STATE OF VERMONT
AGENCY OF TRANSPORTATION

Scoping Report

FOR

Swanton BF 036-1(16)

VT ROUTE 78, BRIDGE 6 OVER MISSISQUOI RIVER

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I. Site Information

Bridge 6 is a Town-owned bridge located on VT Route 78 in the Village of Swanton, 0.2 miles to the west of the junction of U.S. 7, located at mile point 6.60. The existing conditions were gathered from a site visit, the Bridge Inspection Report, the Route Log, and the VTrans Constructability Review of the site.

Roadway Classification	Rural Principal Arterial
Bridge Type	Stringer/Multi-beam or girder
Bridge Span	302 feet
Year Built	1966
Ownership	Village of Swanton

Need

Bridge 6 carries VT Route 78 over the Missisquoi River. The following is a list of the deficiencies of Bridge 6 and VT Route 78 at this location:

1. Both abutment joints have advanced deterioration, and the wearing surface has numerous potholes across the bridge. The latest inspection report states 'the joints have failed and are ineffective', and that the joint troughs have failed at multiple locations. The joints are scheduled to be repaired during the Summer of 2024 through a separate contract.

2. All beam ends at the abutments have significant rust. The downstream (north) fascia beam has significant rust on the bottom flange and lower web over the full length of the bridge.

3. The end diaphragms at both abutments have significant rust. The outer bay intermediate diaphragms have rusted through at scupper locations.

4. The abutment bearings have significant rust, and the pier bearings only have two anchor bolts.

5. The current bridge railings and all four approach guardrail transitions are substandard.

6. The deck drains along both the upstream and downstream sides have full perimeter perforations at the deck soffit, allowing leakage onto the structure below.

7. Pier 1 has undermining noted in the latest inspection report.

Traffic

The Vermont Agency of Transportation (VTrans) performed a traffic study of this site. The traffic volumes are projected for 2029 and 2049.

Traffic Data	2029	2049
AADT	9,498	10,263
DHV	1100	1200
ADTT	1074	1465
%T	6.1	7.7
%D	56	56

Design Criteria

The design standards for this bridge project are the Vermont State Standards (VSS), dated October 22, 1997, AASHTO's A Policy on Geometric Design of Highways and Streets, 7th Edition (AASHTO Green Book), and the VTrans Structures Design Manual, dated 2010, 5th edition. The minimum standards referenced in the following table are for a two-lane Rural Principal Arterial roadway based on a DHV of over 400 and a design speed of 35 mph.

Design Criteria	Source	Existing Condition	Minimum	Comment
Approach Lane and Shoulder Widths	VSS Table 3.3	11'/4' (30')	11'/8' (38')	Substandard[1]
Bridge Lane and Shoulder Widths	VSS Table 3.3	11'/4' (30')	11'/8' (38')	Substandard[1]
Clear Zone Distance	VSS Table 3.4	No issues noted	16' fill 1:4 / 14' cut 1:3 or 1:4	
Banking	VSS Section 3.13	e = 2%	8% (max)	
Speed	VSS Section 3.3	30 mph (Posted)	30 mph (Design)	
Horizontal Alignment	AASHTO Green Book Table 3-13	No curve over bridge, 1,400' radius curve on eastern approach, 1,100' radius curve on western approach	R=273' at 2% bank for 30 mph	
Vertical Grade	VSS Table 3.5	Bridge located on a curve with 3.145% grades	7% (max) for Rolling terrain	
K Values for Vertical Curves	AASHTO Green Book Tables 3-35 and 3-37	K=129.97	19 Crest 37 Sag	
Vertical Clearance Issues	NA	NA	NA	Over River
Stopping Sight Distance	VSS Table 3.1	Limited at intersection with US Route 7[2]	200'	
Bicycle/Pedestrian Criteria	VSS Table 3.7	4' shoulder, 5' sidewalk	3' Shoulder	
Bridge Railing	Design Manual Sect. 13 & VTrans Bridge Rail Policy	Two tier aluminum pipe with spindles	TL-4[3]	Substandard

Hydraulics	VSS Sect. 4.8	Unknown	Unknown	
Structural Capacity	Structures Design Manual, Ch. 3.4.1	Functionally Deficient, H20 Design Load	Design Live Load: HL-93	Substandard

[1] While Bridge 6 is classified as Rural Principal Arterial and requires 8'-0" shoulder per VSS Table 3.3, this requirement is not considered feasible due to the site constraints and the two (2) existing sidewalks on either side of the bridge. Therefore, all alternatives considered will keep 4'-0" shoulders. Footnote b in Table 3.3 of the VSS requires the addition of 2' to the shoulder width in guard rail areas on principal arterials where DHV is over 400 vph.
[2] Sight line issues exist at the intersection of VT Route 78 and US Route 7, just southeast of the bridge. However, the sight lines and stopping sight distances at the bridge are adequate.
[3] VT Route 78 is a part of the National Highway System and based on the posted speed and forecasted truck percentage a TL-4 is recommended.

Inspection Report Summary

The ratings provided below are from the most recent inspection performed on August 8, 2023.

Deck Rating	6 Satisfactory
Superstructure Rating	6 Satisfactory
Substructure Rating	6 Satisfactory
Channel Rating	8 Very Good

From the bridge inspection report:

"8/8/2023 Both bridge joints have some wood temporary form work in place due to failing joint plates. The steel support brackets that hold the joint in place has advanced corrosion and most of them are detached. Joint replacement is needed.

Structure is in fairly good condition. Sliding steel plates joints over both abutments are in need of replacement with troughs having failed in multiple locations with remaining sections left having heavy section loss. Both abutments bridge seats have heavy debris build up with up to ~12" of debris and sediment build up present. Deck drains throughout have been repaired with larger steel tube pipe allowing large perforation ring at the deck soffit allowing leakage to superstructure throughout. Drains should be replaced / repaired with steel drain pipe that extend below bottom flange of superstructure throughout. Superstructure at both abutments has minor rust scaling forming for last 3'-0" along the lower flanges and over bearing area from active joint leakage and needs to be cleaned, painted and grease coated to prevent any furth corrosion. Voids between footings and ledge along pier #1 should be filled in."

Hydraulics

There is currently no Hydraulic Memorandum available for this bridge. The hydraulic evaluation and potential impacts will depend on the alternative pursued. For a full bridge replacement, and/or maintenance of traffic using a temporary bridge, an in-depth hydraulic

analysis will need to be performed. For the superstructure replacement alternative, a hydraulic recommendation for the proposed low chord elevation will be required. Additionally, impacts to hydraulics will need to be considered for any repairs to the substructure elements within the channel.

Geotechnical Report

According to the Geotechnical Scoping Report Data Form, borings are not needed for this project's scoping phase. However, once the recommendation from this scoping report has been accepted, a subsurface investigation is recommended.

Utilities

The existing utilities are shown on the Existing Conditions Layout Sheet, and are as follows:

Municipal Utilities
A gas line is mounted on the upstream (south) fascia beam and a water line mounted on the downstream (north) fascia beam. Both of these utilities will need to be maintained during construction. There are also telephone manholes and sewer manholes on both approaches to the bridge.

Public Utilities (Aerial)
There are overhead utility wires running parallel to the structure on the downstream (north) side. These lines are approximately 75’ from the existing bridge and would only be a factor for certain alternatives.

Public Utilities (Underground)
There is a 60” diameter ACCGMP pipe located under the west approach and running perpendicular to the bridge.

Based on the utilities’ proximity to the existing structure and OSHAs minimum work zone clearance of 25’ from high voltage lines, these overhead lines would need to be either temporarily or permanently relocated during construction depending on the alternative chosen. The aerial lines that would require relocation are within the state ROW.

Right-Of-Way

The existing Right-of-Way (ROW) is approximately 33.5’ wide over the bridge and the approaches, as shown on the Existing Conditions Layout sheet in Appendix O. Marble Mill Park is located adjacent to the river and on each side of the roadway on the south side of the bridge. These parcels are Section 4f and are historic properties, and any permanent ROW impact to these parcels should be avoided, if possible. The existing bridge is located within the existing ROW, and it is anticipated that maintaining the existing alignment will only require temporary rights for construction. These limits and the cost associated with ROW acquisition have been considered for all the discussed alternatives.

Resources

The resources present at this project are shown on the Existing Conditions Layout Sheet and are based on information provided by VTrans, and are as follows:

Biological:

Wetlands/Watercourses

There are no wetlands present within the project area. The Missiquoi River is maintained by the State and US Amry Corps of Engineers.

Wildlife Habitat

There are not many opportunities for wildlife (aquatic and terrestrial) to move through this corridor due to the dam immediately upstream of the structure. Aquatic species are likely present within the Missisquoi River and immediately around the bridge structure. Time of year restrictions for instream work may be a minimization effort for construction if occurring below ordinary high water.

Rare, Threatened and Endangered Species

The project is within the observed summer range of the northern long-eared bat (Myotis septentrionalis), which is federally and state-endangered. The study area contains suitable habitat in the form of potential roost trees. The bridge would also be considered a habitat for roosting bat species. If there will be any below-deck work and/or tree cutting, an acoustic survey is recommended to be completed later in the project development process.

Depending on the scope of the project, survey work by Rare, Threatened and Endangered species experts may or may not be required. Time-of-year restrictions may be required for work that occurs within the stream (if any). Surveys for Rare, Threatened and Endangered species typically are time sensitive, and advanced notice of a year in advance of instream work will be required. There are several Vermont state species mapped within the river at this location if the recommended alternative requires in water work.

Agricultural

Massena stony loam is a prime agricultural soil that is mapped on the northwestern side of the bridge. The area is highly developed, and no agricultural operations are present within the project area. All other soils are statewide significant.

Floodplains/River Corridors

There are FEMA Floodplains mapped within the project area and a Flood Hazard Area/River Corridor Permit may be required if there are impacts.

Archeological:

Based on the results of the Archaeological Resource Assessment, it is determined that the proposed area of potential effect is sensitive for both pre-contact Native American and historic Euro-American archaeological sites. Six archaeologically sensitive areas (ASA) were determined as a result of the assessment. A single ASA is set in each of the southwest, northwest, and northeast quadrants; and the southeast quadrant is divided into three adjacent ASAs. These ASAs can be seen in Figures 3 and 4 of Appendix G. Any work within these areas would require a Phase 1 archaeological survey prior to any ground-disturbing activities.

Historic:

Bridge 6 is not historic, but there are resources in the project area that are considered historic and eligible for listing in the National Register of Historic Places. These include the Swanton Village Historic District, the Swanton Dam, the mill located adjacent to the northwest corner of the bridge, and town-owned Marble Mill Park and Goose Point Park that are located on either end of the bridge.

