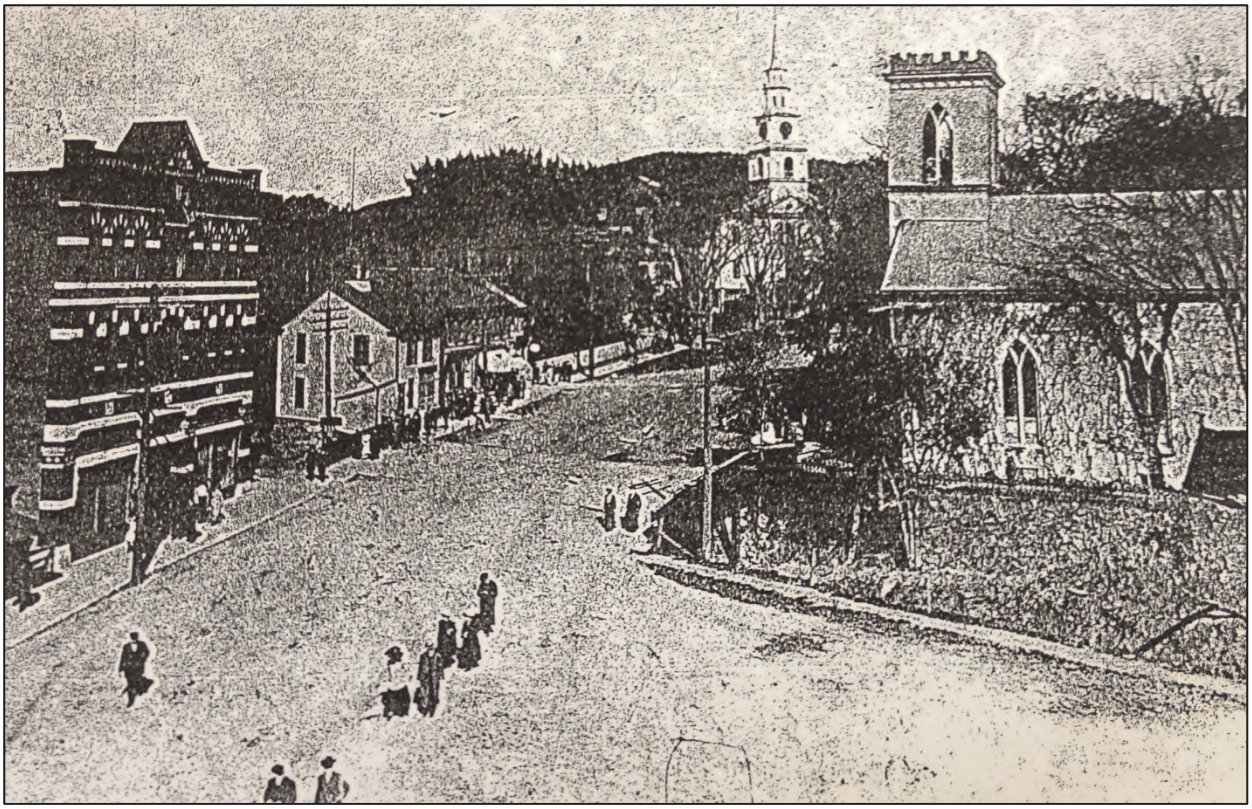

Figure 14. View of Project area, c. 1900. Henry Sheldon Museum of Vermont History archives, Middlebury, VT collection, accessed March 2013.

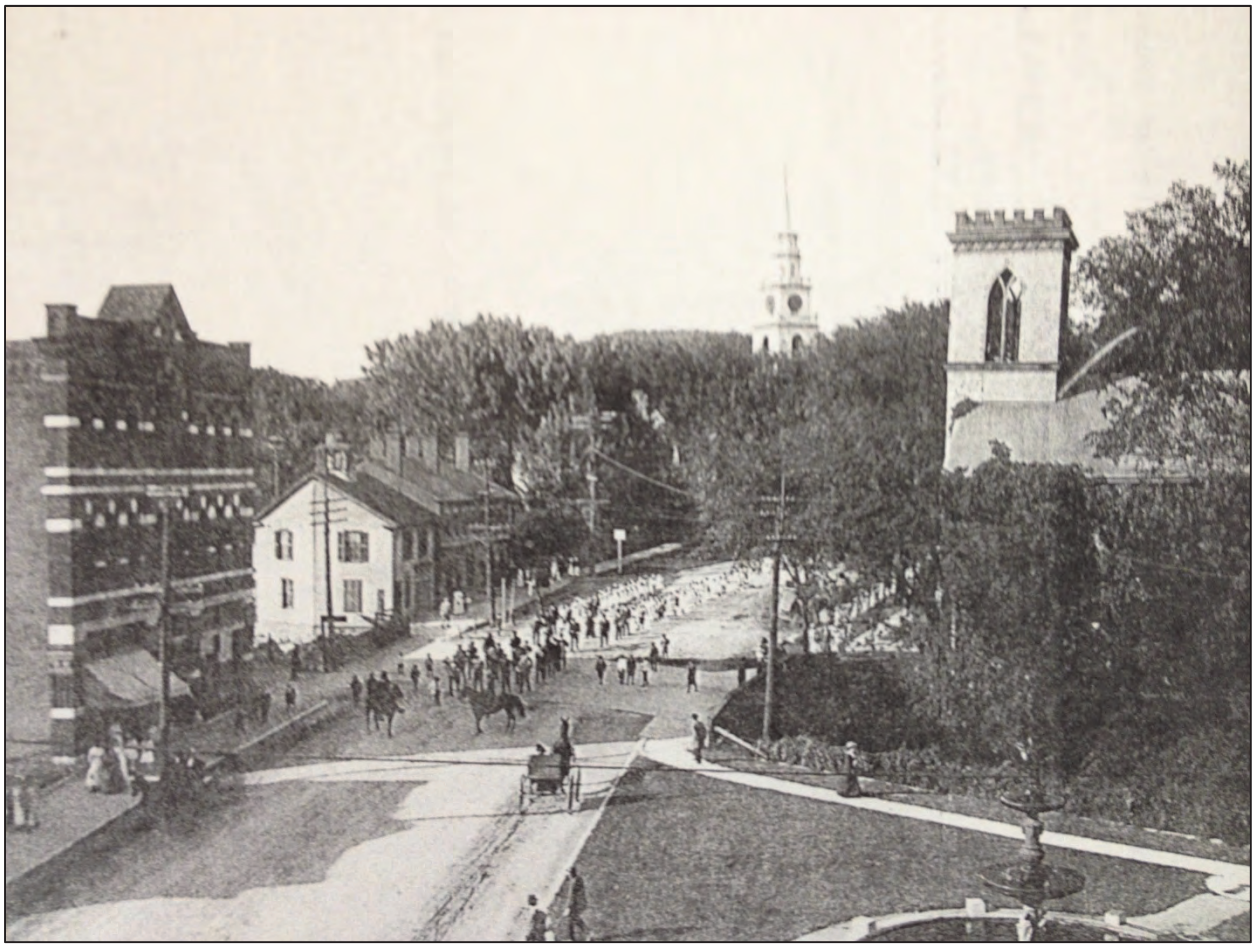

Figure 15. View of Project area, c. 1905. Henry Sheldon Museum of Vermont History archives, Middlebury, VT collection, accessed March 2013.

Figure 16. View of Project area, Merchant's Row Bridge in center, Battell Block on left. Vermont Collection at Middlebury College Library online collections, accessed April 2013, http://middarchive.middlebury.edu/cdm/singleitem/collection/vtpostcards/id/650/rec/2.

Figure 17. View of Project area, c. 1910. Henry Sheldon Museum of Vermont History archives, Middlebury, VT collection, accessed March 2013.

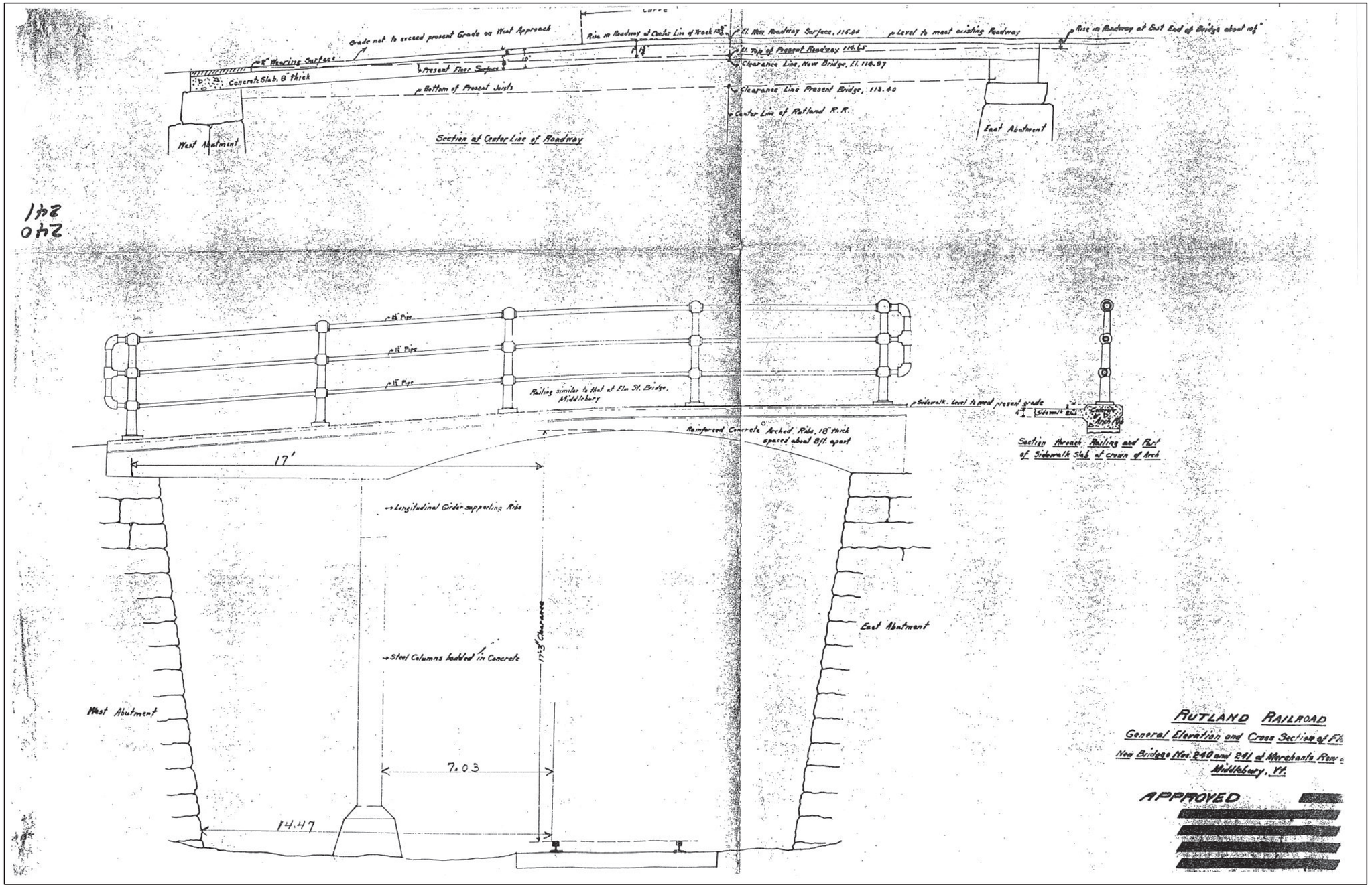

Figure 18. Plans for 1920-1921 construction of Main Street Bridge and Merchant's Row Bridge. VTrans archives, accessed March 2013.

Figure 19. View of St. Stephen's Episcopal Church and original fountain at Triangle Park, note dense vegetation along railroad line cut. Vermont Collection at Middlebury College Library online collections, accessed April 2013, http://middarchive.middlebury.edu/cdm/singleitem/collection/vtpostcards/id/650/rec/2.

Figure 20. View of locomotive emerging from Merchant's Row Bridge (bridge obscured by smoke) c.1939. Henry Sheldon Museum of Vermont History archives, Middlebury, VT collection, accessed March 2013.

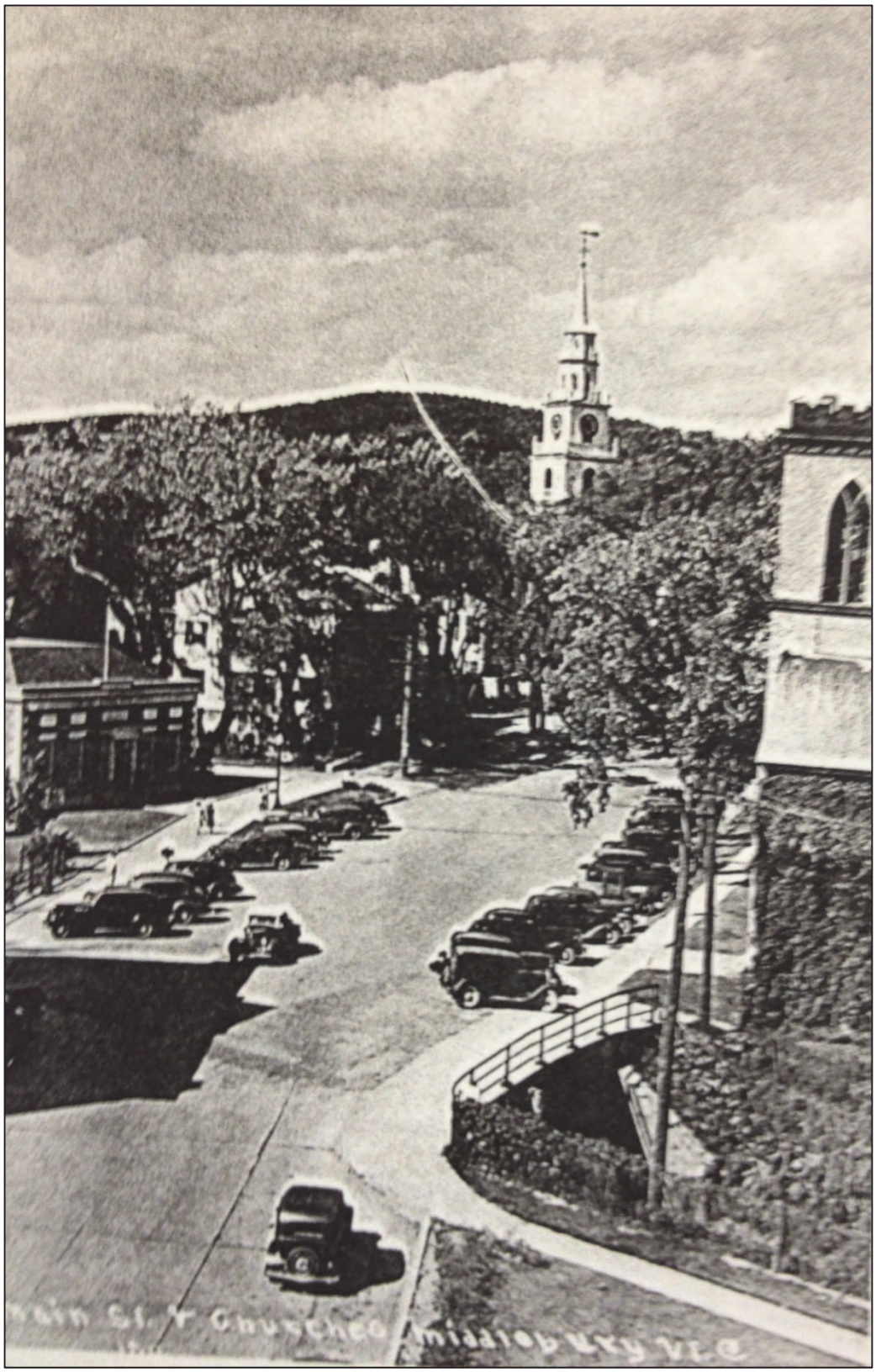

Figure 21. View of Project area, c. 1940, Main Street Bridge in right foreground. Henry Sheldon Museum of Vermont History archives, Middlebury, VT collection, accessed March 2013.

Bridge 241 Northbound St. Stevens Church on right

Figure 22. View of Main Street Bridge, 1963. Poulin Collection of Rutland Railroad Photographs, accessed March 2013, http://midddigital.middlebury.edu/rutland_railroad/RRAPoulinPhotos/.

Bridge 240 Northbound

Figure 23. View of Merchant's Row Bridge, 1963, Main Street Bridge in background. Poulin Collection of Rutland Railroad Photographs, accessed March 2013, http://midddigital.middlebury.edu/rutland_railroad/RRAPoulinPhotos/.

Figure 24. View of Elm Street Bridge, 1963. Note similar railing to Merchant's Row Bridge and Main Street Bridge, as noted on 1920-1921 plans for bridges (Figure 18). Poulin Collection of Rutland Railroad Photographs, accessed March 2013, http://midddigital.middlebury.edu/rutland_railroad/RRAPoulinPhotos/.

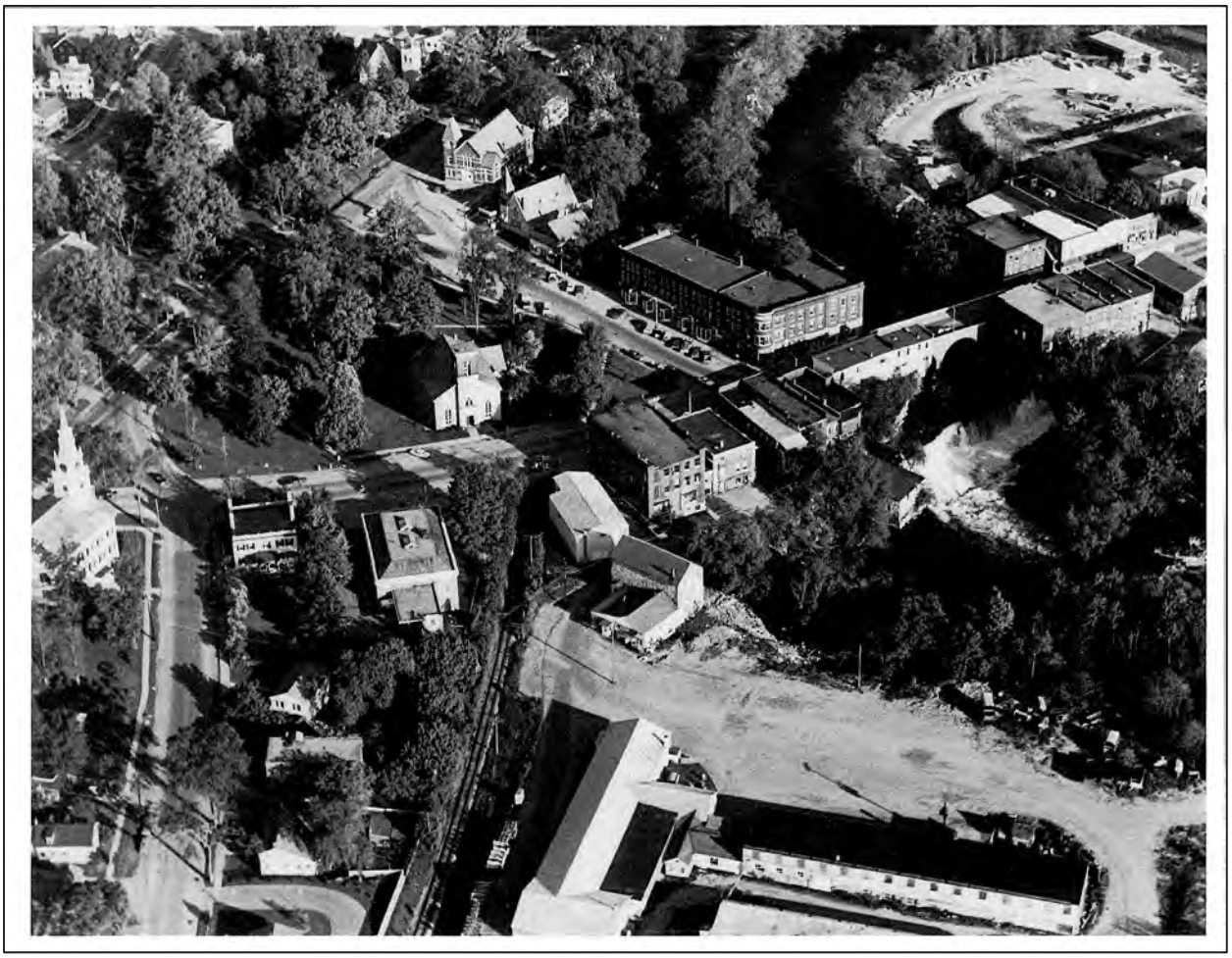

Figure 25. Aerial view of Project area, showing Lazarus Building and St. Stephen's Episcopal Church in center, post-1963. Henry Sheldon Museum of Vermont History archives, Middlebury, VT collection, accessed March 2013.

Southbound Bridge 241

Figure 26. View of Main Street Bridge, 1971 or 1972, note sign for "Lazarus Department Store" on right. Poulin Collection of Rutland Railroad Photographs, accessed March 2013, http://midddigital.middlebury.edu/rutland_railroad/RRAPoulinPhotos/.

PHOTOS

1. View of south approach and east wall from Merchants Row Bridge. Photographer facing SE, February 15, 2013.

2. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Merchants Row Bridge, west wall at south approach. Photographer facing S, February 15, 2013.

3. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of south approach from Merchants Row Bridge, Cross Street Bridge in background. Photographer facing S, February 15, 2013.

4. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Merchants Row Bridge, showing degree of vegetation growth on east wall. Photographer facing N, February 15, 2013.

5. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Merchants Row Bridge, east abutment, south side. Photographer facing NW, February 15, 2013.

6. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of south terminus of east retaining wall, south of Merchants Row Bridge. Photographer facing S, February 15, 2013.

7. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Merchants Row Bridge, west wall and abutment, south side. Photographer facing W, February 15, 2013.

8. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Merchants Row Bridge, piers and abutments. Photographer facing S, February 15, 2013.

9. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Merchants Row Bridge, west wall and abutment, north side. Photographer facing SW, February 15, 2013.

10. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Merchants Row Bridge, east abutment, north side. Photographer facing SE, February 15, 2013.

11. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of east wall of railroad right-of-way and retaining wall southwest of St. Stephen's Episcopal Church, from Merchants Row Bridge. Photographer facing N, February 15, 2013.

12. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Merchants Row Bridge from Main Street Bridge. Photographer facing SE, February 15, 2013.

13. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Main Street Bridge from Merchants Row Bridge, Duclos Building and Lazarus Building in left background, St. Stephen's Episcopal Church on right. Photographer facing NW, February 15, 2013.

14. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Main Street Bridge, south approach. Photographer facing NW, February 15, 2013.

15. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Main Street Bridge, west wall and end of west abutment, south side. Photographer facing SW, February 15, 2013.

16. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of retaining wall southwest of St. Stephen's Episcopal Church from Main Street Bridge, Merchants Row Bridge in right background. Photographer facing SW, February 15, 2013.

17. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of retaining wall southwest of St. Stephen's Episcopal Church and east retaining wall from Main Street Bridge, south side. Photographer facing E, February 15, 2013.

18. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Main Street Bridge, east wall and abutment, south side. Photographer facing SE, February 15, 2013.

19. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Main Street Bridge, west wall and abutment, south side. Photographer facing SW, February 15, 2013.

20. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Main Street Bridge, piers and abutments. Photographer facing N, February 15, 2013.

21. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Main Street Bridge, west abutment, north side. Photographer facing S, February 15, 2013.

22. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Main Street Bridge, east abutment, north end. Photographer facing SE, February 15, 2013.

23. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. Closeup of Main Street Bridge, east wall and abutment contact point, north end. Photographer facing E, February 15, 2013.

24. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of west wall, Main Street Bridge, north side. Photographer facing NW, February 15, 2013.

25. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Main Street Bridge, west wall at north approach. Photographer facing S, February 15, 2013.

26. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Main Street Bridge, west wall below Lazarus Building. Photographer facing S, February 15, 2013.

27. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of north terminus of east wall, north of Main Street bridge. Photographer facing N, February 15, 2013.

28. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. Closeup of east retaining wall, north of Main Street bridge, showing tie back. Photographer facing E, February 15, 2013.

29. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Main Street Bridge and east wall at north approach. Photographer facing SE, February 15, 2013.

30. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Main Street Bridge, east wall, north side. Photographer facing SE, February 15, 2013.

31. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Main Street Bridge, north approach. Photographer facing S, February 15, 2013.

32. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Merchants Row Bridge from Merchants Row, vegetation partially obscures view of railroad right-of-way. Photographer facing SE, February 15, 2013.

33. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View from Merchants Row Bridge. Photographer facing NE, February 15, 2013.

34. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of east wall between bridges as seen from Main Street, St. Stephen's Episcopal Church in background. Fence and vegetation growth partially obscures view of wall. Photographer facing SE, February 15, 2013.

35. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Main Street Bridge and east wall from Triangle Park, fence and vegetation partially obscure view of bridge and railroad right-of-way. Photographer facing NE, February 15, 2013.

36. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Merchants Row Bridge and railroad right-of-way from north end of St. Stephen's Episcopal Church retaining wall, at Main Street Bridge. Photographer facing S, February 15, 2013.

37. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Main Street Bridge from St. Stephen's Episcopal Church retaining wall path, Duclos Building in background. Photographer facing W, February 15, 2013.

38. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Duclos Building and Lazarus Building from Main Street, southeast façades, with Printer Alley between. Main Street Bridge on right. Photographer facing NW, February 15, 2013.

39. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Lazarus Building from Main Street Bridge, southeast facade. Photographer facing NW, February 15, 2013.

40. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Lazarus Building, southeast facade. Photographer facing N, February 15, 2013.

41. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Lazarus Building, northeast elevation. Photographer facing S, February 15, 2013.

42. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Lazarus Building (left) and Duclos Building (right) from Printers Alley, northwest elevations. Photographer facing S, February 15, 2013.

43. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Lazarus Building, southwest elevation. Photographer facing E, February 15, 2013.

44. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Marble Works Building (just north of Lazarus Building) from railroad right-of-way, north and east elevations. Photographer facing SW, February 15, 2013.

45. Main Street and Merchants Row Bridge Replacement, Middlebury, VT. View of Duclos Building (southwest of Lazarus Building) from Main Street, southeast facade. Photographer facing NW, February 15, 2013.

May 29, 2013

Middlebury Bridges Replacement Project – Middlebury WCRS (23)
Addendum to the Determination of National Register Eligibility letter, dated April 19, 2013

In addition to the properties already discussed in the above-referenced letter, we are requesting your agreement on the National Register eligibility recommendation for the small addition to the Bourdon Insurance Agency Building at 48 Merchants Row. (referred to as 10 Merchants Row in the Middlebury Village Historic District National Register nomination). The addition is adjacent to the railroad cut and the east side of the Merchants Row bridge. Each of the alternatives for bridge replacement would require removal of this structure.

The small addition, which houses a barber shop, is a one-story, side gable, rectangular plan structure that appears to have been added to the Bourdon Insurance Agency building in the 1950s or early 1960s. The front of the building has a single door, large storefront window, and a smaller window; it is covered with aluminum siding. The building is connected to the Bourdon Insurance Agency Building through a roof extension and it appears that the opening between the two buildings leads to stairway to the rear of the building. The addition also has a smaller section on the rear.

The Bourdon Insurance Company Building, to which the barber shop is attached, is noted as a contributing resource in the Middlebury Village Historic District National Register nomination as #96. 10 Merchant's Row: a 2½-story (actually the building has 3 stories as it slopes down from the street), stuccoed building set gable end to the road on a random coursed stone foundation. The barber shop extension proposed for removal is not noted or described. Based on the Sanborn maps, the insurance building in its current configuration dates to ca. 1920; earlier Sanborn maps (1905 and 1910) show a 1-story wood-frame building at this location with the same footprint. The 1885 and 1892 Sanborn maps show a similar footprint, but it is not identical. The building was used as a harness shop, grocery, and barber shop. The 1920 Sanborn shows a small concrete building near the location of the subject building, but it has a narrower setback and is not attached to 10 Merchants Row. While it may be presumed it is a different building, it may be possible that the current addition is the earlier concrete building shown on the 1920 map. But the building appears to have received several alterations, including the siding and possibly the storefront window. A 1963 photo of the area does show the building, but it does not present a clear view (Poulin 2013). It is also shown in a photo from 1981-1982 (UVM 2013).

The small addition is not considered to be a significant feature of the earlier 2½- story building, both due to its alterations and the insensitive, non-contextual proportional form of the addition to the Bourdon Insurance Company Building's architectural

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design and to the district as a whole. The addition is not recommended as a contributing feature to either the Bourdon Insurance Company Building or to the Middlebury Village Historic District.

Addition to the Bourdon Insurance Company Building, 10 Merchants Row

VHB National Register Eligibility Recommendation – not a contributing resource to the National Register Middlebury Village Historic District, nor is the building individually eligible.

Agree: _____

APPROVED
HISTORIC PRESERVATION
OFFICER
VT AGENCY OF TRANSPORTATION
BY _____ DATE: 6/19/13

References

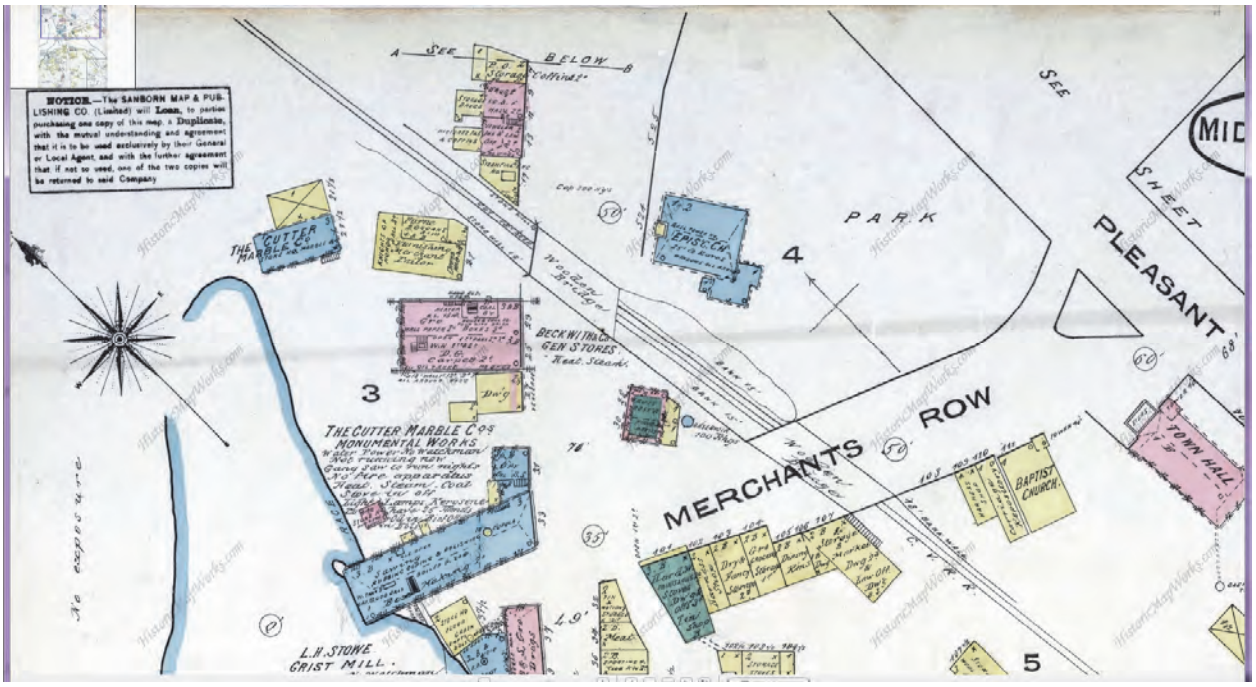
Poulin Collection. 2013. Middlebury. Available online at http://midddigital.middlebury.edu/rutland_railroad/RRAPoulinPhotos/ Accessed April 12, 2013. Last update unknown.

Sanborn Map Company 1885 Middlebury, Vermont, plate 2, New York, NY.

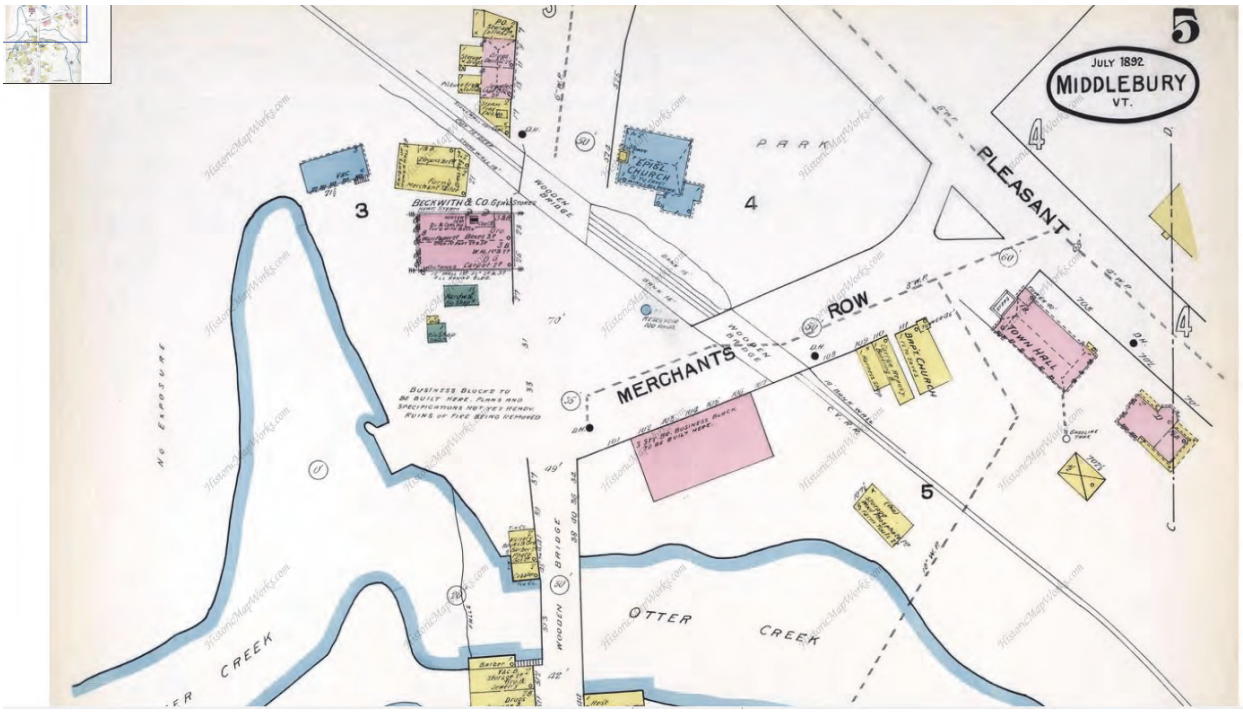
____. 1892 Middlebury, Vermont, plate 5, New York, NY.
____. 1905 Middlebury, Vermont, plate 6, New York, NY.
____. 1910 Middlebury, Vermont, plate 4, New York, NY.
____. 1920 Middlebury, Vermont, plate 4, New York, NY.