Hazardous Materials:

Multiple known hazardous waste sites are located near the proposed project limits, Site No. 20164685, 20164658, for gasoline, heating oil, and underground tanks. There may be a likelihood for hazardous waste to be encountered during ROW and/or excavation on this project, so coordination with the Project Contamination Engineer (Mike Keedy) is recommended once the scope is determined.

Contaminated Soils:

The proposed project is located within a mapped *Urban Background Soils* area. Additional coordination with the Project Contamination Engineer (Mike Keedy) is recommended. Disturbed soils within this project should be expected to be kept on site or follow notice to bidder's guidance.

Act 250 Permits:

There are adjacent parcels that have Act 250 Permits and may need to be amended if impacted.

6(f) Properties:

There is an adjacent 6(f) Property and mitigation may be required if impacted.

Stormwater:

Depending on the amount of redeveloped or expanded impervious surfaces involved in this project, there may be a need for an Operational Stormwater permit. If so, this project would qualify for using Chapter 6 of the 2017 Vermont Stormwater Management Manual as a Public

Linear Transportation Project. There do not appear to be any existing Operational Stormwater permits directly adjacent to the site area. All the surrounding roads are considered Hydrologically Connected Road Segments. Based on a review of Google Street view, it appears that much of the roadway within the proposed limits is curbed with drain inlets. In the event that stormwater features are proposed to meet permitting requirements or otherwise, soils throughout the project corridor are labeled Hydrologic Soil Group A, which is well-suited to infiltrating practices.

Landscape:

The following considerations should be factored into any project decisions based on a review of the site by VTrans Landscape Architect. This project includes work within a riparian area and may benefit from a planting plan. The following locations of trees within the project area should be protected: along Marble Mill Park, in the park adjacent to Depot/Foundry Streets, adjacent to residences, and at the parking area off River Lane. The following special site features should be protected: Marble Mill Park, parking area with informational sign off River Lane, the community park adjacent to Depot/Foundry Streets, and Goose Point Park off of Foundry Street.

It is recommended to consult closely with the community on bridge beautification priorities, and vision for parks and public spaces on both sides of the bridge.

Accessibility & Active Transportation:

Based on a site review conducted by the VTrans Landscape Architect, the following considerations must be integrated into project decisions:

- Sidewalk Accessibility: The project includes work on the sidewalks, and the accessibility of the pedestrian walking path shall be protected.
- Bicycle Accommodation: The project site is located within a moderate-use/priority bicycle corridor, as determined by VTrans. Safe and continuous access for bicyclists must be ensured.
- Transit Considerations: The Alburgh-Georgia Commuter Route, operated by Green Mountain Transit, runs through the project area. Any project decisions must account for potential impacts on this transit route.

To ensure comprehensive planning, it is recommended to engage with local residents, the bicycle committee, and the transit provider during the decision-making process.

II. Safety

Bridge 6 is located at mile marker 6.60, and is located between two high-crash segments on VT Route 78, located to the north and south of the bridge. There have been 21 crashes within 1000 feet of the bridge within the last 5-year period. The crash history data from 2020-2024 is contained in Appendix M.

Currently, the bridge width does not meet VSS standards for the roadway classification and the lane and shoulder widths. Since this is not a high-crash location, the bridge width does not need to be corrected for safety reasons alone, but the alternatives will investigate improving both issues.

III. Maintenance of Traffic

The Vermont Agency of Transportation developed an Accelerated Bridge Program in 2012, which focuses on expedited delivery of construction plans, permitting, and Right-of-Way, as well as accelerated construction of projects in the field. One practice that will help in this endeavor is closing bridges for portions of the construction period, rather than providing temporary bridges. In addition to saving money, the intention is to minimize the closure period with accelerated construction techniques and incentivize contractors to complete projects early. The Agency will consider the closure option on most projects where rapid reconstruction or rehabilitation is feasible. The use of prefabricated elements in new bridges will also expedite construction schedules. This can apply to decks, superstructures and substructures. Accelerated Bridge Construction should provide enhanced safety for the workers and the traveling public while maintaining project quality. The following options have been considered:

Option 1: Staged Construction

Staged construction involves maintaining one lane of traffic on the existing bridge while building one lane at a time for the proposed structure. This allows the road to be open during construction while having minimal impacts on resources and adjacent property owners.

While the time required to develop a staged construction project would remain the same, the time required to complete a staged construction project increases because some of the construction tasks have to be performed multiple times. There will also be increased costs associated with coordinating the phasing of the project and working around traffic. Staged construction entails a more hazardous work environment due to the close proximity of the workers and vehicular traffic to each other in the project area, while also extending the duration required to complete the work.

During staged construction, the gas line mounted on the upstream (south) fascia beam and the water line mounted on the downstream (north) fascia beam will need to be maintained for the local community.

Staged construction can also be used for widening the existing substructure to accommodate a wider superstructure and deck. Consideration can be given to widening the structure symmetrically or on one side, depending on what is needed to meet the standard minimum.

This option will require the use of a temporary traffic signal to enable the safe and efficient operation of alternating one-way traffic. Emergency vehicle preemption will be included in the design of the signal.

The design hourly traffic volume for the year 2029 is 1100 vehicles per hour. Alternating traffic flow across the bridge is expected to result in average delays of approximately 95 seconds, which corresponds with Level of Service (LOS) "F" operating conditions, with 95th percentile queue lengths of 772 feet in the heavier direction (approximately 30-31 vehicle lengths) and 651 feet in the lighter direction of travel (approximately 26 vehicle lengths). As a result, the 95th percentile vehicle queues are expected to extend back onto the intersection of Depot St at N River St and S River St, approximately 270 feet north of the bridge, and the intersection of Merchants Row at River Ln and the Marble Mill Park Parking Lot, approximately 140 feet south of the bridge.
See Appendix N for the Level of Service analysis.

During the staged construction, the existing structure's width is inadequate for phased construction of deck and superstructure replacements. There isn't enough space to shift the work zone while keeping one travel lane open. To ensure a minimum travel lane width of 11 feet, the existing sidewalk that is demolished in phase one will not be reconstructed until the deck replacement is fully completed. During construction, the sidewalks will be closed, and pedestrians and bicyclists will be detoured to the Lamoille Valley Rail Trail south of the bridge.

Advantages: Traffic flow would be maintained through the project corridor during construction. This option would have minimal impacts to adjacent properties and natural resources.

Disadvantages: A project constructed using staged construction will cause delays for all who travel through the work zone, throughout the duration of construction. Further operational analysis should be conducted for the intersections of Depot St at N River St/S River St due to the close spacing to the project site. However, relocating the temporary signal from the bridge to the intersection further north is expected to worsen the Level of Service (LOS) and result in longer queues, as it would require longer clearance times and additional splits for the side street. Staged construction requires additional 1 mile detour for pedestrians and bicyclists. The significant travel distance can be challenging for elderly individuals and people with disabilities, potentially leading to increased vehicle use. Staged construction decreases the safety of the workers and vehicular traffic due to the close proximity of the two operating in the same confined space. The time required to complete is typically longer, as some of the construction tasks must be performed multiple times. There is also the added inconvenience of coordinating work with traffic shifts and joints between stages.

Option 2: Off-Site Detour

This option would close the bridge to all traffic and would utilize an off-site detour route for the duration of the construction. There are two potential detour routes, one to accommodate local traffic and one to accommodate regional traffic.

The local detour route would use a combination of Class 1 and Class 2 Town Highways (TH) and bring traffic from the west side of the VT Route 78 bridge south along TH-1 to Beebe Road. The detour route would then utilize Route 7 north to the intersection of VT Route 78.

The detour has a through distance of 5.5 miles with an approximate travel time of 10 minutes. A map of the local detour route is shown in Appendix O.

The regional detour route would use a Class 2 Town Highway (TH) and direct traffic from the west side of the VT Route 78 bridge south along State Numbered Town Highway (SNTH) 36 until its intersection with SNTH 38 (Lower Newton Road). From there, it continues east for approximately 2.2 miles, becoming VT Route 38 in the Town of St. Albans. The route then connects to US 7 at the intersection of VT Route 38 and N Main Street in the City of St. Albans, which leads back to Swanton or south St. Albans.

The detour has a total length of 20 miles, with an estimated travel time of 35 minutes. Coordination with municipalities will be required for the use of Town Highways. The proposed detour route has been evaluated with a WB-67 design vehicle and assumed encroachment into opposing lanes when necessary. All intersections along detour route have been confirmed to accommodate large trucks with only minor encroachment over the edge of pavement in some instances.

A map of the regional detour and associated truck turning movements are shown in Appendix O.

Advantages: Utilizing an off-site detour would eliminate the need to use a temporary bridge or staged construction to maintain traffic. This would decrease the costs of the temporary traffic control and reduce the duration of construction. The impacts and amount of temporary rights-of-way required to construct the project in this location would also be reduced for this option. Many times, by decreasing the impacts and area of additional right-of-way required, the length of time needed to develop the project can be decreased. The safety of both construction workers and the traveling public will be improved by removing traffic from the construction site.

Disadvantages: Traffic flow would not be maintained through the project corridor during construction. There are local businesses, schools, and emergency services on either side of the construction site and their activities would be greatly impacted by the full closure of the bridge. The bridge costs would be higher due to the accelerated schedule and the need for prefabricated bridge elements and systems.

Option 3: Staged Construction with One-Directional Detour

This option would close the bridge to one direction of traffic and would utilize an off-site detour route for the duration of the construction. Based on recorded ATR data collected along the Merchants Row bridge on Wednesday July 20th and Thursday July 21st, 2022, northbound daily traffic volumes are slightly higher on Merchants Row than southbound traffic volumes with approximately 56% of daily traffic traveling in the northbound direction. During the weekday AM, northbound and southbound traffic volumes are approximately the same, with a difference of no more than ten vehicles. During the weekday PM peak hour, northbound traffic volumes are substantially higher, with approximately 59% of traffic traveling in the northbound direction. Therefore, a one-directional detour of southbound traffic is expected to

result in lower impacts on the overall traffic pattern. The two potential detour routes are as described above.

Advantages: Major traffic flow would be maintained through the project corridor during construction, with minimal impacts on adjacent properties and natural resources. Compared to the temporary signal option, the one-directional detour would reduce delays and queue lengths, traffic would go freely on bridge. Compared to the off-site detour option, the one-directional detour minimizes the increase in traffic volume at intersections along the detour route, reducing the negative impact on delays and queues.