University of Vermont. 2013. Landscape Change Program. Available online at http://www.uvm.edu/landscape/ Accessed May 15, 2013. Last update unknown.

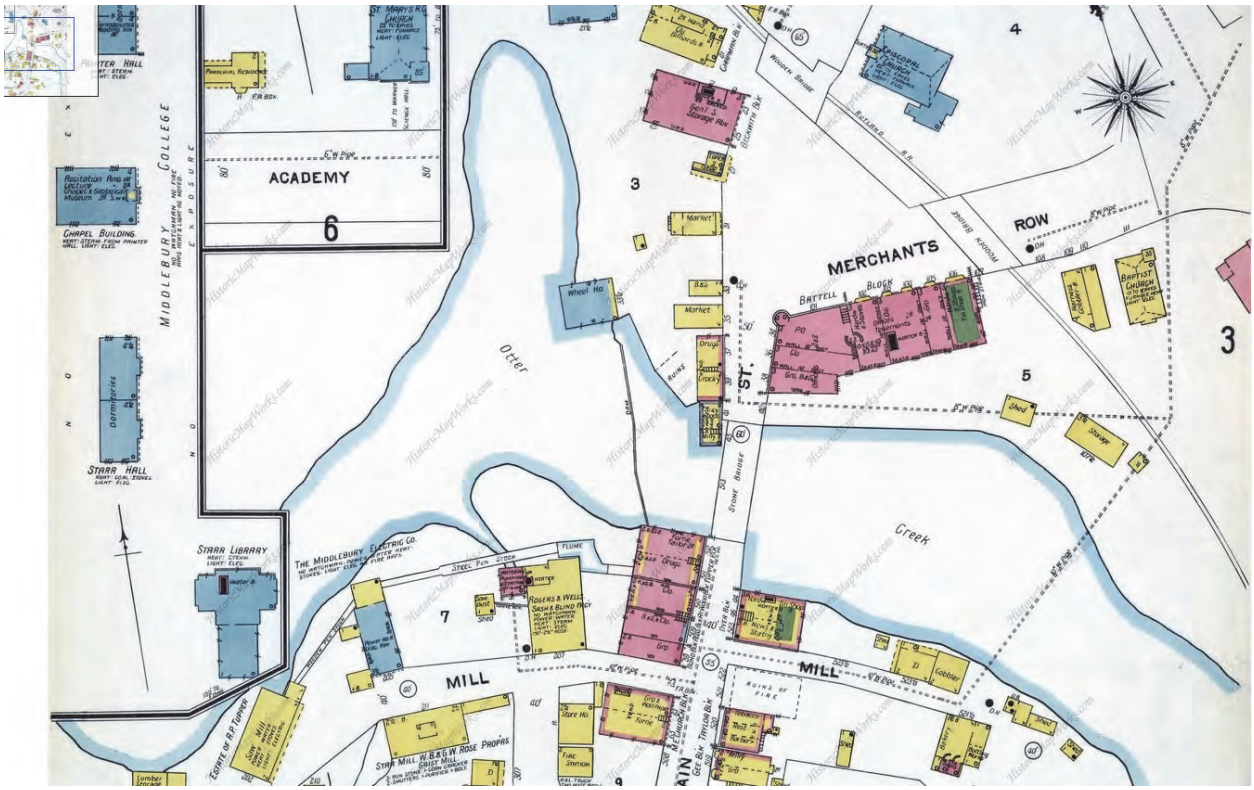
FIGURES



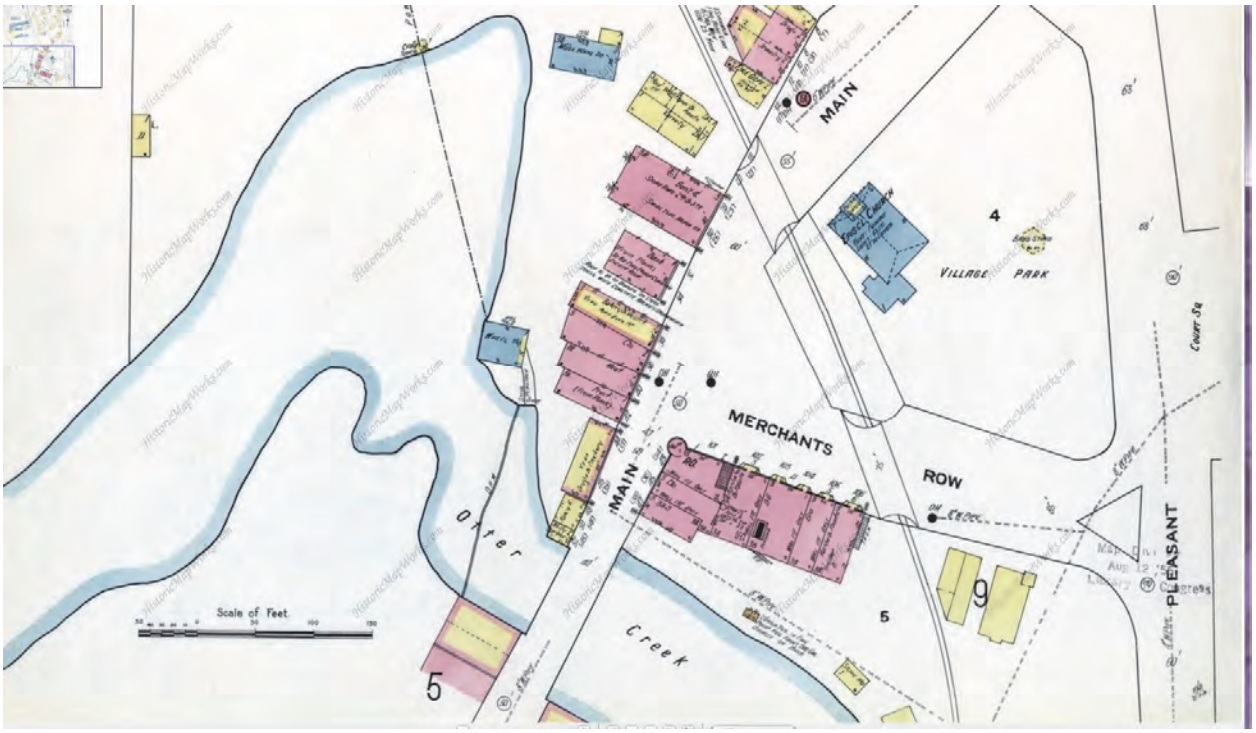
1885 Sanborn map, Plate 2



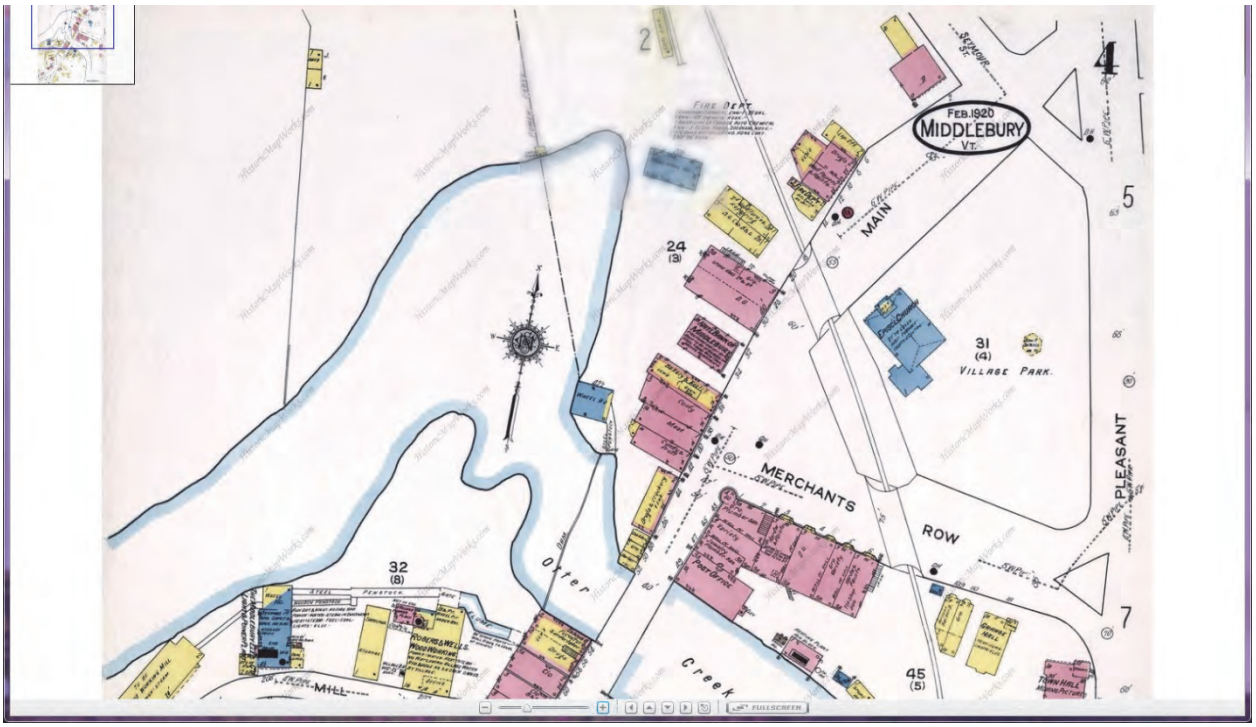
1892 Sanborn map, Plate 5



1905 Sanborn map, Plate 6



1910 Sanborn map, Plate 4



1920 Sanborn map, Plate 4

PHOTOS

Addition to the Bourdon Insurance Agency Building, 48 Merchants Row, Middlebury, Vermont. View facing south, February 2013.

Addition to the Bourdon Insurance Agency Building, 48 Merchants Row, Middlebury, Vermont. View facing west, February 2013.

Southbound - Bridge 240 Bourdon Insurance on left, Grange hall 2nd from left, Battell Block on right

1963 Poulin photo

1981-1982 photo

4

Tunnel Renderings

Main Street and Merchants Row Bridges
Middlebury WCRS(23)
Tunnel Simulations

Before
(View from Main Street)

After

Tunnel Simulations

Before
(Fountain View from West)

After

Main Street and Merchants Row Bridges
Middlebury WCRS(23)
Tunnel Simulations

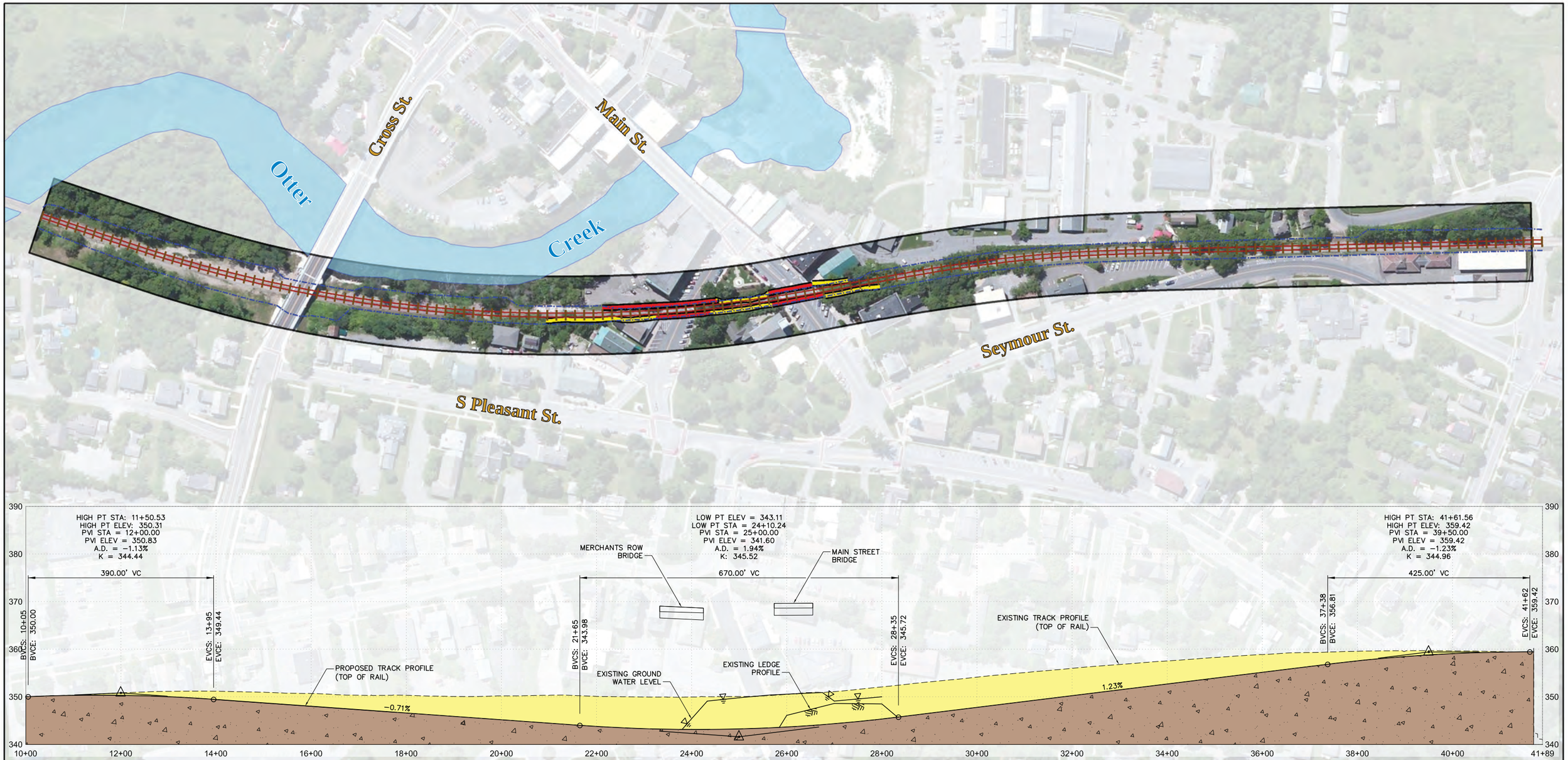
Before
(View from Merchants Row)

After

Tunnel Simulated View

5

Railroad Track Profile Changes



Legend

- Vermont Railway
- Limit of Work
- Granite Retaining Wall
- Stone Retaining Wall

Town Highway Bridge Replacements
Middlebury, Vermont
Plan and Profile
Alternatives Analysis
Railroad Grade Changes

July 10, 2013

150 75 0 150 Feet

Appendix 6

6

Flood Elevations and Track Profile Memorandum

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Memorandum

To: Mark Colgan, P.E.
Project Manager

Date: June 24, 2013

Project No.: 57603.00

From: Tyler Gingras, P.E.
Sherward Farnsworth, P.E.

Re: Middlebury WCRS(23)
Otter Creek Flood Elevations and Proposed Track Profiles

The purpose of this memorandum is to provide documentation of the Otter Creek flood elevations with the proposed top of rail elevations for the 20'-9" and 23'-0" vertical clearance alternatives beneath the Main Street and Merchants Row bridges.

Flood Elevation Data (see attached 11x17 Preliminary Drainage Plan (1 of 2) and (2 of 2))

The existing drainage system daylights at proposed Station 20+50 left, a point where floodwaters might first flow into the railway track structure during high-flow events. As such, Station 20+50 was taken as the initial point of analysis. Based on the Federal Emergency Management Agency (FEMA) July 3, 1984 Flood Insurance Study (FIS) and the stream flood profile of the Otter Creek provided therein on Sheet 02P (attached), the following flood elevations can be assumed at Station 20+50, which is 320 FT south of the Merchants Row Bridge along the centerline of the existing track:

Flood Event	Flood Elevation (FT)
10-Year	343.9
50-Year	345.8
100-Year	347.0
500-Year	348.8

In addition to the published FIS flood elevations, metered stream elevation data for the Otter Creek exists via a USGS stream gaging station on the Otter Creek immediately adjacent to the project area. The gage is located behind the Battell Block at approximate Station 22+34, Left 114 FT, on the east side of the river (see attached plan for reference). After analyzing the data from the stream gage via an independent regression analysis, we concluded that the results generated were relatively consistent with the flood elevations provided in the FIS.

The Otter Creek gaging station is located on a narrow section of the river where, according to profile panel 3 of 20 in the 1985 Middlebury Flood Insurance Map, the stream profile in this area between 100-year top-of-water elevations 346 and 348 (Station 17+30) has a slope of 0.0035 feet/foot. This slope describes the general stream profile reach from the Cross Street Bridge to the Main Street Bridge (aka Battell Bridge).

Of special note is the history of recorded river elevations during large storm events over the past 100 years. Annual peak streamflow data has been gathered at this location since 1904, offering a wealth of information to consider. The most recent recorded storm of significance was Tropical Storm Irene, which raised river elevations to approximate elevations 343.0 and 343.6 at the stream gage and existing drainage outlet locations, respectively. This is less than the above reported FIS 10-year flood elevation, and is reflected in the fact that fourteen events which exceeded Irene river flow volumes have occurred in the past 100 years.

Existing Conditions

The existing track profile begins descending from the elevation 351.2 at Station 13+50, 200 FT south of Cross Street Bridge, (where the Otter Creek 100-year flood elevation is 349.0 FT) to the elevation 350.1 at Station 18+60 (where the Otter Creek 100-year flood elevation is approximately elevation 347.6 FT) and then runs more or less on a flat grade to Station 22+70, elevation 350.0 (near the South fascia of existing Merchants Row Bridge). The track profile then passes through a vertical curve before rising at a rate of 0.0093 feet/foot over the next 400 FT in the northerly direction.

An earth berm currently exists between the tracks and the Otter Creek at approximate elevation 350.0. It begins at Station 21+00 and extends north along the river behind the Battell Block towards the Otter Creek dam. No additional structure is required in this area to block the passage of water from the 100-year storm event into the railroad Right-of-Way.

Prior to the existing berm, however, starting at the downstream side of the Cross Street pier, Station 16+00, and extending to Station 20+80, the existing ground slopes down to the river. Lowering the elevation of the tracks in this area will also lower the existing ground surface between the railroad Right-of-Way and the river. Therefore, any lowering of the existing track profile by more than 1.3 feet in this area will require a wall to retain Q100 storm events with 1.0' of freeboard.

Proposed Conditions: 20'-9" Vertical Clearance

Cross sections of the existing track elevations, proposed track elevations, and 100-year flood elevations have been analyzed between stations 10+00 and 24+00, with the results compiled in the attached table. For example, at Station 20+50, the proposed vertical curve[1] for a 20'–9" clearance under the Merchants Row and Main Street bridges approaches a tangent grade and is at elevation 346.48, which represents a drop of 3.72' below existing grade, is about 6 inches below the 100-year flood profile, and 8 inches above the 50-year flood profile.

In order to keep 100-year flood waters from entering the railroad Right-of-Way, an earth berm will be needed between Station 13+75 to the Cross Street Pier (Station 15+50), and a retaining wall will need to be constructed between Station 16+00 and Station 21+00, to match into the existing berm.

The proposed low point on the vertical curve falls under the Merchants Row Bridge at Station 24+05 with an elevation of 345.13 which is 1.87 FT below the 100-year flood elevation and 0.25 FT below the 50-year flood elevation at station 20+50.

The existing municipal drainage east of the railway will be collected and directed to the proposed railway drainage network that is collecting the drainage between Stations 22+50 to 27+70, and then directing the combined flows north in a closed drainage system along the tracks to Station 28+75 and then west between buildings to the proposed outlet along the east bank of the Otter Creek below the falls. The proposed outlet daylight is at approximate elevation 336.5 which is over 13 FT above the 100-year flood elevation of 323.0 FT at that location.

[1] Vertical Curve PVI Station 25+00.00, PVI Elev. 344.18, G1 = -0.511%, G2 = 1.051%, 550.0 FT VC

Proposed Conditions: 23'-0" Vertical Clearance

Cross sections of the existing track elevations, proposed track elevations, and 100-year flood elevations have been analyzed between stations 10+00 and 24+00, with the results compiled in the attached table. For example, at Station 20+50, the proposed vertical curve[2] for a 23'–0" clearance under the Merchants Row and Main Street bridges approaches a tangent grade at Station 20+50 and is at elevation 344.80, which represents a drop of 5.4' below existing grade, and is about 2.2 feet below the 100-year flood profile.

In order to keep 100-year flood waters from entering the railroad Right-of-Way, an earth berm will be needed between Station 12+50 to Cross Street Pier (Station 15+50) and a retaining wall will need to be constructed between Station 16+00 and Station 21+00 to match into the existing berm.

The proposed low point on the vertical curve falls under the Merchants Row Bridge at Station 24+10 with an elevation of 343.11 which is 3.89 feet below the 100 year flood elevation and 10 inches below the 10-year flood elevation at station 20+50.

It should be noted that the tangent grade of +1.2290% to the north between the Main Street Bridge and Seymour Street Bridge would be the ruling grade on the VTR between Bennington and Burlington for both the northbound and southbound traffic.

Groundwater

Groundwater was observed during on-site geotechnical explorations between stations 23+50 and 27+50, with an average observed water table elevation of approximately 348. Since the proposed top of rail and subsequent bottom of concrete structure are below this elevation, significant underdrain systems will be incorporated into the design in this area. Groundwater elevations in this area will need to be lowered by as much as 7 feet and 9 feet as a result of the 20'-9" and 23'-0" vertical clearance alternatives, respectively. It is likely that the final design of the drainage systems for the preferred alternative will include even more robust groundwater control systems than those shown on the attached Preliminary Drainage Plans. The underdrains will require periodic maintenance to insure proper function as failure of the system will result in wet track conditions.

Furthermore, groundwater influence from the river will likely result in additional groundwater seepage into the railway during high-river events, and during wet periods of the year. The 23'-0" vertical clearance alternative, being the deeper of the two alternatives, would be more susceptible to the effects of high ground water.

Summary

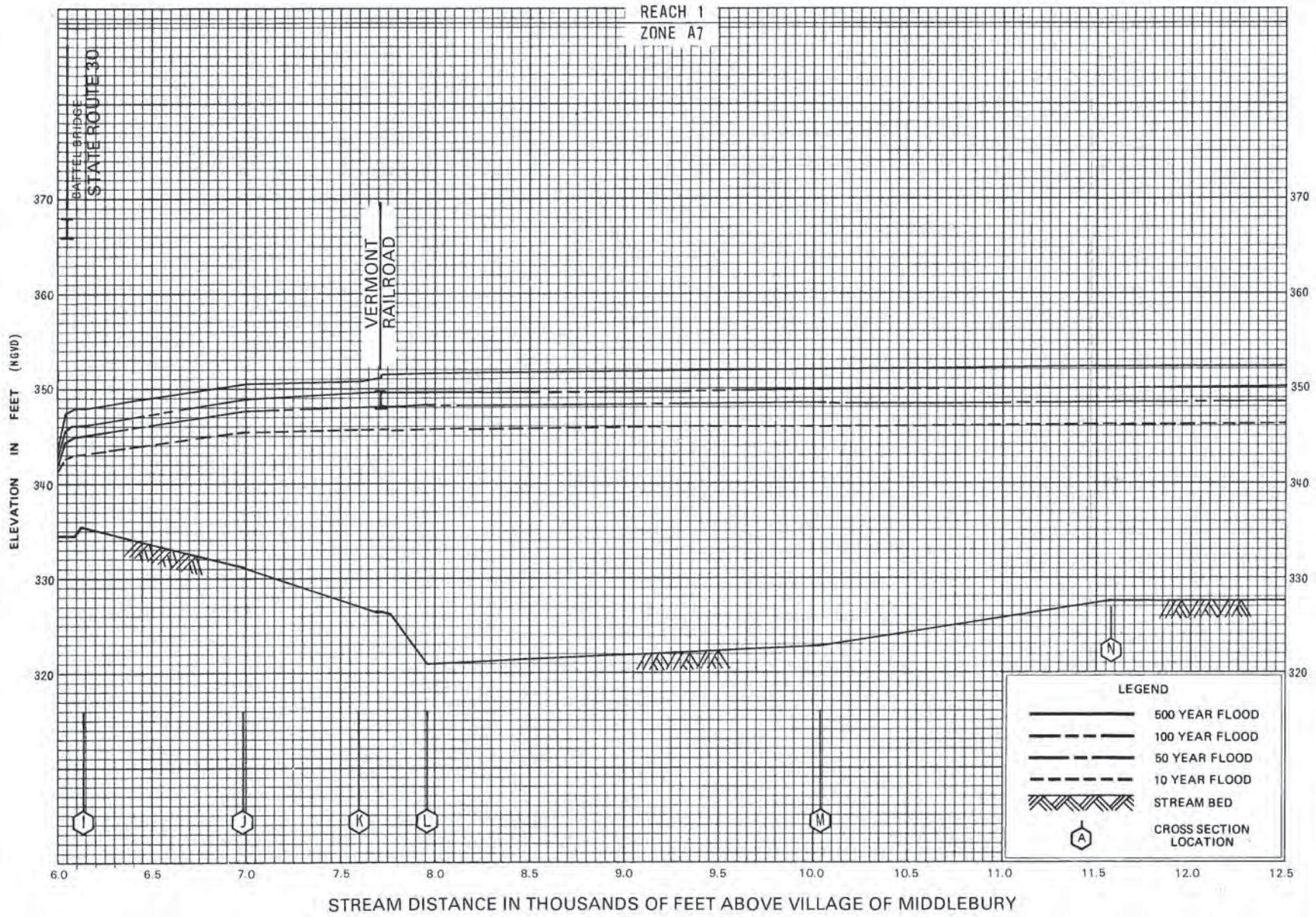
In order to retain the 100-year flood event for either vertical-clearance alternative, a 500 foot long retaining wall is recommended on the west side of the tracks between the Cross Street Pier (approximate station 16+00) and station 21+00. Additionally, an earthen berm less than 2 feet high will be required between approximate stations 13+75 and 15+50 for the 20'-9" vertical clearance alternative, or between approximate stations 12+50 and 15+50 for the 23'-0" vertical clearance alternative.

[2] Vertical Curve PVI Station 25+00.00, PVI Elev. 341.60, G1 = -0.7100%, G2 = 1.2290%, 670.0 FT VC

Comparison of Existing and Proposed Track Profile Elevations against Q100 Elevation for 20' - 9" and 23' - 0" Vertical Clearances

By: S. Farnsworth 6/14/2013

Track Station	FEMA 100 Year Flood Elevation	Existing Track		20' - 9" Clearance Track Profile		23' - 0" Clearance Track Profile		Comments	Wall/Berm Comments Between Otter Creek and the Tracks
		Track Elevation	Distance Between Q100 and Top of Rail	Track Elevation	Distance Between Q100 and Top of Rail	Track Elevation	Distance Between Q100 and Top of Rail		
10+00	349.60	350.0	+ 0.4	349.98	+ 0.4	349.98	+ 0.4	Existing Top of Rail is only 0.4 feet above Q 100 at North end of Bridge # 239 over the Otter Creek.	Ideal design is to provide a wall or berm to an elevation of one foot above Q100 Elevation along the tracks to keep Q100 out of Tunnel/ Merchants Row Bridge areas.
11+50.53	349.34	350.6	+ 1.3	NA	NA	350.34	+ 1.0	High Point on the Vertical Curve for the 23'-0" Clearance.	
11+83.42	349.29	350.7	+ 1.4	350.42	+ 1.1	NA	NA	High Point on the Vertical Curve for the 20'-9" Clearance.	
12+00	349.26	350.8	+ 1.5	350.42	+ 1.2	350.28	+ 1.0		
12+50	349.17	351.0	+ 1.8	350.36	+ 1.2	350.17	+ 1.0	Begin Berm "Left" for 23' - 0" Clearance for Q100.	
13+00	349.09	351.2	+ 2.1	350.24	+ 1.2	349.99	+ 0.9		Minimum Length for **Q100**, 23'-0' Clearance, new 300 foot long berm.
13+50	349.0	351.2	+ 2.2	350.05	+ 1.1	349.74	+ 0.7		
13+75	348.94	351.2	+ 2.3	349.93	+ 1.0	349.58	+ 0.6	Begin Berm "Left" for 20' - 9" Clearance for Q100.	
14+00	348.88	351.2	+ 2.3	349.81	+ 0.9	349.41	+ 0.5		Minimum Length for **Q100**, 20'-9' Clearance, **new** 175 foot long berm.
14+50	348.75	350.8	+ 2.1	349.55	+ 0.8	349.06	+ 0.3		
15+50	348.5	350.8	+ 2.3	349.04	+ 0.5	348.35	-0.1	Cross Street Bridge, upstream pier face.	Existing pier
16+00	348.4	350.7	+ 2.3	348.78	+ 0.4	347.99	-0.4	Cross Street Bridge, downstream pier face.	
17+50	348.0	350.3	+ 2.3	348.02	+ 0.0	346.93	-1.1		Minimum Length wall to retain a **Q100 storm event**, 500 feet, 20'-9" or 23'-0" clearance.
20+50	347.0	350.2	+ 3.2	346.48	-0.5	344.8	-2.2		
21+00	346.8	350.3	+ 3.5	346.23	-0.6	344.44	-2.4	End wall at existing berm which is at elevation 350.0	
22+50	346.8	350.0	+ 3.2	345.47	-1.3	343.48	-3.3	Begin Tunnel/Merchants Row Bridge (approximate)	
24+04.97	346.8	350.0	+ 3.2	345.13	-1.7	NA	NA	Low point Station for the 20'-9" Clearance	
24+10.24	346.8	350.0	+ 3.2	NA	NA	343.11	-3.7	Low point Station for the 23'-0" Clearance	



FLOOD PROFILES

OTTER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWN OF MIDDLEBURY, VT.

(ADDISON CO.)

02P

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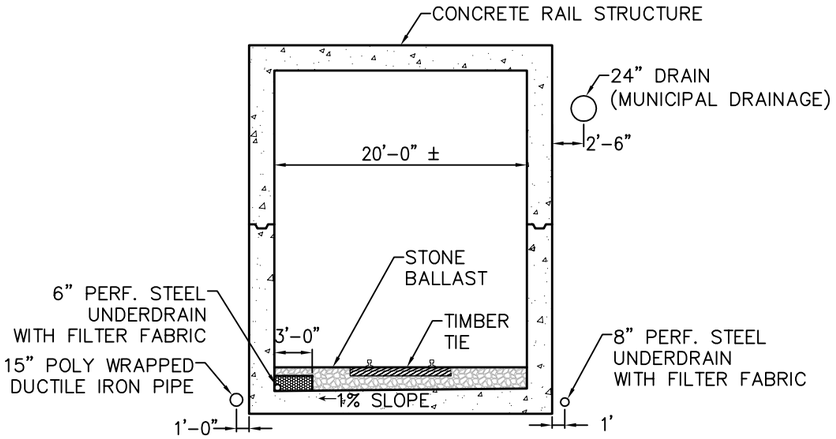

RAILROAD DRAINAGE CROSS-SECTION

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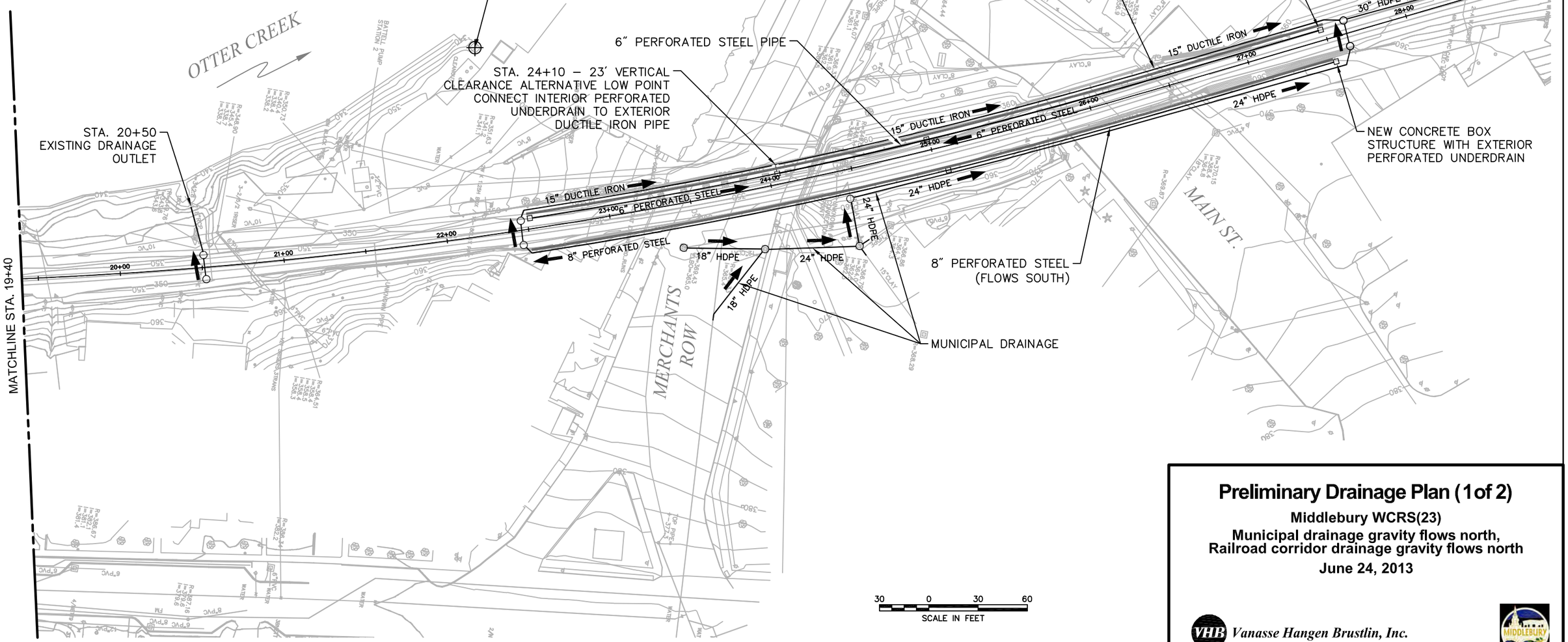

Preliminary Drainage Plan (1 of 2)

Middlebury WCRS(23)

Municipal drainage gravity flows north,
Railroad corridor drainage gravity flows north

June 24, 2013

Vanasse Hangen Brustlin, Inc.