Disadvantages: Southbound traffic would not be maintained during construction. There are local businesses, schools, and emergency services on south side of the construction site and their activities would be greatly impacted by the detour. The bridge costs would be higher due to the accelerated schedule and the need for prefabricated bridge elements and systems.

Option 4: Temporary Bridge

A temporary bridge could be placed downstream on the north side of the existing structure only since there is an existing dam structure on the upstream side. A downstream temporary bridge would require further relocation of the aerial utility lines that run along the north side of the structure to meet OSHA work zone standards. This could present an issue since the existing aerial utility lines cross the roadway over the east approach. A downstream temporary bridge would have adverse temporary impacts to archeologically sensitive resources, and the habitat of threatened and endangered species living in the project area. A temporary bridge located north of the existing bridge would require Right-of-Way acquisition.

Based on the daily traffic volumes, a two-lane temporary bridge with a sidewalk would be appropriate. The temporary bridge will need to be two or three spans to accommodate the 300' plus total bridge length required.

A temporary bridge would trigger additional studies due to the impacts of the archeologically sensitive areas and habitat of threatened and endangered species in the area. In addition, historic resources in the areas would be impacted, and care should be taken to avoid impacting these locations as much as possible.

See the Temporary Bridge Layout Sheet in Appendix P.

Advantages: Traffic flow can be maintained along the VT Route 78 corridor. The construction zone would be separate from traffic which allows for the new structure to be built along the existing alignment, minimizing permanent impacts to the site.

Disadvantages: This option would have adverse impacts on the surrounding resources and additional costs to restore the impacted resources. The current traffic flow would be disrupted and there would be decreased safety for workers and vehicular traffic because of cars driving near the construction site and construction vehicles entering and exiting the construction site. This traffic control option would be costly and time consuming, as construction activities

could require a second construction season in order to construct the temporary bridge and approaches.

IV. Alternatives Discussion

Bridge 6 is Functionally Deficient due to being designed for H20 loading and Functionally Obsolete due to substandard travel lane widths, shoulder widths, and bridge railing. In order to meet the required 8'-0" shoulder widths to remove the Functionally Obsolete classification, the bridge would need to be widened by approximately 4'-0" on each side. This is not considered feasible due to the site constraints and the two (2) existing sidewalks on either side of the bridge. Therefore, all alternatives considered will keep 4'-0" shoulders.

The deck, superstructure, and substructure are rated 6 - Satisfactory. The existing channel is rated 7 – Good. The alternatives presented here are based on improvement of the condition of the bridge.

Alternative 1: Ultra High-Performance Concrete (UHPC) Overlay and Miscellaneous Repairs

The first alternative with the most limited structural scope would be repairing the existing deck deficiencies, removing the top of the existing deck surface, and applying a UHPC overlay. FHWA (Publication No. FHWA-RC-24-0008 & FHWA-HRT-17-097) reviewed the application of UHPC on existing decks, and hydromilling is the recommended approach to achieve a roughened surface to form a strong bond between the existing concrete deck and the UHPC layer. Hydro demolition will remove unsound concrete, and partial depth and full depth repairs will be applied to the deck as needed. The existing wearing surface and top 1.5" of the existing concrete deck will be removed, and a 2" UHPC layer will be applied. The UHPC provides increased durability with less material than conventional concrete overlays. It has high strength and stiffness, low permeability, high resistance to freeze-thaw damage, and less tendency for cracking. This approach provides comparable dead load for the deck and surface layer relative to the original design, so the original capacity can be restored. The UHPC layer will only be applied within the limits of the roadway and underneath the existing curbs to be replaced. The existing sidewalk and bridge railings will remain, and minor repairs will be performed on these elements. The deck drains, bridge joints, and abutment backwalls will be replaced. The repairs to the existing superstructure and substructure will include beam end repairs, replacing the bearings, cleaning the abutment bridge seats, and addressing Pier 1 undermining.

To determine the necessary beam end repairs, an in-depth inspection will need to be performed to measure the section loss in the beams at the support locations. The latest inspection report notes "minor rust scaling" at the beam ends; however, detailed measurements are needed to analyze the as-inspected load-carrying capacity of these beams properly. After calculating the remaining capacity, the appropriate repairs can be designed and detailed.

With these repairs being made as stated above, the rest of the components of the existing Superstructure (rated 6—Satisfactory) and Substructure (rated 6—Satisfactory) will be able to be reused as part of this alternative.

For this alternative, the existing bridge footprint will be maintained. This will address the deterioration issues of the existing bridge. However, the bridge will continue to be classified as Functionally Deficient and Functionally Obsolete due to the substandard travel lane widths and shoulder widths.

Alternative 2: Deck Replacement and Miscellaneous Repairs

The second alternative will be to replace the deck and perform any repairs determined as necessary to meet current safety and structural standards. As part of the deck replacement scope, the bridge railings, deck drains, joints, and abutment backwalls would be replaced. The repairs to the existing superstructure and substructure would include performing beam end repairs, replacing the bearings, cleaning the abutment bridge seats, and addressing Pier 1 undermining.

To determine the necessary beam end repairs, an in-depth inspection will need to be performed to measure the section loss in the beams at the support locations. The latest inspection report notes “minor rust scaling” at the beam ends; however, detailed measurements are needed to properly analyze the as inspected load carrying capacity of these beams. After the remaining capacity is calculated, the appropriate repairs will be designed and detailed.

With these repairs being made as stated above, the rest of the components of the existing Superstructure (rated 6 – Satisfactory) and Substructure (rated 6 – Satisfactory) will be able to be re-used as a part of this alternative.

For this alternative, the new deck will not be widened and will match the existing bridge footprint. This will address the deterioration issues of the existing bridge. However, the bridge will continue to be classified as Functionally Deficient and Functionally Obsolete due to the substandard travel lane widths and shoulder widths.

Alternative 3: Superstructure Replacement

A superstructure replacement option for this bridge will include a new deck, railings, superstructure, bearings, and repairs to address Pier 1 undermining. Due to the new superstructure configuration and thermal movement, different abutment joint options would be considered to offset the existing joints relative to the beam ends and bearings. This will reduce the amount of water that is currently leaking through to the structure below and causing deterioration at these locations.

With the repair being made to Pier 1 as stated above, the rest of the Substructure (rated 6 – Satisfactory) will be able to be re-used as a part of this alternative.

For this alternative, it is possible to use a temporary bridge, staged construction, or closure and an off-site detour to accommodate traffic during construction.

Based on an initial review of the existing conditions, widening of the proposed superstructure while re-using the existing substructure is potentially feasible for an additional width of approximately 1'-0" on either side (2'-0" total). In order to meet the current required lane and shoulder configurations, the bridge will need to be widened a total of 8'-0". Therefore, due to the site constraints of this bridge, it will not be possible to remove the Functionally Obsolete classification if this alternative is chosen.

This alternative will address the deterioration issues of the existing bridge and would remove the Functionally Deficient classification.

Alternative 4: Full Bridge Replacement

For a new structure, an integral abutment bridge was not considered based on the site conditions. The existing substructure piers are founded on bedrock and the abutments are drilled and grouted into the existing mill structure.

A potential new structure off-alignment will be on the north side while maintaining traffic on the existing bridge due to the existing dam on the south side of the bridge. After initial review of ROW impacts and abnormal shift it would introduce to the horizontal alignment of VT 78, this option was not further investigated. A new structure would be constructed on-alignment in place of the existing structure.

Additional variables for a full bridge replacement include:

a. Roadway Width

The current curb to curb width is 30'-0" and the local community has expressed concerns about improving pedestrian and cyclist access across the bridge. Since a new bridge with an 80+ year life is being proposed, consideration was given to upgrading the existing bridge geometry.

The minimum lane and shoulder widths for the proposed bridge to meet the state standards would be a 8'-11'-11'-8' configuration. However, widening the bridge and its approaches would have major impacts to the surrounding area, including hazardous materials, historic and archaeological areas, in order to match back into the existing width on either approach after the bridge. There is low bicycle traffic over the bridge, even during peak hours, and there's an existing rail trail for bicycles within 1 mile of the bridge. Since the impacts of widening were determined to be greater than maintaining the existing width, the potential widening to meet required current standards was not considered feasible. For this alternative, a proposed new bridge would keep the same 4'-11'-11'-4' configuration as existing.

b. Span and Skew

The existing structure consists of four spans, two 70'-0" approach spans and two 80'-0" center spans, with two abutments and three piers. Other span options such as a two span or three span structures are acceptable if the existing waterway area is not reduced under any of the alternatives considered. No fill from the abutments should extend beyond the current embankments and preferably the channel opening should be widened to better match the upstream and downstream channel widths.

Removing one or two piers from the proposed structure would improve the waterway. A new structure with two equal 150'-0" spans with one pier or three spans of 90'-0", 120'-0", and 90'-0" with two piers would improve the channel. The superstructure required for a single-span bridge would not be economical compared against the two-span structure and will not be explored further.

The skew would remain at 0 degrees for the new structure constructed along the existing alignment.

c. Horizontal Alignment

The existing bridge is located on a tangent, with horizontal curves on the east and west approaches. The curve to the west is located approximately 10' from the bridge with a radius of 1100' and the curve to the east is located approximately 150' from the bridge with a radius of 1400'. The superelevation of the roadway cross sections around the curves is normal crown. The regulatory speed limit in the Village of Swanton is 30 mph. The existing horizontal curves meet AASHTO standards, therefore it is recommended that the proposed alignment matches existing.

d. Vertical Alignment

The existing bridge is located on a vertical curve centered at the middle of the bridge, with slopes of approximately 3.45 percent on either side. The existing vertical curve over the bridge meets AASHTO standards. Both the east and west approaches contain sag curves that do not meet the 30 mph design speed. The sag curve on the west approach has a K-value of approximately 21, which meets the criteria for 20 mph, and the sag curve on the east approach has a K-value of 10, which meets the criteria for 15 mph. Adjustments to these sag curves to meet AASHTO standards would require approximately 4' of fill for 300' on the eastern approach. Raising the roadway to meet the minimum standard along the approaches would result in permanent impacts to adjacent buildings, and as such will not be explored further.

e. Superstructure Type

The most common superstructure types for comparable spans in Vermont are steel beams/girders with concrete decks. Steel girders with a cast-in-place deck would be an economical solution using conventional construction methods. If accelerated construction techniques are pursued, Prefabricated Bridge Units (PBUs) or steel girders with precast deck

panels could be used. If this alternative is selected, the superstructure would be designed in the next phase.

f. Substructure Type

The existing piers are on spread footings and founded on bedrock. The existing abutments are on spread footings founded on the existing mill wall structure and connected via drilled and grouted dowels. The existing mill structure is founded on bedrock. The existing plans provided by VTrans show estimated depth of rock/existing structure along the existing bridge alignment. This information could be used to approximate the depth of the proposed piers for a new two or three span structure.

g. Maintenance of Traffic

To accommodate traffic during construction, either a temporary bridge, staged construction, full closure, or one-directional closure with an off-site detour could be used.