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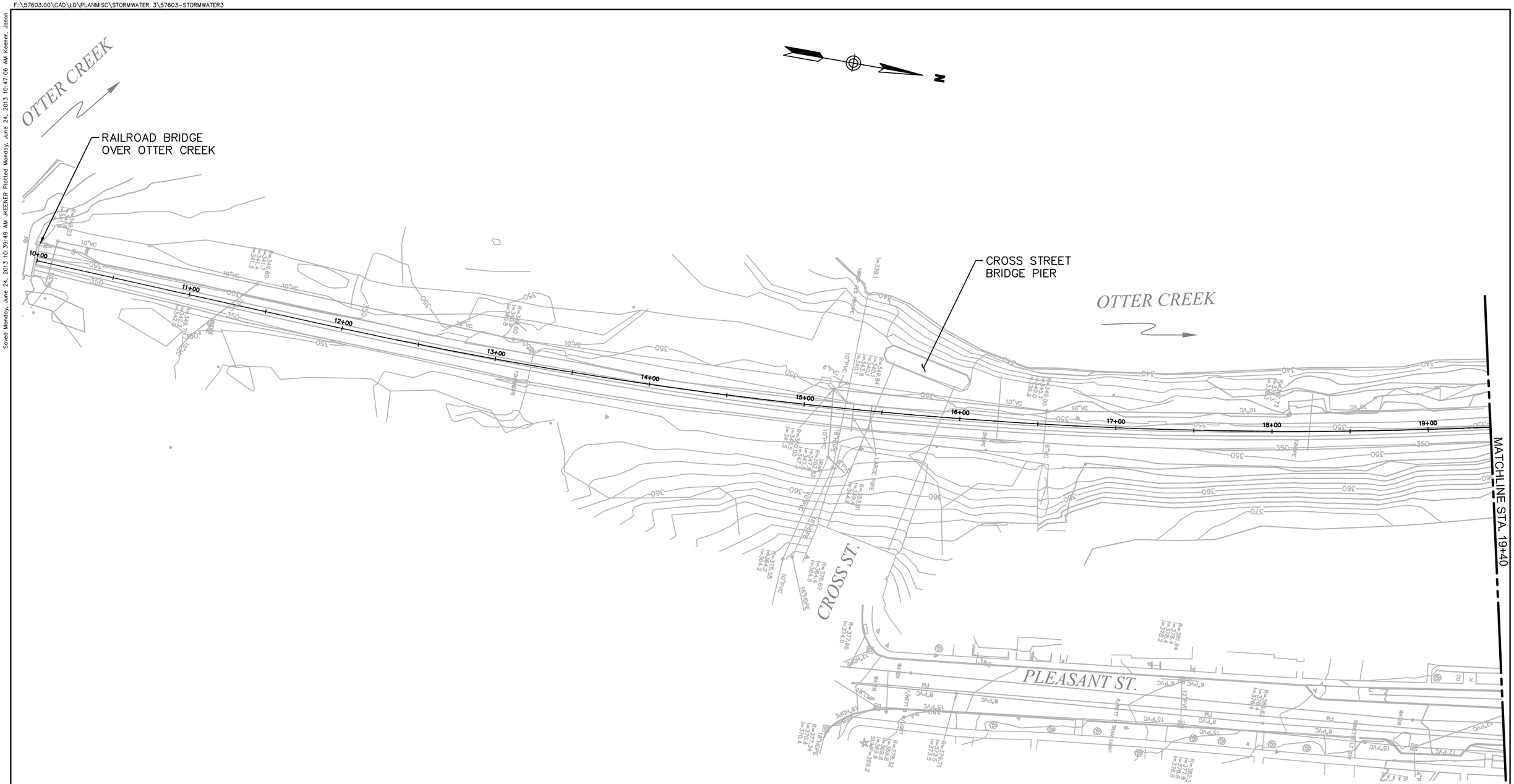

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Preliminary Drainage Plan (2 of 2)

Middlebury WCRS(23)

Municipal drainage gravity flows north,
Railroad corridor drainage gravity flows north

June 24,2013

Vanasse Hangen Brustlin, Inc.

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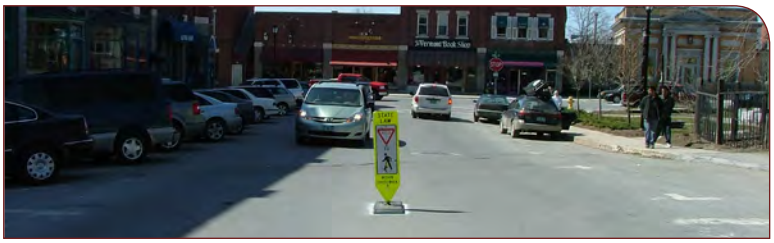


Order-of-Magnitude Cost Estimates

VHB

Town of Middlebury, VT

Middlebury WCRS(23)

Main Street and Merchants Row Bridge Improvements

Order-of-Magnitude Cost Estimate

Alternative No.	Alternative Name	Structural	Roadway	Railroad	Drainage	Transit	Total
1.)	No Build - Do Nothing	N/A	N/A	N/A	N/A	N/A	$0.00
2.)	Rehabilitate (see note 6)	$ 19,450,000.00	$762,500.00	$4,725,000.00	$2,062,500.00	$87,500.00	$27,087,500.00
3.)	Build on New Location (see note 7)	$ 22,460,000.00	$3,050,000.00	$4,725,000.00	$2,062,500.00	$280,000.00	$32,577,500.00
4.)	Replace with Two Bridges	$ 9,770,000.00	$610,000.00	$3,780,000.00	$1,650,000.00	$70,000.00	$15,880,000.00
5.)	Replace with Tunnel	$ 11,330,000.00	$610,000.00	$3,780,000.00	$1,650,000.00	$70,000.00	$17,440,000.00

Notes:

1.) V.C. = Vertical Clearance

2.) Railroad Alternatives assume project limits extend along railroad from Otter Creek Truss to Elm Street Bridge. Track profile grades were adjusted accordingly to allow for required vertical clearance under the various alternatives.

3.) Transit Alternative assumes temporary relocation of the ACTR bus stop to the south end of South Pleasant Street and the permanent location back in its existing location on Merchants Row.

4.) The replacement options include a northern track approach profile grade of 1.3%.

5.) For purposes of this summary sheet, drainage costs are based on all railroad corridor and municipal drainage flowing north via a gravity system outletting below the Otter Creek Falls with an easement across the MarbleWorks property.

6.) Alternative 2, Rehabilitate Bridges assumes a 25% increase in costs for the Roadway, Railroad, Drainage, and Transit components of the work due to increased complications, extradorinary engineering and construction methods, greater work limits, and longer construction schedule over Replacement alternatives.

7.) Alternative 3, Build on New Location assumes the following: aprox. 5 times the Roadway costs, 4 times the Transit costs, and a 25% increase in costs for the Railroad and Drainage components of the work due to increased scope, impacts, and schedule for new alignments when compared to the Replacement alternatives.

Alt. #2 - Rehabilitate Bridges

MIDDLEBURY WCRS(23)
CONSTRUCTION COST ESTIMATE
VHB PROJECT NUMBER: 57603

CALCULATED BY: J.J. WESTCOTT
DATE: 5/23/2013
CHECKED BY: B. RICHARD

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNITS	UNIT COST	COST
STRUCTURAL COSTS					
204.25	STRUCTURAL EXCAVATION	9000	CY	$12.00	$108,000.00
204.30	GRANULAR BACKFILL	19600	CY	$30.00	$588,000.00
514.10	WATER REPELLENT SILANE	68	GAL	$65.69	$4,466.92
529.10	REMOVAL OF BRIDGE PAVEMENT	1792	SY	$10.00	$17,920.00
529.15	REMOVAL OF STRUCTURE (2757 SF)	2	EA	$125,000.00	$250,000.00
540.10	PRECAST CONCRETE SUPERSTRUCTURE	290	LF	$8,205.00	$2,379,450.00
540.10	CAST-IN-PLACE CONCRETE SUB-STRUCTURE	290	LF	$18,500.00	$5,365,000.00
602.35	TEMPORARY SUPPORT OF STONE MASONRY	300	LF	$6,250.00	$1,875,000.00
-	COFFERDAM / SUPPORT OF EXCAVATION	25000	SF	$45.00	$1,125,000.00
				SUBTOTAL:	**$ 11,712,836.92**
	MOBILIZATION / DEMOBILIZATION (8%)				$ 937,026.95
	TRAFFIC CONTROL (10%)				$ 1,171,283.69
	CONTINGENCIES (25%)				$ 2,928,209.23
				CONSTRUCTION TOTAL:	**$ 16,749,356.79**
	ENGINEERING & ENVIRONMENTAL PERMITTING (10%)				$ 819,898.58
	CONSTRUCTION ADMINISTRATION/INSPECTION (12%)				$ 1,405,540.43
				ENG & ENV PERMITTING TOTAL:	$ 2,225,439.01
	RIGHT-OF-WAY EASEMENT & ACQUISITIONS				$ 250,000.00
	UTILITY RELOCATIONS				$ 225,000.00
				ROW & UTILITIES TOTAL:	$ 475,000.00
				ALTERNATIVE TOTAL:	**$ 19,449,795.80**

Alt. #3 - Build on New Location

MIDDLEBURY WCRS(23)
CONSTRUCTION COST ESTIMATE
VHB PROJECT NUMBER: 57603

CALCULATED BY: J.J. WESTCOTT
DATE: 5/23/2013
CHECKED BY: B. RICHARD

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNITS	UNIT COST	COST
STRUCTURAL COSTS					
204.25	STRUCTURAL EXCAVATION	18000	CY	$12.00	$216,000.00
204.30	GRANULAR BACKFILL	28000	CY	$30.00	$840,000.00
514.10	WATER REPELLENT SILANE	170	GAL	$65.69	$11,167.30
529.10	REMOVAL OF BRIDGE PAVEMENT	4480	SY	$10.00	$44,800.00
529.15	REMOVAL OF STRUCTURE (3000 SF)	2	EA	$75,000.00	$150,000.00
540.10	PRECAST CONCRETE STRUCTURE (PRECAST CONCRETE U WALL)*	580	LF	$8,205.00	$4,758,900.00
540.10	PRECAST CONCRETE STRUCTURE (PRECAST CONCRETE BOX)**	315	LF	$14,966.00	$4,714,290.00
602.35	REBUILT STONE MASONRY***	800	CY	$654.00	$523,200.00
-	COFFERDAM / SUPPORT OF EXCAVATION	25000	SF	$25.00	$625,000.00
	*ASSUME ADDITIONAL WALL NEEDED WHERE TRACK IS LOWERED BETWEEN EXISTING AND NEW BRIDGES.				
	**ASSUME LONGER STRUCTURES NEEDED IN NEW BRIDGE LOCATIONS TO ACOCUNT FOR SKEW AND HORIZONTAL CURVE IN BOTH APPROACH ROADWAY ALIGNMENTS.				
	***ASSUME SIGNIFICANT REBUILDING OF MASONRY DUE TO TRACK LOWERING THROUGH PROJECT LIMITS.				
				SUBTOTAL:	**$ 11,883,357.30**
	MOBILIZATION / DEMOBILIZATION (10%)				$ 1,188,335.73
	TRAFFIC CONTROL (15%)				$ 1,782,503.60
	CONTINGENCIES (25%)				$ 2,970,839.33
				CONSTRUCTION TOTAL:	**$ 17,825,035.96**
	ENGINEERING & ENVIRONMENTAL PERMITTING (10%)				$ 831,835.01
	CONSTRUCTION ADMINISTRATION/INSPECTION (12%)				$ 1,426,002.88
				ENG & ENV PERMITTING TOTAL:	$ 2,257,837.89
	RIGHT-OF-WAY EASEMENT & ACQUISITIONS				$ 1,250,000.00
	UTILITY RELOCATIONS				$ 1,125,000.00
				ROW & UTILITIES TOTAL:	$ 2,375,000.00
				ALTERNATIVE TOTAL:	**$ 22,457,873.85**

Alt. #4 - Replace with Two Bridges

MIDDLEBURY WCRS(23)
CONSTRUCTION COST ESTIMATE
VHB PROJECT NUMBER: 57603

CALCULATED BY: J.J. WESTCOTT
DATE: 5/23/2013
CHECKED BY: B. RICHARD

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNITS	UNIT COST	COST
STRUCTURAL COSTS					
204.25	STRUCTURAL EXCAVATION	1800	CY	$12.00	$21,600.00
204.30	GRANULAR BACKFILL	2800	CY	$30.00	$84,000.00
514.10	WATER REPELLENT SILANE	17	GAL	$65.69	$1,116.73
529.10	REMOVAL OF BRIDGE PAVEMENT	448	SY	$10.00	$4,480.00
529.15	REMOVAL OF STRUCTURE (4757 SF)	2	EA	$100,000.00	$200,000.00
540.10	PRECAST CONCRETE STRUCTURE (PRECAST CONCRETE U WALL)	290	LF	$8,205.00	$2,379,450.00
540.10	PRECAST CONCRETE STRUCTURE (PRECAST CONCRETE BOX)	210	LF	$14,966.00	$3,142,860.00
602.35	REBUILT STONE MASONRY	400	CY	$654.00	$261,600.00
-	COFFERDAM / SUPPORT OF EXCAVATION	10000	SF	$25.00	$250,000.00
				SUBTOTAL:	**$ 6,345,106.73**
	MOBILIZATION / DEMOBILIZATION (8%)				$ 507,608.54
	TRAFFIC CONTROL (5%)				$ 317,255.34
	CONTINGENCIES (20%)				$ 1,269,021.35
				CONSTRUCTION TOTAL:	**$ 8,438,991.96**
	ENGINEERING & ENVIRONMENTAL PERMITTING (5%)				$ 317,255.34
	CONSTRUCTION ADMINISTRATION/INSPECTION (10%)				$ 634,510.67
				ENG & ENV PERMITTING TOTAL:	$ 951,766.01
	RIGHT-OF-WAY EASEMENT & ACQUISITIONS				$ 200,000.00
	UTILITY RELOCATIONS				$ 175,000.00
				ROW & UTILITIES TOTAL:	$ 375,000.00
				ALTERNATIVE TOTAL:	**$ 9,765,757.97**

Alt. #5 - Replace with Tunnel

MIDDLEBURY WCRS(23)
CONSTRUCTION COST ESTIMATE
VHB PROJECT NUMBER: 57603

CALCULATED BY: J.J. WESTCOTT
DATE: 5/23/2013
CHECKED BY: B. RICHARD

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNITS	UNIT COST	COST
STRUCTURAL COSTS					
204.25	STRUCTURAL EXCAVATION	1800	CY	$12.00	$21,600.00
204.30	GRANULAR BACKFILL	2800	CY	$30.00	$84,000.00
514.10	WATER REPELLENT SILANE	17	GAL	$65.69	$1,116.73
529.10	REMOVAL OF BRIDGE PAVEMENT	448	SY	$10.00	$4,480.00
529.15	REMOVAL OF STRUCTURE (4757 SF)	2	EA	$100,000.00	$200,000.00
540.10	PRECAST CONCRETE STRUCTURE (PRECAST CONCRETE U WALL)	155	LF	$7,923.00	$1,228,065.00
540.10	PRECAST CONCRETE STRUCTURE (PRECAST CONCRETE BOX)	345	LF	$14,965.00	$5,162,925.00
602.35	REBUILT STONE MASONRY	400	CY	$654.00	$261,600.00
-	COFFERDAM / SUPPORT OF EXCAVATION	16000	SF	$25.00	$400,000.00
				SUBTOTAL:	**$ 7,363,786.73**
	MOBILIZATION / DEMOBILIZATION (8%)				$ 589,102.94
	TRAFFIC CONTROL (5%)				$ 368,189.34
	CONTINGENCIES (20%)				$ 1,472,757.35
				CONSTRUCTION TOTAL:	**$ 9,793,836.36**
	ENGINEERING & ENVIRONMENTAL PERMITTING (5%)				$ 368,189.34
	CONSTRUCTION ADMINISTRATION/INSPECTION (10%)				$ 736,378.67
				ENG & ENV PERMITTING TOTAL:	$ 1,104,568.01
	RIGHT-OF-WAY EASEMENT & ACQUISITIONS				$ 225,000.00
	UTILITY RELOCATIONS				$ 200,000.00
				ROW & UTILITIES TOTAL:	$ 425,000.00
				ALTERNATIVE TOTAL:	**$ 11,323,404.37**

Alt. #3 or #4 - Roadway Costs

MIDDLEBURY WCRS(23)
CONSTRUCTION COST ESTIMATE
VHB PROJECT NUMBER: 57603

CALCULATED BY: D. Peck
DATE:
CHECKED BY:

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNITS	UNIT COST	COST
ROADWAY COSTS					
203.15	COMMON EXCAVATION	1400	CY	$13.87	$19,418.00
203.16	SOLID ROCK EXCAVATION	30	CY	$14.17	$425.10
210.10	COLD PLANING, BITUMINOUS PAVEMENT	4700	SY	$8.74	$41,078.00
301.26	SUBBASE OF CRUSHED GRAVEL, FINE GRADED	220	CY	$53.50	$11,770.00
301.35	SUBBASE OF DENSE GRADED CRUSHED STONE	850	CY	$36.22	$30,787.00
406.25	BITUMINOUS CONCRETE PAVEMENT	850	TON	$127.17	$108,094.50
616.28	CAST-IN-PLACE CONCRETE CURB, TYPE B	1500	LF	$18.71	$28,065.00
618.10	PORTLAND CEMENT CONCRETE SIDEWALK, 5 INCH	970	SY	$40.11	$38,906.70
				SUBTOTAL:	**$ 278,544.30**
	MOBILIZATION / DEMOBILIZATION (8%)				$ 22,283.54
	TRAFFIC CONTROL (10%)				$ 27,854.43
	CONTINGENCIES (20%)				$ 55,708.86
				CONSTRUCTION TOTAL:	**$ 384,391.13**
	ENGINEERING & ENVIRONMENTAL PERMITTING (5%)				$ 13,927.22
	CONSTRUCTION ADMINISTRATION/INSPECTION (10%)				$ 27,854.43
				ENG & ENV PERMITTING TOTAL:	$ 41,781.65
	RIGHT-OF-WAY EASEMENT & ACQUISITIONS				$ 50,000.00
	UTILITY RELOCATIONS				$ 125,000.00
				ROW & UTILITIES TOTAL:	$ 175,000.00
				ALTERNATIVE TOTAL:	**$ 601,172.78**

Alt. #3 or #4 - Railroad Costs

MIDDLEBURY WCRS(23)
CONSTRUCTION COST ESTIMATE
VHB PROJECT NUMBER: 57603

CALCULATED BY: J.J. WESTCOTT
DATE: 5/23/2013
CHECKED BY: B. RICHARD

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNITS	UNIT COST	COST
RAILROAD COSTS					
203.16	SOLID ROCK EXCAVATION	1800	CY	$150.00	$270,000.00
203.17	UNCLASSIFIED EXCAVATION	38500	CY	$19.00	$731,500.00
630.20	FLAGGERS, RAILROAD	2000	HR	$75.00	$150,000.00
649.21	GEOTEXTILE UNDER RAILROAD BALLAST	7469	SY	$4.00	$29,876.00
900.608	SPECIAL PROVISION (DISPOSAL OF CONTAMINATED SOIL)	16072	CY	$5.00	$80,360.00
900.620	SPECIAL PROVISION:	3189	EACH	$75.00	$239,175.00
	CROSSTIE PROGRAM FOR EXISTING TRACK, 33% REPLACEMENT				(included)
	REMOVE EXISTING TRACK				(included)
	CONSTRUCT TRACK, 115 LB CWR				(included)
	FINAL SURFACE, ALIGN, DESTRESS CWR				(included)
900.620	SPECIAL PROVISION (THERMITE FIELD WELDS)	10	EACH	$2,500.00	$25,000.00
900.680	SPECIAL PROVISION (BALLAST)	5772	TON	$40.00	$230,880.00
-	SUPPORT OF EXCAVATION	1	LS	$200,000.00	$200,000.00
-	MISC. SLOPE PROTECTION	1	LS	$125,000.00	$125,000.00
-	MISC. RETAINING WALLS	1	LS	$175,000.00	$175,000.00
				SUBTOTAL:	**$ 2,256,791.00**
	MOBILIZATION / DEMOBILIZATION (8%)				$ 180,543.28
	TRAFFIC CONTROL (5%)				$ 112,839.55
	CONTINGENCIES (25%)				$ 564,197.75
				CONSTRUCTION TOTAL:	**$ 3,114,371.58**
	ENGINEERING & ENVIRONMENTAL PERMITTING (5%)				$ 112,839.55
	CONSTRUCTION ADMINISTRATION/INSPECTION (10%)				$ 225,679.10
				ENG & ENV PERMITTING TOTAL:	$ 338,518.65
	RIGHT-OF-WAY EASEMENT & ACQUISITIONS				$ 150,000.00
	UTILITY RELOCATIONS				$ 175,000.00
				ROW & UTILITIES TOTAL:	$ 325,000.00
				ALTERNATIVE TOTAL:	**$ 3,777,890.23**

Alt. #3 or #4 - Drainage Costs

MIDDLEBURY WCRS(23)
CONSTRUCTION COST ESTIMATE
VHB PROJECT NUMBER: 57603

CALCULATED BY:
DATE:
CHECKED BY:

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNITS	UNIT COST	COST
DRAINAGE COSTS: ALL GRAVITY FLOW NORTH					
203.16	SOLID ROCK EXCAVATION	750	CY	$90.00	$67,500.00
204.20	TRENCH EXCAVATION OF EARTH	15000	CY	$18.50	$277,500.00
204.30	GRANULAR BACKFILL FOR STRUCTURES	2100	CY	$35.29	$74,109.00
301.15	SUBBASE OF GRAVEL (UNDERDRAIN)	341	CY	$25.56	$8,715.96
601.2615	18" CPEP(SL)	173	LF	$45.00	$7,785.00
601.2620	24" CPEP(SL)	452	LF	$50.00	$22,600.00
602.2625	30" CPEP(SL)	410	LF	$85.00	$34,850.00
604.10	CONCRETE CATCH BASIN WITH CAST IRON GRATE	25	EACH	$5,500.00	$137,500.00
604.21	PRECAST REINFORCED CONCRETE MANHOLE WITH CAST IRON COVER	4.2	EACH	$4,000.00	$16,800.00
625.10	SLEEVES FOR UTILITIES (3 X 18")	63	LF	$95.00	$5,985.00
625.10	SLEEVES FOR UTILITIES (4 X 12")	94.5	LF	$85.00	$8,032.50
628.35	PVC SEWER PIPE (24")	52.5	LF	$80.00	$4,200.00
628.35	PVC SEWER PIPE (8")	183.75	LF	$60.00	$11,025.00
628.35	PVC SEWER PIPE (6")	315	LF	$48.59	$15,305.85
628.35	PVC SEWER PIPE (2")	84	LF	$48.59	$4,081.56
629.23	SEAMLESS COPPER WIRE TUBE (1")	42	LF	$45.00	$1,890.00
629.24	DUCTILE IRON PIPE, CEMENT-LINED (15")	577.5	LF	$90.00	$51,975.00
629.24	DUCTILE IRON PIPE, CEMENT-LINED (12")	162.75	LF	$100.00	$16,275.00
629.27	GATE VALVE WITH VALVE BOX (8")	1.05	EACH	$1,250.00	$1,312.50
630.20	FLAGGERS, RAILROAD	210	HR	$57.29	$12,030.90
900.620	SPECIAL PROVISION (SANITARY SEWER: PRIVATE-SERVICE PUMP STATION)	1.05	EACH	$25,000.00	$26,250.00
900.640	SPECIAL PROVISION (8" PERFORATED STEEL DRAIN PIPE (UNDERDRAIN))	525	LF	$95.00	$49,875.00
900.640	SPECIAL PROVISION (6" PERFORATED STEEL DRAIN PIPE (UNDERDRAIN))	525	LF	$80.00	$42,000.00
				SUBTOTAL:	**$ 897,598.27**
	MOBILIZATION / DEMOBILIZATION (8%)				$ 71,807.86
	TRAFFIC CONTROL (5%)				$ 44,879.91
	CONTINGENCIES (25%)				$ 224,399.57
				CONSTRUCTION TOTAL:	**$ 1,238,685.61**
	ENGINEERING & ENVIRONMENTAL PERMITTING (10%)				$ 89,759.83
	CONSTRUCTION ADMINISTRATION/INSPECTION (10%)				$ 89,759.83
				ENG & ENV PERMITTING TOTAL:	$ 179,519.66
	RIGHT-OF-WAY EASEMENT & ACQUISITIONS				$ 225,000.00
	UTILITY RELOCATIONS				$ -
				ROW & UTILITIES TOTAL:	$ 225,000.00
				ALTERNATIVE TOTAL:	**$ 1,643,205.27**

Alt. #3 or #4 - Transit Costs

MIDDLEBURY WCRS(23)
CONSTRUCTION COST ESTIMATE
VHB PROJECT NUMBER: 57603

CALCULATED BY: J.J. WESTCOTT
DATE: 5/23/2013
CHECKED BY: B. RICHARD

ITEM NO.	ITEM DESCRIPTION	QUANTITY	UNITS	UNIT COST	COST
TRANSIT COSTS: TEMPORARY RELOCATION ON S. PLEASANT ST.					
406.25	BITUMINOUS CONCRETE PAVEMENT	0	TON	$127.17	$0.00
604.40	CHANGING ELEVATION OF DROP INLETS, CATCH BASINS, OR MANHOLES	1	EACH	$839.97	$839.97
616.21	VERTICAL GRANITE CURB	640	LF	$28.28	$18,099.20
618.10	PORTLAND CEMENT CONCRETE SIDEWALK, 5 INCH	145	SY	$40.11	$5,815.95
				SUBTOTAL:	**$ 24,755.12**
	MOBILIZATION / DEMOBILIZATION (8%)				$ 1,980.41
	TRAFFIC CONTROL (5%)				$ 1,237.76
	CONTINGENCIES (15%)				$ 3,713.27
				CONSTRUCTION TOTAL:	**$ 31,686.56**
	ENGINEERING & ENVIRONMENTAL PERMITTING (5%)				$ 1,237.76
	CONSTRUCTION ADMINISTRATION/INSPECTION (10%)				$ 2,475.51
				ENG & ENV PERMITTING TOTAL:	$ 3,713.27
	RIGHT-OF-WAY EASEMENT & ACQUISITIONS				$ 15,000.00
	UTILITY RELOCATIONS				$ 10,000.00
				ROW & UTILITIES TOTAL:	$ 25,000.00
				ALTERNATIVE TOTAL:	**$ 60,399.83**

8

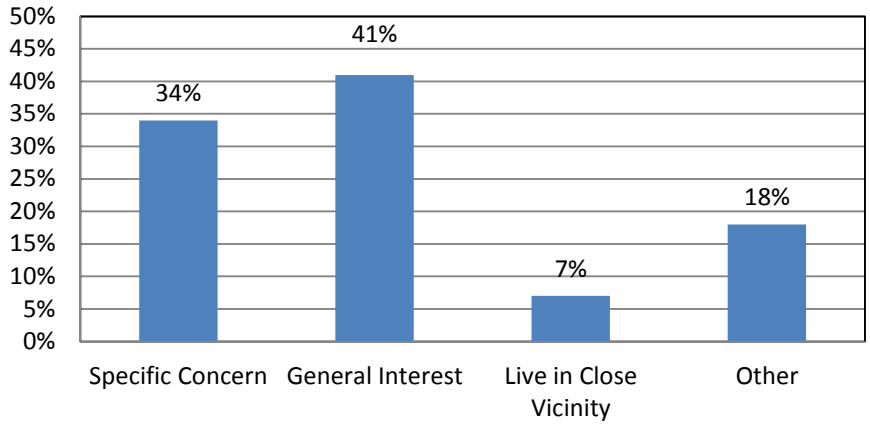
Public Survey Results

Middlebury Main Street and Merchants Row Bridge Replacements
Middlebury WCRS(23)

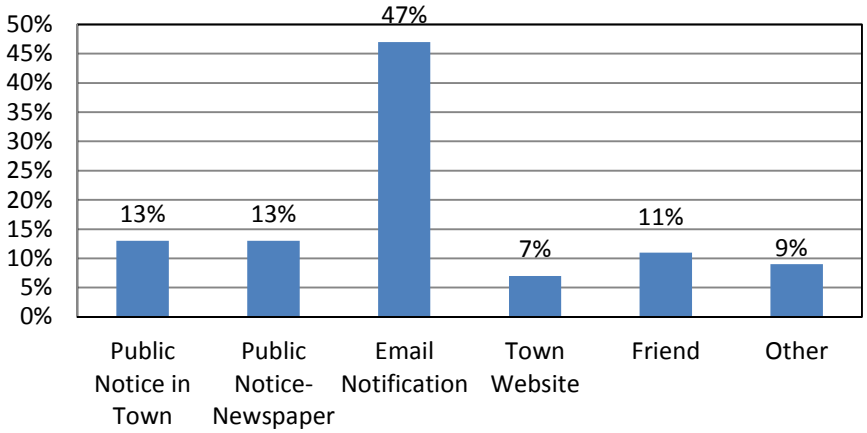
Local Concerns Meeting - Audience Survey
Town Hall Theater, Middlebury, VT

March 28, 2013
6:00 PM

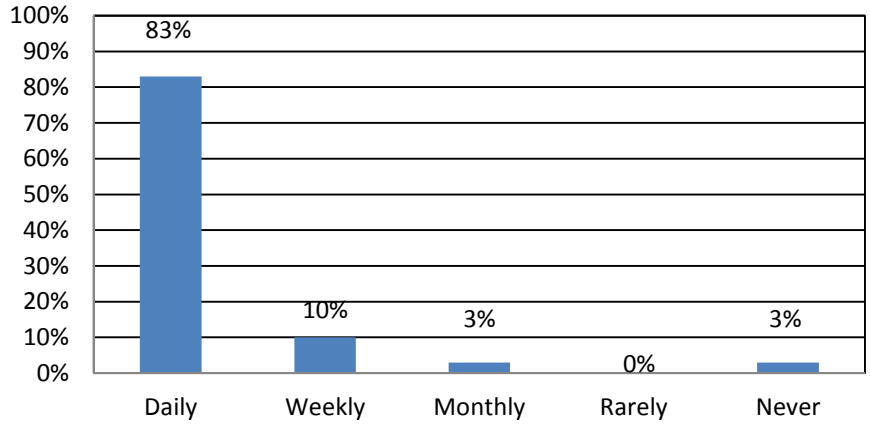
1. What is your reason for attending this meeting?



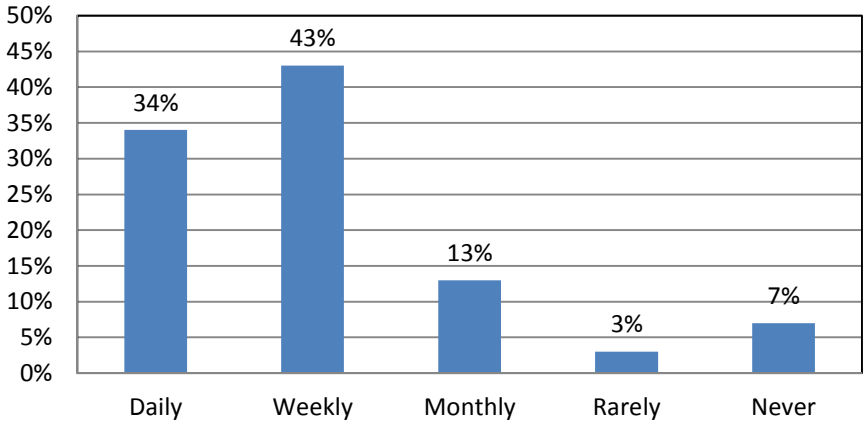
2. How did you hear about this meeting?



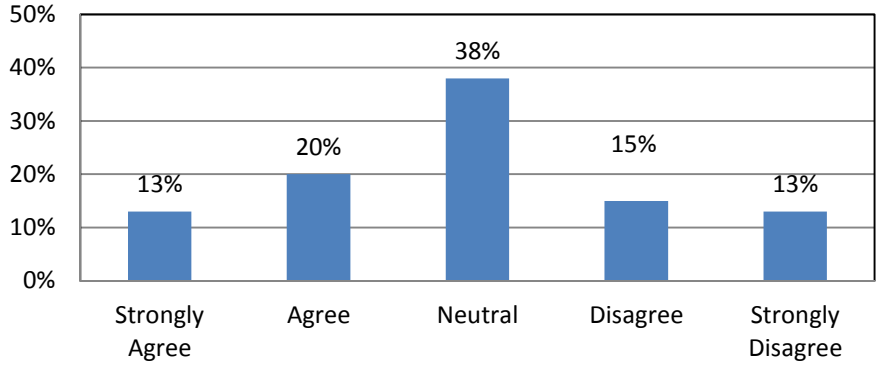
3. How often do you drive across the bridges?