V. Alternatives Summary

Based on the existing site and bridge conditions, the following are the viable alternatives:

- Alternative 1a: UHPC Overlay and Miscellaneous Repairs with Traffic Maintained during Staged Construction
- Alternative 1b: UHPC Overlay, and Miscellaneous Repairs with Traffic Maintained during Off-Site Detour
- Alternative 2a: Deck Replacement and Miscellaneous Repairs with Traffic Maintained during Staged Construction
- Alternative 2b: Deck Replacement and Miscellaneous Repairs with Traffic Maintained along Off-Site Detour
- Alternative 2c: Deck Replacement and Miscellaneous Repairs with Traffic Maintained on Temporary Bridge
- Alternative 3a: Superstructure Replacement with Traffic Maintained during Staged Construction
- Alternative 3b: Superstructure Replacement with Traffic Maintained along Off-Site Detour
- Alternative 3c: Superstructure Replacement with Traffic Maintained on Temporary Bridge
- Alternative 4a: Full Bridge Replacement with Traffic Maintained during Staged Construction
- Alternative 4b: Full Bridge Replacement with Traffic Maintained along Off-Site Detour
- Alternative 4c: Full Bridge Replacement with Traffic Maintained on Temporary Bridge

VI. Cost Matrix

Swanton BF 036-1(16)		Do Nothing	Alt 1a	Alt 1b	Alt 2a	Alt 2b	Alt 2c	Alt 3a	Alt 3b	Alt 3c	Alt 4a	Alt 4b	Alt 4c
			UHPC Overlay and Miscellaneous Repairs		Deck Replacement and Miscellaneous Repairs			Superstructure Replacement			Full Bridge Replacement		
			a. Staged	b. Off-Site Detour	a. Staged	b. Off-Site Detour	c. Temporary Bridge	a. Staged	b. Off-Site Detour	c. Temporary Bridge	a. Staged	b. Off-Site Detour	c. Temporary Bridge
COST	Bridge Cost	$0	$1,036,200	$901,000	$1,932,900	$2,378,300	$1,632,200	$3,503,600	$3,046,600	$3,046,600	$12,908,200	$11,224,500	$11,224,500
	Removal of Structure	$0	$20,700	$18,000	$28,865	$25,100	$25,100	$86,595	$75,300	$75,300	$54,122	$47,063	$47,063
	Roadway	$0	$547,000	$381,000	$609,000	$415,000	$384,000	$627,000	$436,000	$436,000	$1,153,000	$802,000	$802,000
	Maintenance of Traffic	$0	$221,600	$90,300	$221,600	$90,300	$2,474,040	$221,600	$90,300	$2,474,040	$221,600	$84,300	$2,474,040
	Construction Costs	$0	$1,825,500	$1,390,300	$2,792,365	$2,908,700	$4,515,340	$4,438,795	$3,648,200	$6,031,940	$14,336,922	$12,157,863	$14,547,603
	Construction Engineering & Contingencies	$0	$547,650	$347,575	$837,710	$727,175	$1,128,835	$665,819	$547,230	$904,791	$2,867,384	$1,823,679	$2,182,140
	Accelerated Premium	$0	$0	$458,799	$0	$959,871	$0	$0	$1,203,906	$0	$0	$4,012,095	$0
	Total Construction Costs w CEC	$0	$2,373,150	$2,196,674	$3,630,075	$4,595,746	$5,644,175	$5,104,614	$5,399,336	$6,936,731	$17,204,306	$17,993,637	$16,729,743
	Preliminary Engineering[2]	$0	$182,550	$139,030	$279,237	$290,870	$361,227	$665,819	$547,230	$904,791	$2,867,384	$1,215,786	$2,909,521
	Right of Way	$0	$15,000	$15,000	$15,000	$15,000	$150,000	$15,000	$15,000	$150,000	$15,000	$15,000	$150,000
	Total Project Costs	$0	$2,570,700	$2,350,704	$3,924,311	$4,901,616	$6,155,402	$5,785,434	$5,961,566	$7,991,522	$20,086,691	$19,224,423	$19,789,263
	Annualized Costs	$0	$128,535	$117,535	$196,216	$245,081	$307,770	$165,298	$170,330	$228,329	$267,823	$256,326	$263,857
	Town Share	N/A	$128,535	$58,768	$196,216	$122,540	$307,770	$289,272	$149,039	$399,576	$2,008,669	$961,221	$1,978,926
	Town %	N/A	5.0%	2.5%	5.0%	2.5%	5.0%	5.0%	2.5%	5.0%	10.0%	5.0%	10.0%
SCHEDULING	Project Development Duration[3]	N/A	2 years	2 years	2 years	2 years	4 years	2 years	2 years	4 years	4 years	4 years	4 years
	Construction Duration	N/A	12 months	4 months	12 months	4 months	12 months	18 months	8 months	18 months	30 months	16 months	24 months
	Closure Duration (If Applicable)	N/A	N/A	30 days	N/A	30 days	N/A	N/A	60 days	N/A	N/A	120 days	N/A
ENGINEERING	Typical Section - Roadway (feet)	30'-0"	30'-0"	30'-0"	30'-0"	30'-0"	30'-0"	30'-0"	30'-0"	30'-0"	30'-0"	30'-0"	30'-0"
	Typical Section - Bridge (feet)	4-11-11-4	4-11-11-4	4-11-11-4	4-11-11-4	4-11-11-4	4-11-11-4	4-11-11-4	4-11-11-4	4-11-11-4	4-11-11-4	4-11-11-4	4-11-11-4
	Geometric Design Criteria	Substandard Width	Substandard Width	Substandard Width	Substandard Width	Substandard Width	Substandard Width	Substandard Width	Substandard Width	Substandard Width	Substandard Width	Substandard Width	Substandard Width
	Traffic Safety	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	Alignment Change	No	No	No	No	No	No	No	No	No	No	No	No
	Bicycle Access	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	Hydraulics[4]	-	-	-	-	-	-	-	-	-	-	-	-
	Pedestrian Access	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change	No Change
	Utilities	No Change	No Change	No Change	No Change	No Change	No Change	Temp Relocation	Temp Relocation	Temp Relocation	Temp Relocation	Temp Relocation	Temp Relocation
OTHER	ROW Acquisition	No	No	No	No	No	Yes	No	No	Yes	No	No	Yes
	Road Closure	No	No	Yes	No	Yes	No	No	Yes	No	No	Yes	No
	Design Life	<10	20	20	20	20	20	35	35	35	75	75	75

Notes: (1) Costs are estimates only, used for comparison purposes; (2) Preliminary Engineering costs include costs associated with environmental, utility and archeological mitigation. It is assumed that alternatives utilizing a temporary bridge will have a lower cost associated with archeological impacts as the areas can be protected and no excavation is required. Alternatives 2c, 3c and 4c would have permanent impacts and excavation within the archeological areas and therefore have a higher cost for mitigation under Preliminary Engineering; (3) Project Development Durations are starting from the end of the Project Definition Phase; (4) Hydraulic analysis is pending from VTrans.

VII. Conclusion

We believe there are two viable alternatives, and we recommend they are both presented to the Town for feedback, given the required municipal contribution to the project cost.

The first recommendation is **Alternative 1b**; UHPC Overlay and Miscellaneous Repairs with Traffic Maintained by Off-Site Detour. It is recommended for the following reasons:

- The recommended alternative was estimated to have the lowest annualized cost for the anticipated additional service life provided, as well as the lowest overall cost.
- The Village of Swanton provided feedback that they were interested in reducing the Town's Share of the project as much as possible, which would be 2.5% for using an off site detour for a rehabilitation scope.
- The proposed bridge cross section will be consistent with the approaches, providing 11' lanes, 4' shoulders and 5'-6" sidewalks. VT Route 78 is classified as a Rural Principal Arterial which requires 8'-0" shoulders per VSS Table 3.3; however, this for this section of the roadway, the 4' shoulders and 5'-6" sidewalks on both sides are more appropriate.

The second recommendation is **Alternative 3b**; Superstructure Replacement with Traffic Maintained by Off-Site Detour. It is recommended for the following reasons:

- The recommended alternative was estimated to have the second-lowest annualized cost for the anticipated additional service life provided.
- The Village of Swanton provided feedback that they were interested in reducing the Town's Share of the project as much as possible, which would be 2.5% for using an off site detour for a rehabilitation scope.
- The proposed bridge cross section will be consistent with the approaches, providing 11' lanes, 4' shoulders and 5'-6" sidewalks. VT Route 78 is classified as a Rural Principal Arterial which requires 8'-0" shoulders per VSS Table 3.3; however, this for this section of the roadway, the 4' shoulders and 5'-6" sidewalks on both sides are more appropriate.
- The notable inconvenience to the traveling public for the off-site detour warrants looking at a service life extension more substantial than a deck replacement

For both recommended alternatives, the Structure information and Traffic Control are the same.

Structure

The proposed superstructure will have a lane and shoulder configuration of 4'-11'-11'-4' and two 5'-6" clear sidewalks with galvanized 3 rail box beam railings (Vermont Standard Detail S-361A). The abutments and piers will be re-used, and the existing four span configuration will remain unchanged. The alignment of the approach roadways and over the bridge will match existing.

This recommended alternative addresses the on-going deterioration issues of the existing bridge and removes the Functionally Deficient classification. Due to the site constraints of this bridge, it will not be feasible to remove the Functionally Obsolete classification.

Traffic Control

The preferred method of traffic control is to perform an off-site detour. There are two potential detour routes, one to accommodate local traffic and one to accommodate regional traffic. The off-site detour is anticipated to remain in place within one construction season. During the full closure, emergency vehicle access will be maintained at all times. Coordination with schools will be necessary, as the detour may impact schedules if construction occurs during the school year. Trash Services and mail delivery will be maintained and will follow the detour route during the closure. A map of both detour routes is shown in Appendix N.

VIII. Appendices

- A: Site Photos
- B: Town Map
- C: Bridge Inspection Report
- D: Geotechnical Scoping Report Data Form
- E: Natural Resources Memo
- F: Environmental Specialist Resource Memo
- G: Archeological Resource Memo
- H: Historic Resource Memo
- I: Stormwater Resource Memo
- J: Landscape Resource Memo
- K: Community Input
- L: Crash Data
- M: Level of Service Analysis
- N: Detour Routes
- O: Plans

Appendix A: Site Photos

Photo 1: Bridge 6 – Typical Top of Deck, Looking Southeast

Photo 2: Bridge 6 – Bridge from West Approach, Looking East

Photo 3: Bridge 6 – West Approach from Bridge, Looking West

Photo 4: Bridge 6 – Bridge from East Approach, Looking West

Photo 5: Bridge 6 – East Approach from Bridge, Looking East

Photo 6: Bridge 6 – South Elevation, Looking North

Photo 7: Bridge 6 – North Elevation, Looking South

Photo 8: Bridge 6 – Looking Upstream (South)

Photo 9: Bridge 8 - Looking Downstream (North)

Appendix B: Town Map

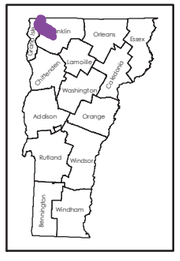
Scale: 1:89,660

N

- INTERSTATE
- STATE LONG
- STATE SHORT
- TOWN LONG
- FEDERAL
- BIKE PATH
- INTERSTATE
- STATE HIGHWAY
- CLASS 1
- CLASS 2
- CLASS 3
- CLASS 4
- LEGAL TRAIL
- PRIVATE
- DISCONTINUED
- FEDERAL AID
- MAINTENANCE DISTRICT
- POLITICAL BOUNDARY
- VTRANS REGION BOUNDARY
- NAMED RIVER-STREAM
- UNNAMED RIVER-STREAM
- Point from Local Bridge Data *
- Point from Local Culvert Data *

* Points are from local town bridge and culvert inventories. Some points may overlap where VTrans has also conducted an inventory on the Town highway.
Data source: VOBCIT aka VTCulverts

Produced by:
Mapping Section
Division of Policy, Planning and Intermodal Development
Vermont Agency of Transportation
March 2022



SWANTON

COUNTY-TOWN CODE: **0615-0**
FRANKLIN COUNTY
DISTRICT # 8
District Long Name: St. Albans District
VTrans Four Region: Northwest

SWANTON
VT 78 BR 6

This map was funded in part through grants from the Federal Highway Administration, U.S. Department of Transportation. The representation of the authors expressed herein do not necessarily state or reflect those of the U. S. Department of Transportation.

Appendix C: Bridge Inspection Report

VERMONT
AGENCY OF TRANSPORTATION

Route VT78 /
Structure #00006 / (Routine, Servi-Lift)
VT 00078 ML over MISSISQUOI RIVER
Team Lead: Jeremy Spooner, **Inspection Date:** 08/08/2023

Town: 223 - SWANTON VILLAGE

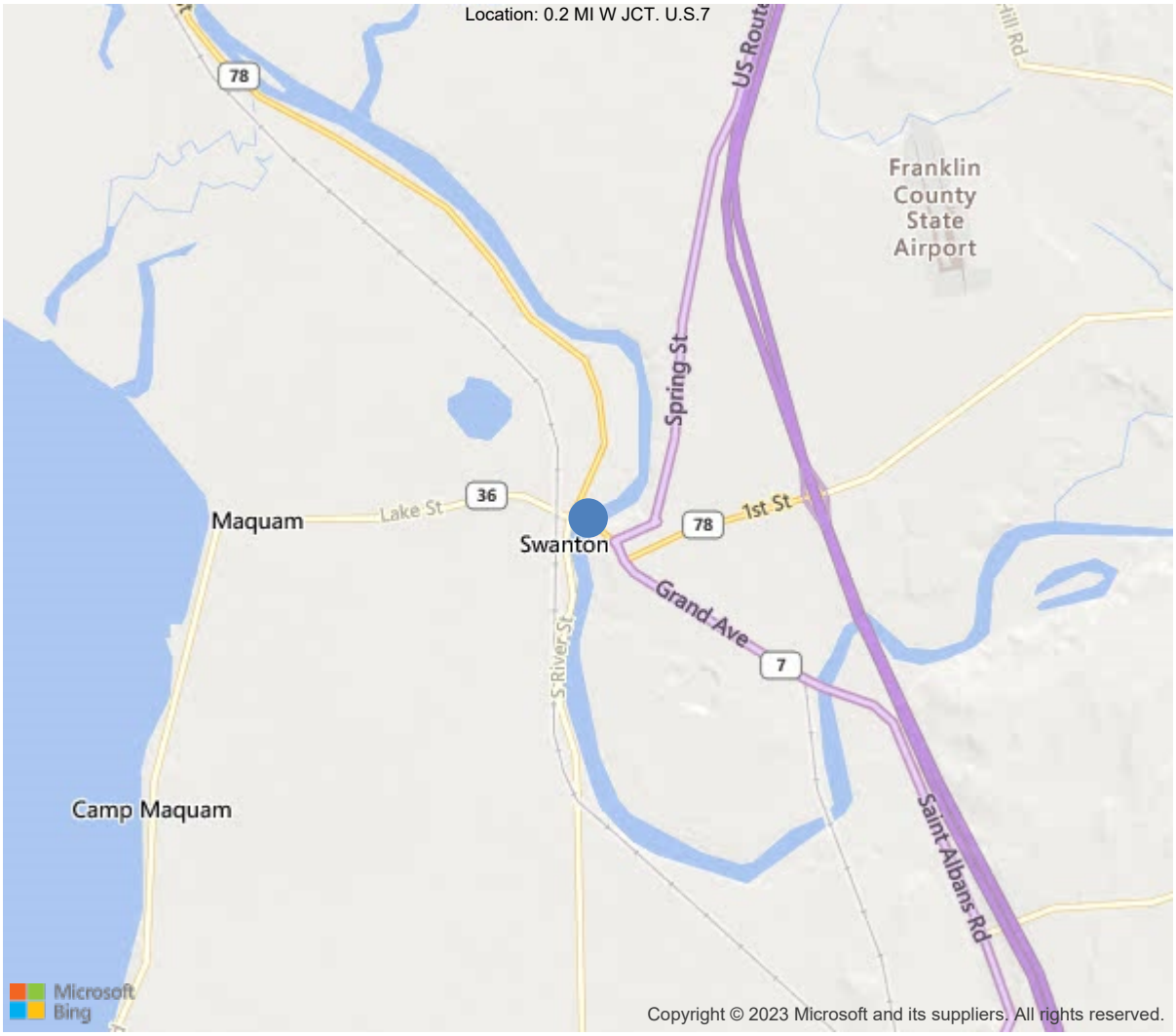
District 8, 11 - FRANKLIN County

Owner: 3 - Town or Township Highway Agency

Maintenance Responsibility: 3 - Town or Township Highway Agency

VERMONT
AGENCY OF TRANSPORTATION

Route VT78 /
Structure #00006 / (Routine, Servi-Lift)
VT 00078 ML over MISSISQUOI RIVER
Team Lead: Jeremy Spooner, **Inspection Date:** 08/08/2023



44.92085, -73.12752

VERMONT
AGENCY OF TRANSPORTATION

Route VT78 /

Structure #00006 / (Routine, Servi-Lift)

VT 00078 ML over MISSISQUOI RIVER

Team Lead: Jeremy Spooner, **Inspection Date:** 08/08/2023

IDENTIFICATION	
(1) State Names	50 - Vermont
(8) Structure Number	200036000606152
(5) Inventory Route	1
(2) Highway Agency District	8 - District 8
(3) County Code	11 - FRANKLIN
(4) Place Code	71650
(6) Features Intersected	MISSISQUOI RIVER
(7) Facility Carried	VT 00078 ML
(9) Location	0.2 MI W JCT. U.S.7
(11) Mile Point	9.927 mi
(12) Base Highway Network	Yes
(13) LRS Inventory Rte & Subrte	0110000078
(16) Latitude	44.9208527777778
(17) Longitude	-73.1275194444444
(98) Border Bridge State Code	
(99) Border Bridge Structure No.	
STRUCTURE TYPE AND MATERIAL	
(43) Main Structure Type	42
Material	4 - Steel continuous
Type	2 - Stringer/Multi-beam or girder
(44) Approach Structure Type	00
Material	0 - Other
Type	0 - Other
(45) No. of Spans in Main Unit	4
(46) No. of Approach Spans	0
(107) Deck Structure Type	1 - Concrete Cast-in-Place
(108) Wearing Surface/Protective System	
Type of Wearing Surface	6 - Bituminous
Type of Membrane	2 - Preformed Fabric
Type of Deck Protection	0 - None
AGE AND SERVICE	
(27) Year Built	1966
(106) Year Reconstructed	0
(42) Type of Service	55
On	5 - Highway-pedestrian
Under	5 - Waterway
(28) Lane	
On	2
Under	0
(29) Average Daily Traffic	10800
(30) Year of ADT	2018
(109) Truck ADT	15 %
(19) Bypass, Detour Length	50 mi
GEOMETRIC DATA	
(48) Length of Maximum Span	80 ft
(49) Structure Length	302 ft
(50) Curb or Sidewalk Width	
Left	5 ft
Right	5 ft
(51) Bridge Roadway Width Curb to Curb	40 ft
(52) Deck Width Out to Out	41.6 ft
(32) Approach Roadway Width (W/Shoulders)	30 ft
(33) Bridge Median	0 - No median
(34) Skew	0 Deg
(35) Structure Flared	0 - No flare
(10) Inventory Route Min Vert Clear	99.99 ft
(47) Inventory Route Total Horiz Clear	40 ft
(53) Min Vert Clear Over Bridge Rdwy	99.99 ft
(54) Min Vert Underclear	0 ft
Ref:	
(55) Min Lat Underclear RT	0 ft
Ref:	
(56) Min Lat Underclear LT	0 ft
NAVIGATION DATA	
(38) Navigation Control	0 - No navigation control on w
(111) Pier Protection	
(39) Navigation Vertical Clearance	0 ft
(116) Vert-Lift Bridge Nav Min Vert Clear	0 ft
(40) Navigation Horizontal Clearance	0 ft