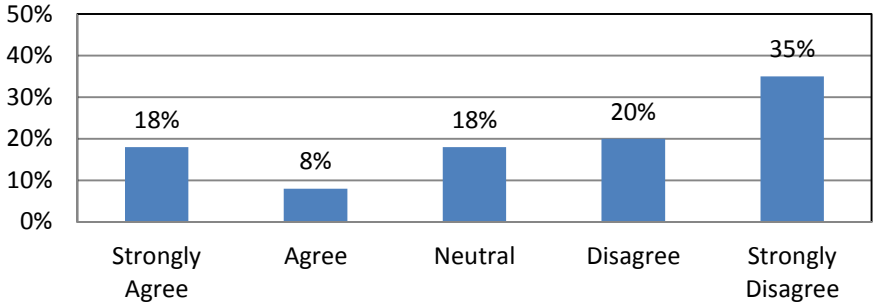
4. How often do you walk/bike across the bridges?



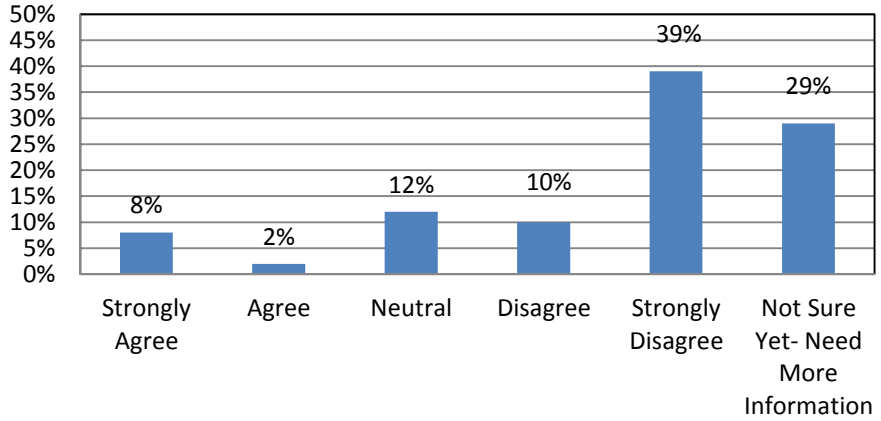
5. If one bridge was closed for construction, I would be inconvenienced.



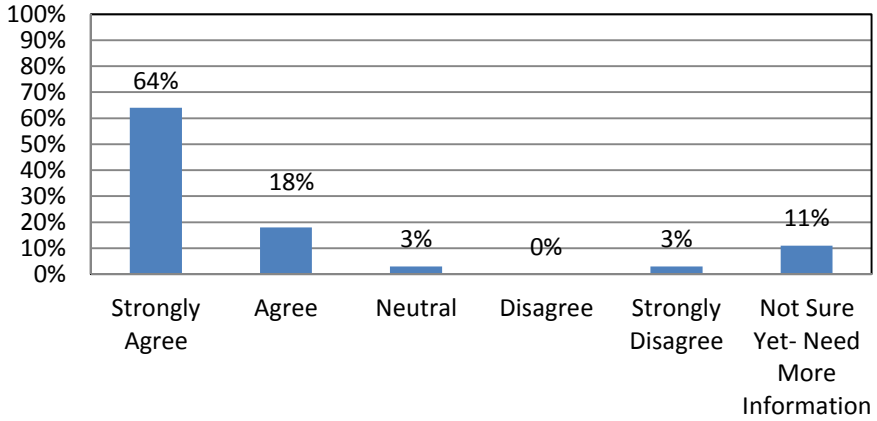
6. The railroad bridges and stone walls are an important contribution to the aesthetics of the downtown area.



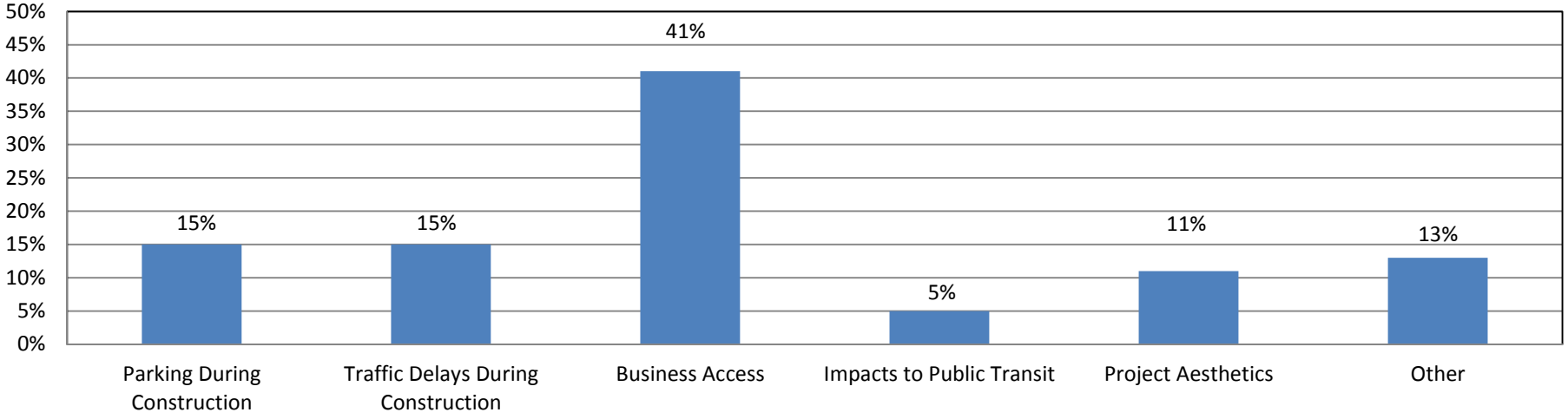
7. I support the idea of keeping two separate bridges.



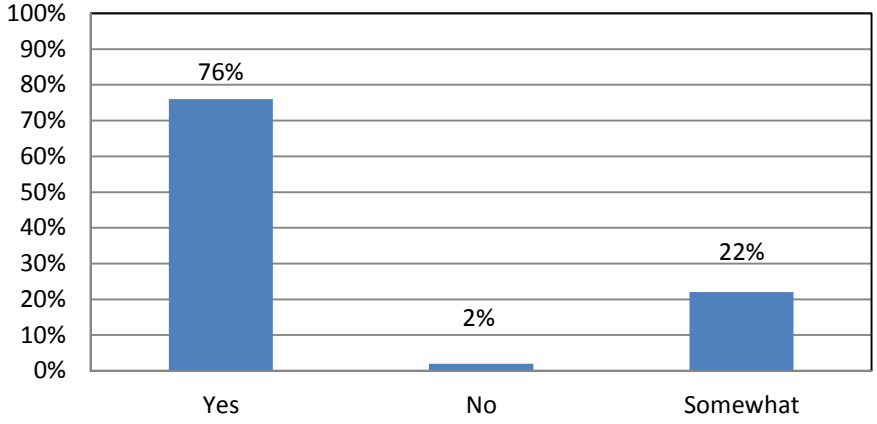
8. I support the idea of a tunnel concept.



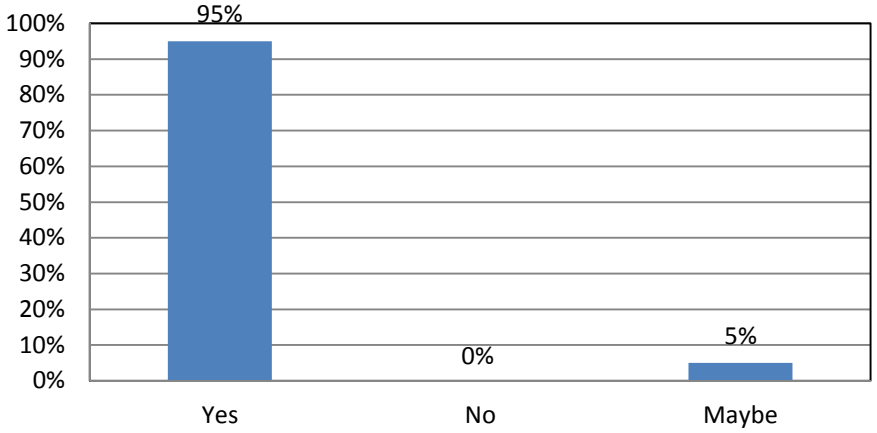
9. Which are you most concerned about?



10. Was this meeting helpful to you?



11. Do you plan on attending the Alternatives Presentation Meeting?

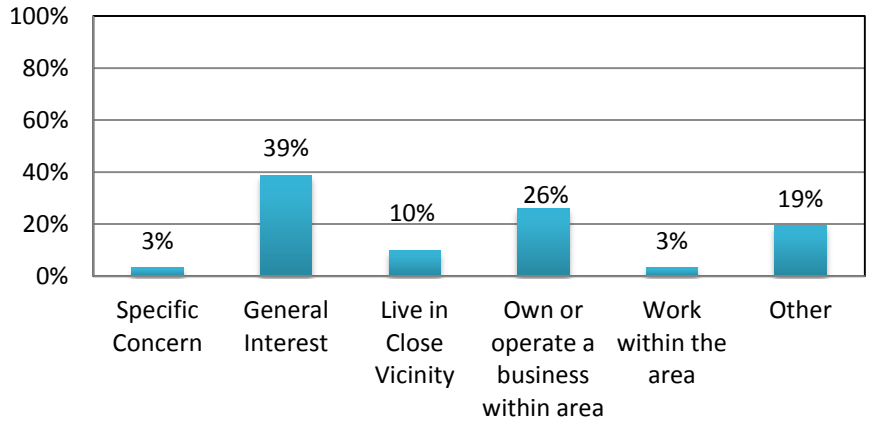


Middlebury Main Street and Merchants Row Bridge Project
Middlebury WCRS(23)

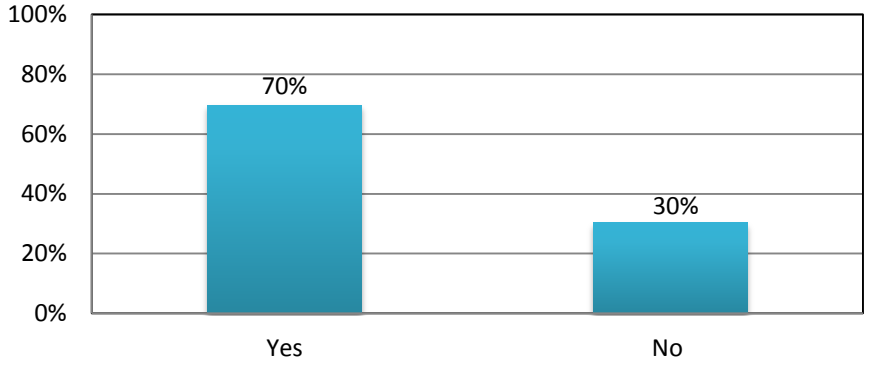
Alternatives Presentation Meeting - Audience Survey
Twilight Hall Auditorium, Middlebury, VT

June 4, 2013
6:00 PM

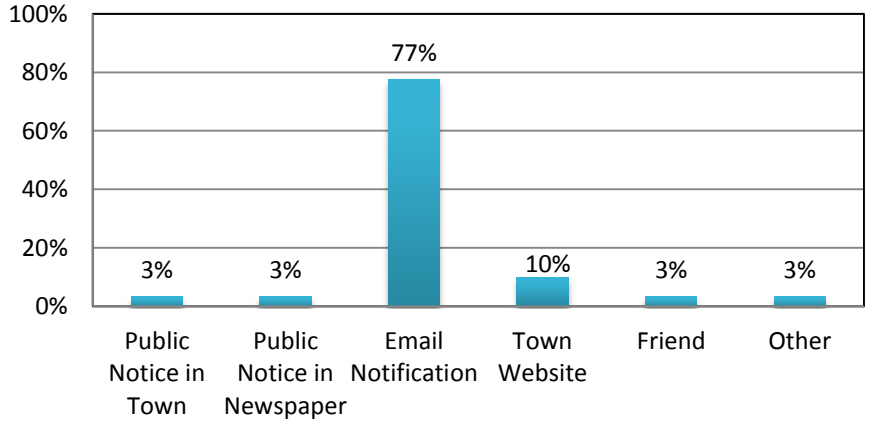
1. What is your primary reason for attending this meeting?



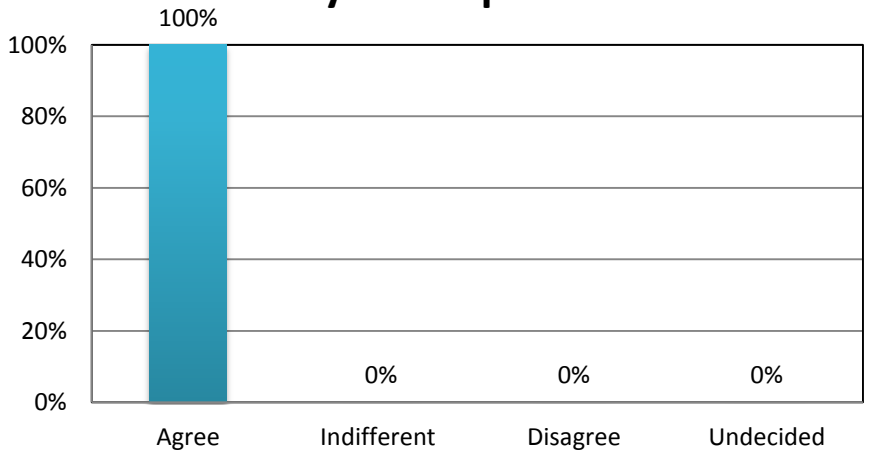
2. Did you attend the March 28, 2013 Local Concerns Public Meeting?



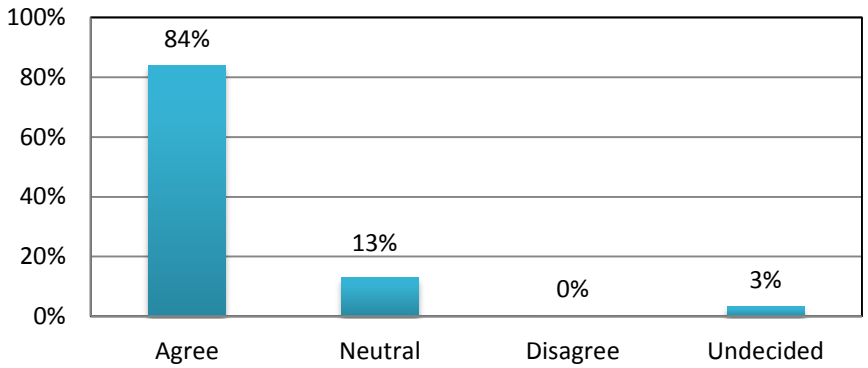
3. How did you hear about this meeting?



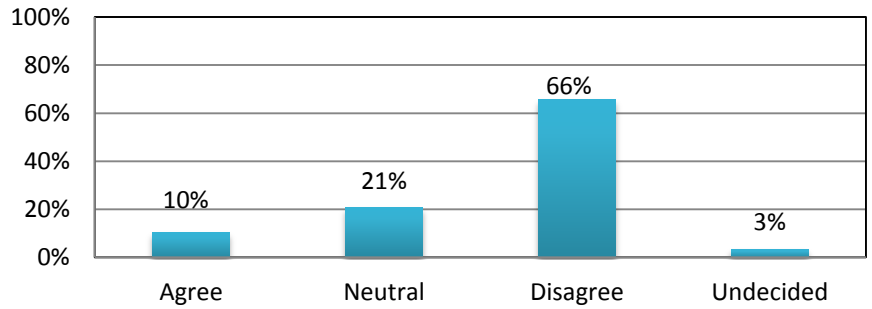
4. The aesthetics of Downtown Middlebury are important to me.



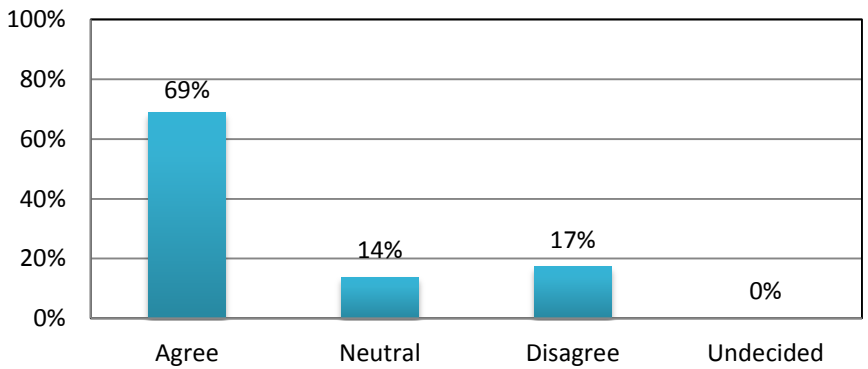
5. I feel Triangle Park is an important historic feature of Downtown Middlebury



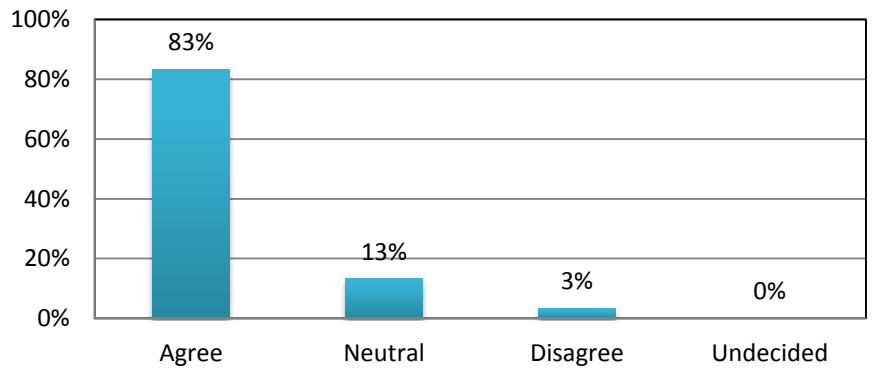
6. I feel the noise from passing trains between the bridges detracts from the historic nature of Downtown Middlebury.