CLASSIFICATION	
(112) NBIS Bridge Length	Y
(104) Highway System	1
(26) Functional Class	2 - Rural Principal Arterial -
(100) Defense Highway	1 - The inventory route is on
(101) Parallel Structure	N - No parallel structure exis
(102) Direction of Traffic	2 - way traffic
(103) Temporary Structure	
(105) Federal Lands Highways	0 - N/A
(110) Designated National Network	0 - The inventory route is not
(20) Toll	3 - On free road. The structu
(21) Maintain	3 - Town or Township Highway A
(22) Owner	3 - Town or Township Highway A
(37) Historical Significance	5 - Bridge is not eligible for
CONDITION	
(58) Deck	6
(59) Superstructure	6
(60) Substructure	6
(61) Channel & Channel Protection	8
(62) Culverts	N
LOAD RATING AND POSTING	
(31) Design Load	5 - MS 18 / HS 20
(63) Operating Rating Method	1
(64) Operating Rating	
Type	1 - Load Factor(LF)
Rating	55
(65) Inventory Rating Method	1 - Load Factor(LF)
(66) Inventory Rating	
Type	
Rating	33
(70) Bridge Posting	5 - Equal to or above legal loads
(41) Structure Open/Posted/Closed	A - Open, no restriction
APPRAISAL	
(67) Structural Evaluation	6
(68) Deck Geometry	5
(69) Clearances, Vertical/Horizontal	N
(71) Waterway Adequacy	8
(72) Approach Roadway Alignment	8
(36A) Bridge Railings	0 - Inspected feature does not meet
(36B) Transitions	0 - Inspected feature does not meet
(36C) Approach Guardrail	0 - Inspected feature does not meet
(36D) Approach Guardrail Ends	0 - Inspected feature does not meet
(113) Scour Critical Bridges	8 - Bridge foundations determined t
PROPOSED IMPROVEMENTS	
(75) Type of Work	35 - Bridge rehabilitation bec
(76) Length of Structure Improvement	302 ft
(94) Bridge Improvement Cost (Multiply value by 1000)	$ 4397
(95) Roadway Improvement Cost (Multiply value by 1000)	$ 50
(96) Total Project Cost (Multiply value by 1000)	$ 4447
(97) Year of Improvement Cost Estimate	2020
(114) Future ADT	11340
(115) Year of Future ADT	2028

INSPECTIONS *			
(90) Inspection Date			08/08/2023
(91) Frequency			24
(92) Critical Feature Inspection	Done	Freq. (Mon)	Date
A: Fracture Critical Detail	No		
B: Underwater Inspection	No		
C: Other Special Inspection			

* The inspection date and frequency information in this box contains the current NBI date and frequency information. Please refer to the report header for the date this inspection was conducted.

VERMONT
AGENCY OF TRANSPORTATION

Route VT78 /
Structure #00006 / (Routine, Servi-Lift)
VT 00078 ML over MISSISQUOI RIVER
Team Lead: Jeremy Spooner, **Inspection Date:** 08/08/2023

Deck

ELEMENTS	DESCRIPTION	UNITS	TOTAL	CS1	CS2	CS3	CS4
12	Reinforced Concrete Deck	SF	12563	11933	630	0	0
1120	Efflorescence/Rust Staining	SF	630	0	630	0	0
510	Wearing Surfaces	SF	12080	11430	620	30	0
3210	Delam/Spall/Patched Area/Pothole	SF	30	0	0	30	0
3230	Effectiveness (Wearing Surface)	SF	620	0	620	0	0
305	Assembly Joint without Seal	LF	82	41	0	41	0
2370	Metal Deterioration or Damage	LF	41	0	0	41	0
330	Metal Bridge Railing	LF	604	512	92	0	0
1000	Corrosion	LF	12	0	12	0	0
7000	Damage	LF	80	0	80	0	0
804	Concrete Fascia	LF	604	544	50	10	0
1120	Efflorescence/Rust Staining	LF	10	0	0	10	0
1130	Cracking (RC and Other)	LF	50	0	50	0	0

58 - Deck (6 - SATISFACTORY CONDITION - structural elements show some minor deterioration.)
Reinforced concrete deck is in satisfactory condition with multiple locations of saturated areas scattered throughout the span in the deck soffit. A few areas throughout the span in bay #1 have saturation surrounding the short weep tubes creating efflorescence leakage and small rust stains. Areas surrounding cold joints in deck soffit have some efflorescence leakage and small rust stains present. Span #4 in western travel has small pot hole forming that has exposed steel reinforcing. Small pot hole in eastern travel lane near the end of span #3 with top of deck exposed.

200 - Existing Wearing Surface Depth (2")

A21 - Deck Wearing Surface Condition (3 - Satisfactory)
Asphalt wearing surface is in satisfactory condition having light wearing in wheel paths. Span #4 in western travel has small pot hole forming that has exposed steel reinforcing. Small pot hole in eastern travel lane near the end of span #3 with top of deck exposed. Multiple scattered patched areas are present along the top surface in span #1 of the eastern travel lane.

A24 - Deck Curb Condition (2 - Good)
Concrete curb with granite block facing is in fairly good condition having some light wearing throughout.

A25 - Deck Sidewalk Condition (3 - Good)
Concrete sidewalks are present along both the upstream and downstream sides and are in fairly good condition having some very light hairline cracks present. Top surface of sidewalk has minor to moderate concrete scaling along the north side surrounding the joint over abutment #2.

A36 - Deck Joint Trough Condition (5 - Poor)
Steel troughs over both abutments have heavy rust scaling and section loss scattered throughout. Trough's have failed in multiple locations allowing heavy leakage to structure below. Bridge seats have collected heavy debris and sediment from failed troughs with heaviest debris near center line of roadway measuring up to ~12" in height.

A38 - Deck Drain Condition (5 - Poor)

Spans #1 and #4 have two (2) while spans #2 and #3 have three (3) steel tube deck drains along both the upstream and downstream sides in poor condition. Drains have been repaired in the past with larger steel tube downspouts welded below existing deck drains which has created full perimeter perforations at the deck connection which allows leakage to structure below.

A39 - Deck Fascia Condition (2 - Good)

Concrete fascia's are in fairly good condition having some hairline cracking scattered throughout. Fascia soffit has transverse hairline to light cracking with light saturation in surrounding the cracks and efflorescence leakage and small rust staining present along the drip edge.

B.C.05 Bridge Railing Condition Rating (SATISFACTORY - Widespread minor or isolated moderate defects.)

aluminum pipe with spindles is in satisfactory condition having small scrapes and small dents along the rail scattered throughout. Spindles are present along both the upstream and downstream sides with a few small areas of dents along the spindles. Multiple locations have spindles previously replaced with the lower portions of new spindles having heavy rusting scattered throughout.

B.C.08 Bridge Joints Condition Rating (IMMINENT FAILURE - Joints have failed and are ineffective.)

8/8/23 - Bridge joints have failed and wood form work has been installed. the joint over abutment 2 had holes formed in the roadway from failing joint so plywood has been installed between the bridge beams and back walls along the upstream half. the downstream half is in poor condition and will soon need to have temporary repairs made to stop further holes forming in the roadway. Joint over abutment 1 has wood 4x4 holding up the joint because of heavy corrosion and brackets missing. both joints need to be replaced as the leakage is causing deterioration of the beam ends.

Steel plates over abutment #2 has had recent steel repairs in eastern travel lane with welds holding up fixing cracked steel plate for 4'-0". Steel plates still have bounce present when traffic drives over continuing to further fatigue the steel. Top surface of steel plates have scratches, gouges and wearing in wheel paths in both lanes. Steel plate has up to ~1” of bending and distortion with backwall side of plate being higher than deck side. Steel plate has ~1/2” of steel height exposed due to backwall being higher. ~1-1/2” of room is left for expansion with small amounts of sediment and debris on steel. Steel plates over abutment #1 have lighter steel bending and distortion than joint over other abutment. Backwall side is still ~1/4” to ~1/2” higher than deck side. Top surface of steel plate has gouges, scrapes and wearing present in wheel paths. ~1-1/4” left for bridge expansion with small amounts of sediment and debris on steel.

APPROACH

72 - Approach Roadway Alignment (8 - Equal to present desirable criteria)

A13 - Approach Rail Condition (3 - Satisfactory)

Galvanized steel beam rail is in okay condition having minor scrapes and dents along the face of rail.

A16 - Approach Post Condition (3 - Satisfactory)

Galvanized steel posts with no offsets are in okay condition with the upper portions having some small bends and dents.

A18 - Approach Erosion/Settlement (2 - Minor)

minor bump at the approach joint.

B.C.06 Bridge Railing Transitions Condition Rating (FAILED - Bridge is closed due to component condition, and is beyond corrective action. Replacement is required to restore service.)

No transition rail, rail needs to be installed.

VERMONT
AGENCY OF TRANSPORTATION

Route VT78 /
Structure #00006 / (Routine, Servi-Lift)
VT 00078 ML over MISSISQUOI RIVER
Team Lead: Jeremy Spooner, **Inspection Date:** 08/08/2023

Superstructure

ELEMENTS	DESCRIPTION	UNITS	TOTAL	CS1	CS2	CS3	CS4
107	Steel Open Girder/Beam	LF	1812	1442	320	50	0
1000	Corrosion	LF	370	0	320	50	0
515	Steel Protective Coating	SF	13137	9737	2500	900	0
3420	Peeling/Bubbling/Cracking	LF	3400	0	2500	900	0
311	Movable Bearing	EA	24	12	1	11	0
1000	Corrosion	EA	12	0	1	11	0
313	Fixed Bearing	EA	6	6	0	0	0

59 - Superstructure (6 - SATISFACTORY CONDITION - structural elements show some minor deterioration.)

Six (6) painted steel rolled beams are in fairly good to satisfactory condition. Beams have cover plates at the midspan of each span and over each pier that are welded to the bottom flanges being in fairly good condition. Beam #1 has small to large areas along the lower portions of webs and lower flange (mainly along the outer flange) that has heavy rust scaling with moderate pitting below. Protective layer has heavy bubbling, peeling and flaking scattered throughout in small areas. Splice plates are present in spans #1, #2 and #3 in fairly good condition with splice plates along beam #1 having areas of minor to moderate rust scaling and pack rust forming between the beams. Beams #1, #2, #5 and #6 have areas in surrounding areas where surface corrosion has initiated and is starting to progress below the existing deck drains from active leakage.

A55 - Lateral Bracing Condition (4 - Fair)

Fifteen (15) painted steel c-channels are present per bay throughout the structure that are bolted to plates that are welded to the webs of the rolled beams are in fairly good to fair condition. Cross bracing over both abutments has heavy rust scaling and pitting present throughout from active leakage from failed joint above. Scattered diaphragms in bays #1 and #5 have steel deck drains welded with full perimeter perforations around the deck soffit that have allowed leakage to cross bracing progressing corrosion with paint failure and surface corrosion progressing. Remaining cross bracing is in fairly good condition with a few having some small areas of blistering, peeling flake and freckling rust.

B.C.07 Bridge Bearings Condition Rating (SATISFACTORY - Widespread minor or isolated moderate defects.)

Movable steel rollers are present over both abutments and pier #1 and pier #3. Movable steel rollers at abutments have progressing rust scaling throughout due to active leakage from joints above and have heavy debris and sediment surrounding bearings. Fixed bearings are present at pier #2. All bearings at piers are in fairly good condition having a few small areas of freckling rust.

B.C.14 NSTM Inspection Condition (NOT APPLICABLE - Component does not exist.)

Substructure

ELEMENTS	DESCRIPTION	UNITS	TOTAL	CS1	CS2	CS3	CS4
210	Reinforced Concrete Pier Wall	LF	125	90	32	3	0
1080	Delamination/Spall/Patched Area	LF	3	0	0	3	0
1090	Exposed Rebar	LF	2	0	2	0	0
1190	Abrasion/Wear (PSC/RC)	LF	30	0	30	0	0
215	Reinforced Concrete Abutment	LF	83	0	63	20	0
1080	Delamination/Spall/Patched Area	LF	20	0	0	20	0
1130	Cracking (RC and Other)	LF	63	0	63	0	0
800	Reinforced Concrete Wing/Retaining Wall	EA	4	0	4	0	0
1130	Cracking (RC and Other)	EA	4	0	4	0	0

60 - Substructure (6 - SATISFACTORY CONDITION - structural elements show some minor deterioration.)
Reinforced concrete abutment #1 is in satisfactory condition having minor abrasion along the channel flow line. Abutment stem has scattered areas of light to minor cracking with a few areas of rust stains present.

Reinforced concrete abutment #2 is in satisfactory condition having minor abrasion along the channel flow line. Small shallow spalls are present along the upstream end exposing steel reinforcing along the lower portions of abutment stem. Upper portions of abutment stem have scattered light to minor cracks present with a few scattered areas of rust staining.

A71 - Abutment End Walls Condition (4 - Satisfactory)
Reinforced concrete backwalls are present over both abutments having some hairline cracks, efflorescence leakage, small rust stains and some chipping / spalling along the upper portions.

A77 - Retaining/Wingwall Condition (3 - Good)
Reinforced concrete wing walls are in fairly good condition having some hairline cracks scattered throughout and abrasion along the lower portions.

A78 - Abutment Footings Condition (4 - Satisfactory)
Reinforced concrete footings are poured on ledge in fairly good to satisfactory condition. Abutment #1 footing has minor to moderate abrasion along the channel flow line that has progressed along the ledge line.

A83 - Pier Shaft Condition (4 - Satisfactory)
Reinforced concrete pier walls are in fairly good to satisfactory condition. Pier #1 in span #1 has small areas of honeycombing that has exposed steel reinforcing. Pier #2 in span #2 has small areas of honeycombing along the lower portions with a few areas progressing into spalling that have exposed steel reinforcing. Pier walls have areas of cold joints with very light honeycombing scattered throughout and a few small hairline cracks throughout.

A86 - Pier Footings Condition (4 - Satisfactory)
Reinforced concrete footings are poured on ledge in fairly good to satisfactory condition. Each pier footing has minor abrasion along the flow line. Pier #1 has undermining along the upstream nose and along the midsection in span #1 with ~1'-0" high void between the ledge and underside of concrete and extends for ~15'-0" near the mid section and ~3'-0" near the upstream nose. Pier footings have areas of minor to moderate cracking scattered throughout.

CHANNEL

61 - Channel Condition (8 - Banks are protected or well vegetated. River control devices such as spur dikes and embankment protection are not required or are in a stable condition.)

Missisquoi River flows straight through structure flowing over ledge outcroppings. Majority of channel flow is present in span #4. Large dam is present upstream controlling channel flow. Undermining is present along pier #1 along the upstream nose for ~3'-0" creating a void between bottom of concrete footing and ledge. Undermining is also present along the midsection of pier #1 for ~15'-0" and penetrates up to a ~1'-0" below and has a max height of ~1'-0" along the span #1 side. large stone blocks are stacked against the bank of the downstream side of abutment #1 with remainder of channel banks having reinforced concrete retaining walls.

B.C.10 Channel Protection Condition Rating (VERY GOOD - Some inherent defects.)

B.C.11 Scour Condition Rating (No scour.)

GENERAL OBSERVATION

8/8/2023 - Both bridge joints have some wood temporary form work in place due to failing joint plates. the steel support brackets that hold the joint in place has advanced corrosion and most of them are detached. joint replacement is needed.

Structure is in fairly good condition. Sliding steel plates joints over both abutments are in need of replacement with troughs having failed in multiple locations with remaining sections left having heavy section loss. Both abutment bridge seats have heavy debris build up with up to ~12" of debris and sediment build up present. Deck drains throughout have been repaired with larger steel tube pipe allowing large perforation ring at the deck soffit allowing leakage to superstructure below. Drains should be replaced / repaired with steel drain pipe that extend below bottom flange of superstructure throughout. Superstructure at both abutments has minor rust scaling forming for last 3'-0" along the lower flanges and over bearing areas from active joint leakage and needs to be cleaned, painted and grease coated to prevent any further corrosion. Voids between footings and ledge along pier #1 should be filled in.

VERMONT
AGENCY OF TRANSPORTATION

Asset **#200036000606152**(Routine, Servi-Lift)
District: 8, **County:** 11
Team Lead: Jeremy Spooner, **Inspection Date:** 08/08/2023

ELEMENTS	DESCRIPTION	UNITS	TOTAL	CS1	CS2	CS3	CS4
12	Reinforced Concrete Deck	SF	12563	11933	630	0	0
1120	Efflorescence/Rust Staining	SF	630	0	630	0	0
510	Wearing Surfaces	SF	12080	11430	620	30	0
3210	Delam/Spall/Patched Area/Pothole	SF	30	0	0	30	0
3230	Effectiveness (Wearing Surface)	SF	620	0	620	0	0
107	Steel Open Girder/Beam	LF	1812	1442	320	50	0
1000	Corrosion	LF	370	0	320	50	0
515	Steel Protective Coating	SF	13137	9737	2500	900	0
3420	Peeling/Bubbling/Cracking	LF	3400	0	2500	900	0
210	Reinforced Concrete Pier Wall	LF	125	90	32	3	0
1080	Delamination/Spall/Patched Area	LF	3	0	0	3	0
1090	Exposed Rebar	LF	2	0	2	0	0
1190	Abrasion/Wear (PSC/RC)	LF	30	0	30	0	0
215	Reinforced Concrete Abutment	LF	83	0	63	20	0
1080	Delamination/Spall/Patched Area	LF	20	0	0	20	0
1130	Cracking (RC and Other)	LF	63	0	63	0	0
305	Assembly Joint without Seal	LF	82	41	0	41	0
2370	Metal Deterioration or Damage	LF	41	0	0	41	0
311	Movable Bearing	EA	24	12	1	11	0
1000	Corrosion	EA	12	0	1	11	0
313	Fixed Bearing	EA	6	6	0	0	0
330	Metal Bridge Railing	LF	604	512	92	0	0
1000	Corrosion	LF	12	0	12	0	0
7000	Damage	LF	80	0	80	0	0
800	Reinforced Concrete Wing/Retaining Wall	EA	4	0	4	0	0
1130	Cracking (RC and Other)	EA	4	0	4	0	0
804	Concrete Fascia	LF	604	544	50	10	0
1120	Efflorescence/Rust Staining	LF	10	0	0	10	0
1130	Cracking (RC and Other)	LF	50	0	50	0	0