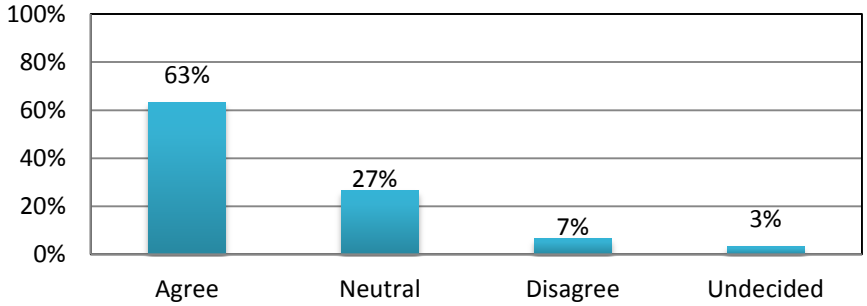
7. I feel minimizing impacts to the Downtown area should be a primary concern of this project.



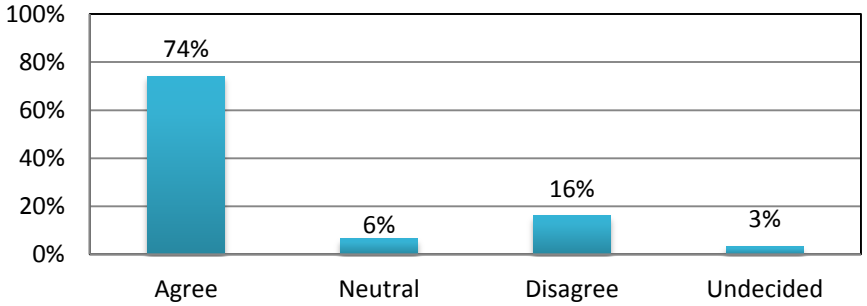
8. I feel unifying Triangle Park with the Town Green will increase the use of the space.



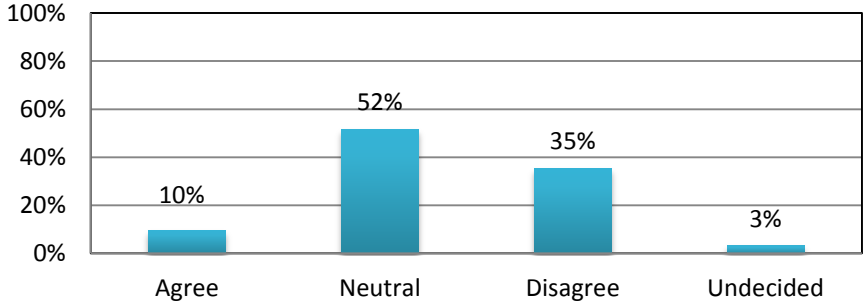
9. I feel connecting Triangle Park and the Town Green will improve the events that are held there, such as Festival on the Green.



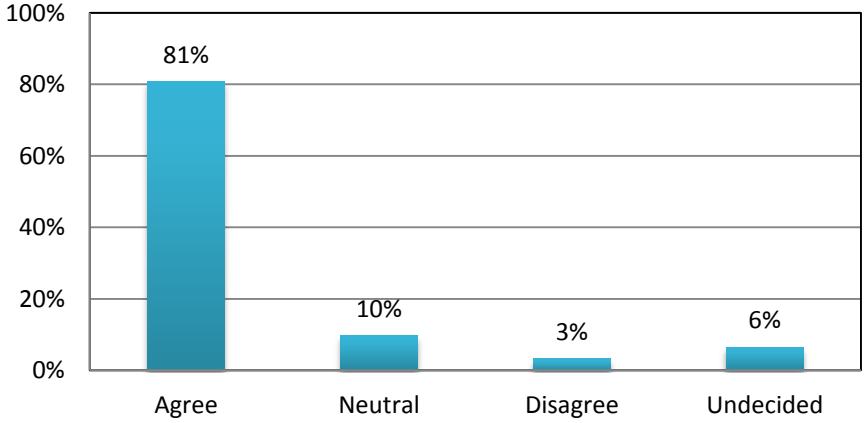
10. I feel the tunnel alternative will have a positive impact on the public spaces in historic Downtown Middlebury.



11. I feel the two bridges alternative will have a positive impact on the public spaces in historic Downtown Middlebury.



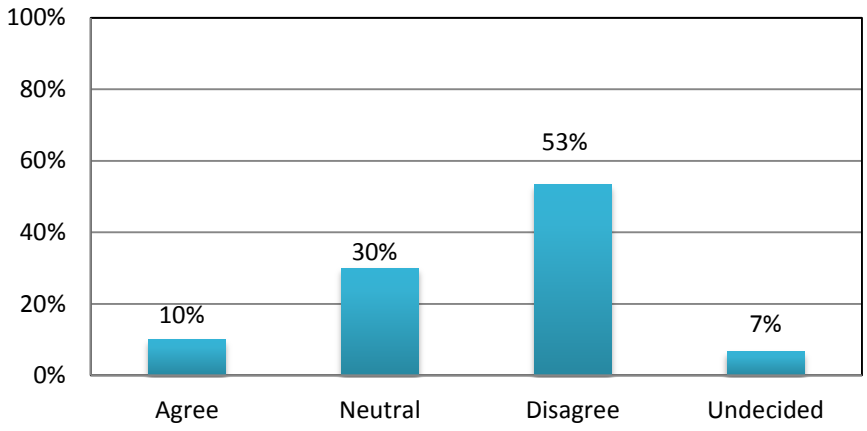
12. I support the tunnel alternative.



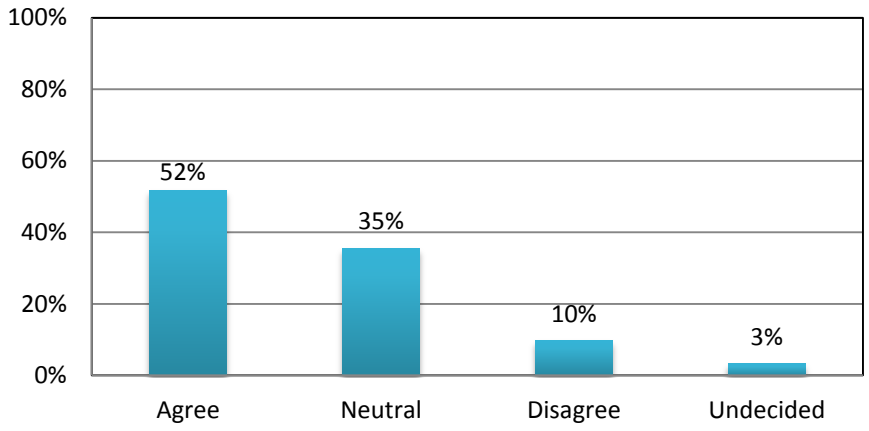
Middlebury Main Street and Merchants Row Bridge Project
Middlebury WCRS(23)

Alternatives Presentation Meeting - Audience Survey
Twilight Hall Auditorium, Middlebury, VT

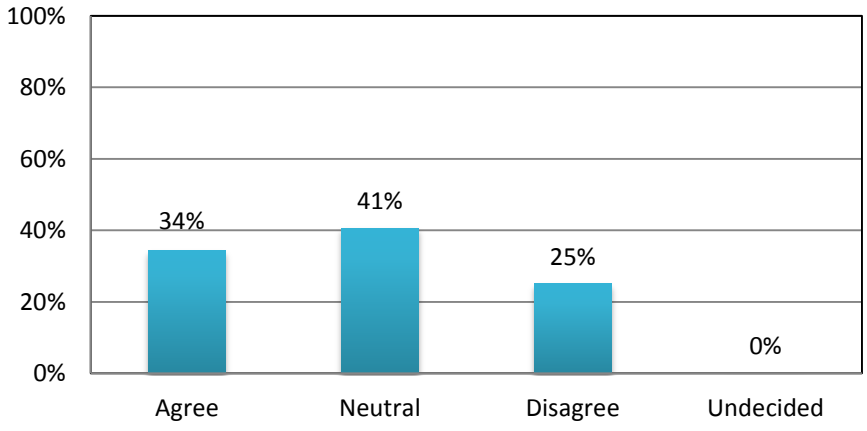
13. I support the two bridges alternative.



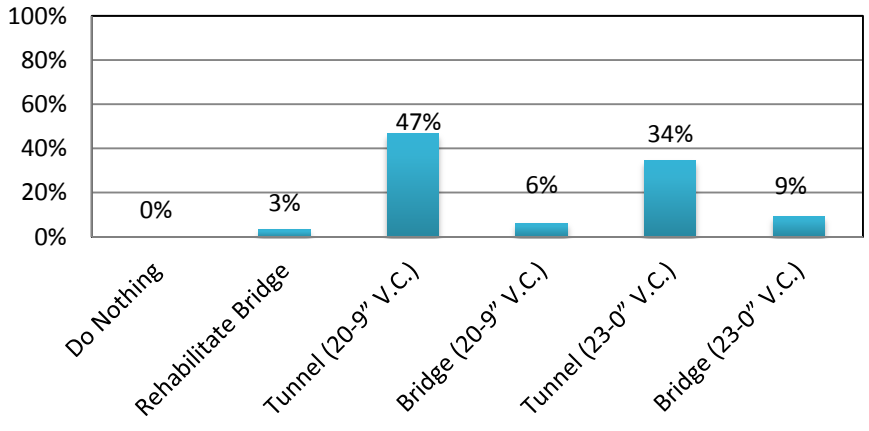
14. I support the 20' - 9" vertical clearance goal.



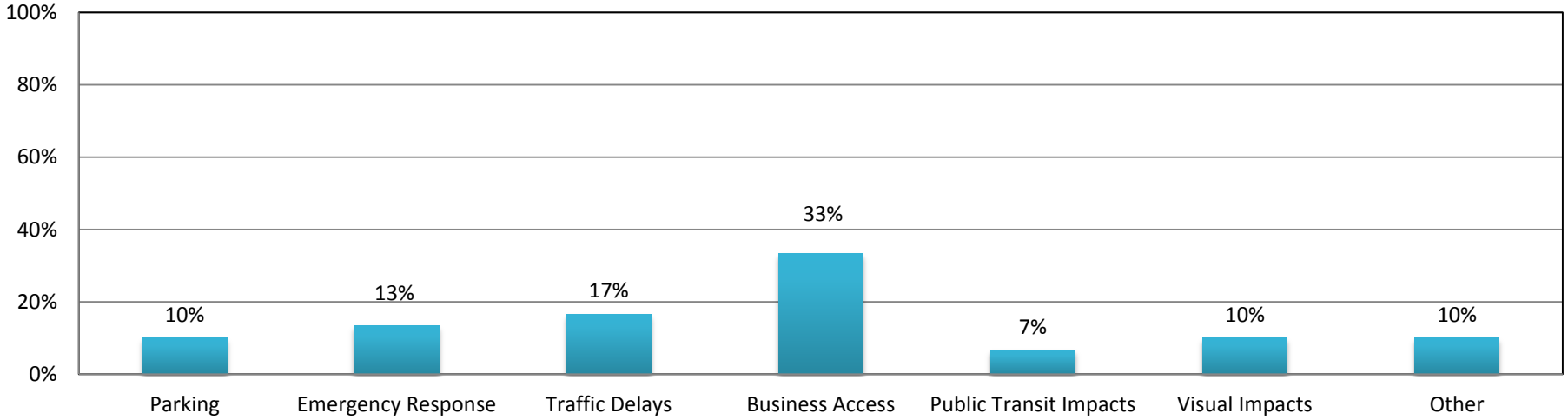
15. I support the 23' - 0" vertical clearance goal.



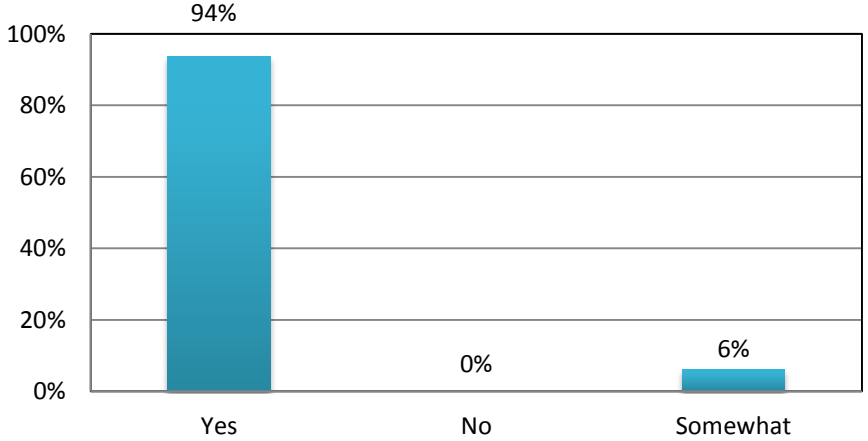
16. I support the following alternative:



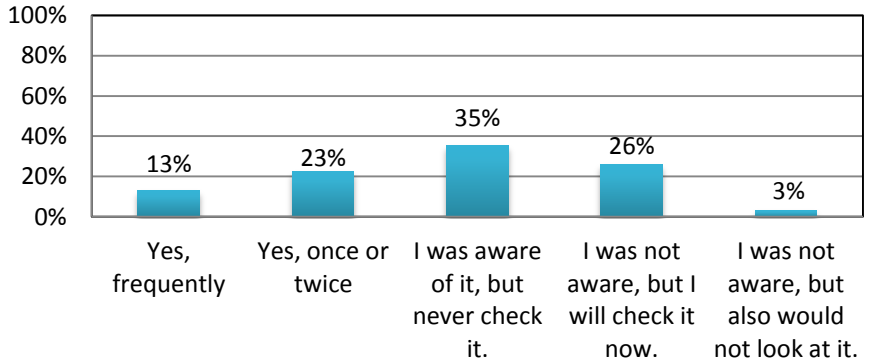
17. Which are you most concerned about during construction?



18. Was this meeting helpful to you?



19. Have you looked at MiddleburyBridges.org for project updates?



9

Town's Letter of Support

TOWN of MIDDLEBURY
94 Main Street
Middlebury, Vermont 05753

July 15, 2013

Patti Coburn, P.E.
VTrans Local Transportation Facilities Project Manager
Vermont Agency of Transportation
1 National Life Drive
Montpelier, VT 05633-5001

Re: Middlebury WCRS(23) Highway Bridge Replacements over Vermont Railway

Dear Ms. Coburn,

We are pleased and impressed at the rapid progress being made on this critical project. The highway bridges spanning Vermont Railway on Merchants Row and Main Street in downtown Middlebury have long passed their useful life. The bridges' deterioration is well documented in VTrans safety inspection reports for many years. The challenge now is to accelerate the planning, design and construction process to foreclose the potential for bridge failure and the potential ensuing public safety and economic cataclysm.

The public presentation of alternatives on June 4 showed clearly how innovative engineering, design and construction can ameliorate the short-term challenges of maintaining rail traffic and commercial access throughout a relatively short construction period. More importantly the option of constructing a tunnel, rather than two separate bridges with a very short distance between them, could reduce the state's long-term operation and maintenance cost. At the same time, the tunnel will restore the Town Green to its original form by removing the unsightly gash of the railroad cut and replacing it with usable public space.

This project is the first VTrans Construction Manager/General Contractor (CMGC) in the state and provides a great opportunity to demonstrate how highly complex and sometimes daunting projects can be effectively managed for creative solutions in record time. We appreciate the trust VTrans has placed in the Town of Middlebury to move this project to completion next year. We <u>strongly</u> endorse the tunnel option as the best and most efficient solution to address the VTrans, VT Railway and Town of Middlebury needs.

Therefore, in accordance with Attachment E, item #5 of the cooperative agreement between the Town and the Agency, the Town is requesting VTrans' concurrence on the Town's choice of the tunnel as the preferred alternative.

We look forward to continued cooperation to make this project an exemplary success.

Sincerely,

Middlebury Selectboard

Nick Artim Dean George, Chair Victor Nuovo

Craig Bingham Travis Forbes Gary Baker Susan Shashok

Cc: Dan Delabruere, VTrans Rail Program Director
Mark Richter, Federal Highway Administration

VHB

www.vhb.com