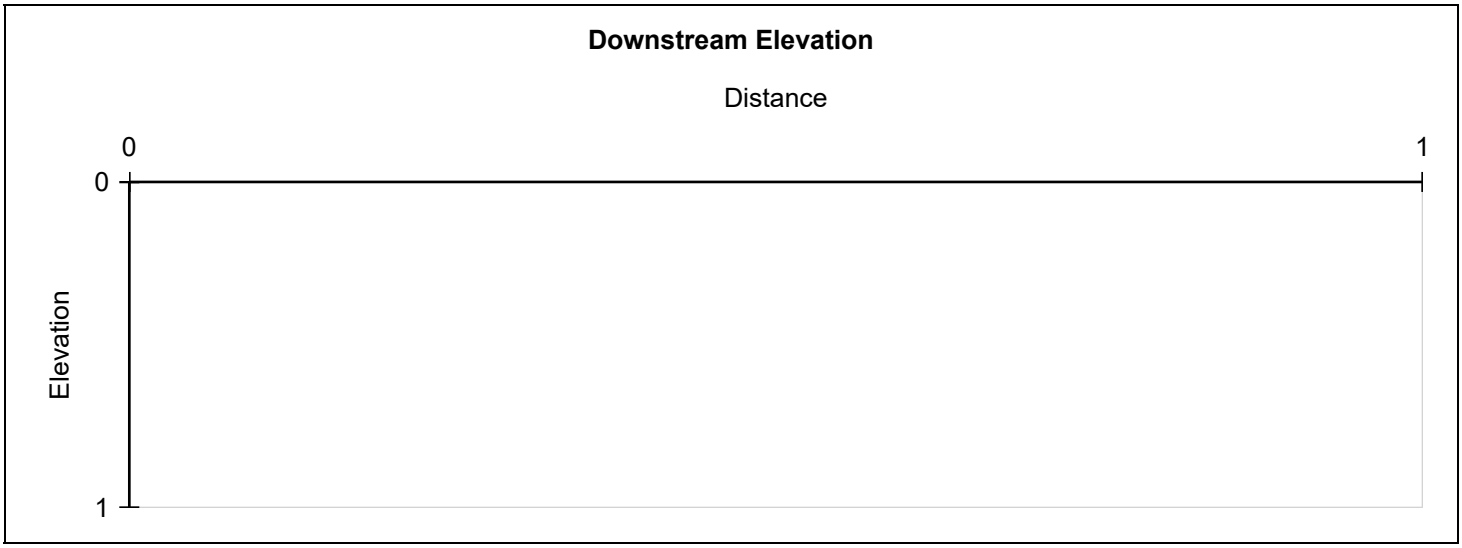
VERMONT
AGENCY OF TRANSPORTATION

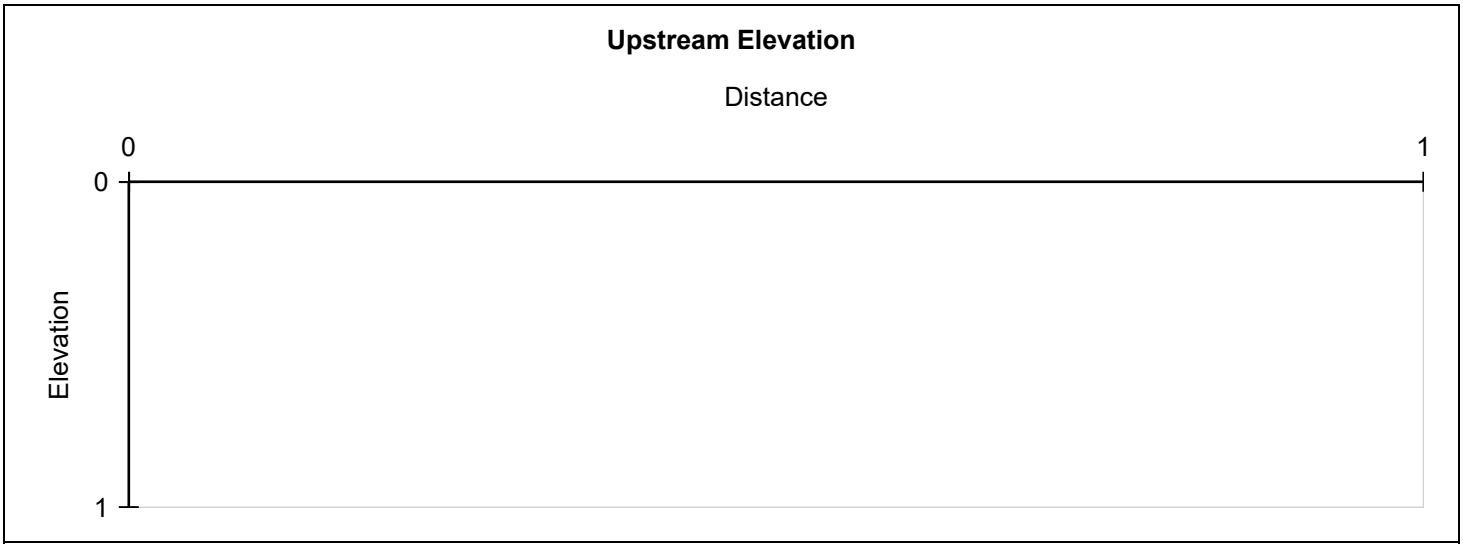
Route VT78 /
Structure #00006 / (Routine, Servi-Lift)
VT 00078 ML over MISSISQUOI RIVER
Team Lead: Jeremy Spooner, **Inspection Date:** 08/08/2023

Channel Profile

Waterway Flow:	Top of Water:
Origin:	Bottom of Beam:

Station	Distance	Downstream	Upstream





Approach looking west

Upstream near abutment 2 rail spindles

Downstream near pier 1 rail spindles

Missing bolt in the rail hoop

VERMONT
AGENCY OF TRANSPORTATION

Route VT78 /
Structure #00006 / (Routine, Servi-Lift)
VT 00078 ML over MISSISQUOI RIVER
Team Lead: Jeremy Spooner, **Inspection Date:** 08/08/2023

Potholes in wearing surface

Exposed deck

Approach looking east

Span 1 deck

VERMONT
AGENCY OF TRANSPORTATION

Route VT78 /
Structure #00006 / (Routine, Servi-Lift)
VT 00078 ML over MISSISQUOI RIVER
Team Lead: Jeremy Spooner, **Inspection Date:** 08/08/2023

Downstream

Upstream

Abutment 1

Pier 1 span 1

Beam 6 bearing

Abutment 1 joint

Abutment 1 joint

Pier 1 bearings

Pier 2 span 2

Beam 6 looking west

Beam 6 looking east

Saturation and minor spalling around deck weep tubes

Upstream pier 2 nose cracking

Pier 3 span 2

Beam 6 span 2

Span 2 deck

Beam 4 splice plate span 2

Pier 3 bearings

Upstream fascia

Pier 2 fixed bearings beams 5,6

Pier 2 fixed bearings beams 1-4

Beam 1 span 3

Pier 3 span 3

Pier 3 span 4

VERMONT
AGENCY OF TRANSPORTATION

Route VT78 /
Structure #00006 / (Routine, Servi-Lift)
VT 00078 ML over MISSISQUOI RIVER
Team Lead: Jeremy Spooner, **Inspection Date:** 08/08/2023

Beam 1 span 1

Beam 1

Section loss beam 1

Heavy rust scale beam 1

Beam 6 span 4

Beam 6 looking west

Abutment 2

Debris on abutment 2 seat

Section loss beam ends abutment 1

Wood blocking along back wall from bay 3 to upstream end

Beam 1 abutment 2

abutment 1 joint

corroded bracket abutment 1 joint

beam 1 debris

joint abutment 1 patching

VERMONT
AGENCY OF TRANSPORTATION

Route VT78 /
Structure #00006 / (Routine, Servi-Lift)
VT 00078 ML over MISSISQUOI RIVER
Team Lead: Jeremy Spooner, **Inspection Date:** 08/08/2023

Maintenance Needs

Date Reported: 07/15/2021

Priority:	5 - Cyclical Activity - Per Policy	**Status:**	Open
Type of Work:	14 - Deck - Joint repair or replacement	**Component:**	Deck

Deficiency Description

8/8/23 joints have failed over half of the bridge and have wood temporary supports installed to fix holes that have developed. Sliding steel plate joints are present over both abutments having failed and wide cracking with bending over the other half. the steel plates will continue to fail on the other lane. The joints need a more permeant repair as the wood and existing steel plate will fail again. Troughs have areas of heavy section loss and have failed in multiple locations. Joints allow heavy leakage to structure below and have built up ~12" of debris and sediment along abutment bridge seats. Joint are in need of major rehab or full replacement over both abutments.

Remarks

Joints have had some temporary repair work done to plug holes that have developed in the roadway.

Abutment 2 joint

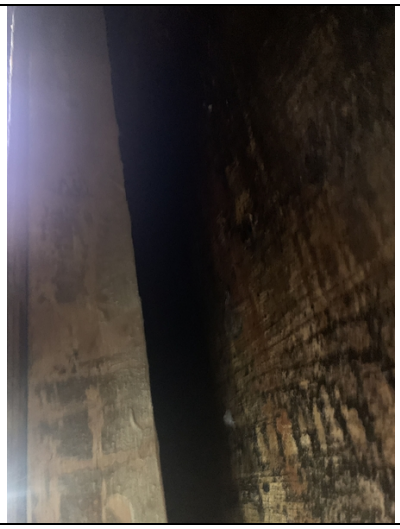
Abutment 1 joint

VERMONT
AGENCY OF TRANSPORTATION

Route VT78 /
Structure #00006 / (Routine, Servi-Lift)
VT 00078 ML over MISSISQUOI RIVER
Team Lead: Jeremy Spooner, **Inspection Date:** 08/08/2023

Joint trough abutment 1

Wood used to support joint abutment 1



plywood temporary form work abutment 1

abutment 1 seat area

joint abutment 1

drain trough failed from corrosion

VERMONT
AGENCY OF TRANSPORTATION

Route VT78 /
Structure #00006 / (Routine, Servi-Lift)
VT 00078 ML over MISSISQUOI RIVER
Team Lead: Jeremy Spooner, **Inspection Date:** 08/08/2023

Maintenance Needs

Date Reported: 07/16/2021

Priority:	5 - Cyclical Activity - Per Policy	**Status:**	Open
Type of Work:	10 - Deck - Drainage system repair	**Component:**	Deck

Deficiency Description

Deck drains along both the upstream and downstream sides have been previously repaired however have full perimeter perforations present at the deck soffit and continue to allow leakage to structure below and should be replaced.

Remarks

Typically drain

VERMONT
AGENCY OF TRANSPORTATION

Route VT78 /
Structure #00006 / (Routine, Servi-Lift)
VT 00078 ML over MISSISQUOI RIVER
Team Lead: Jeremy Spooner, **Inspection Date:** 08/08/2023

Maintenance Needs

Date Reported: 07/16/2021

Priority:	5 - Cyclical Activity - Per Policy	**Status:**	Open
Type of Work:	26 - Superstructure - Clean and painting beam ends	**Component:**	Superstructure

Deficiency Description

Failed Joints over both abutments have allowed continuous leakage to structure below which has progressed steel corrosion that has minor to to moderate rust scaling and is in need of cleaning and painting. Beam #1 throughout also has built up rust scaling along the outer lower flange and should be cleaned and painted to prevent further corrosion.

Remarks

End diaphragm's abutment 1

Beam 1

hole in the diaphragm

Appendix D: Geotechnical Scoping Report Data Form

Geotechnical Scoping Report Data Form

General Project Information

<table>
<tr><td>Project Name:</td><td colspan="5">Swanton BF 036-1(16)</td></tr>
<tr><td>Project Pin #</td><td colspan="5">22j402</td></tr>
<tr><td>Requestor Name:</td><td colspan="5">Laura Stone, P.E.</td></tr>
<tr><td>Prepared By:</td><td colspan="5">S. Madden, Geotechincal Engineer</td></tr>
<tr><td>Date:</td><td colspan="5">11/17/2023</td></tr>
<tr><td>Location Information of Structure:</td><td colspan="5"><table><tr><td>Town</td><td>Route</td><td>Mile Marker</td></tr><tr><td>Swanton Village</td><td>VT 78</td><td>6.60</td></tr></table></td></tr>
<tr><td>Structure Type:</td><td>Bridge</td><td>Structure ID #:</td><td>6</td><td>Conceptual Treatment Type:</td><td>Undertermined</td></tr>
<tr><td>General Project Description:</td><td colspan="5">This structure consists of a stringer/multi-beam girder over the Missisquoi River in the Town of Swanton Village on VT Route 78.</td></tr>
</table>

Geological Information

Surficial Map Description:	Pebbly marine sand (Champlain Sea deposit)
Bedrock Map Description:	Oib - Shale, Siltstone - Dark-gray shale with thin discontinuous beds of crossbedded and graded dolomitic siltstone (Iberville Formation)

Record Plan Information

Are there Record Plans?	Yes ☒ No ☐
Record Plans ID #	66s1301
Record Plan Notes:	A 304ft long bridge with two abutments and three piers. Elevation information for the piers, abutments, and retaining walls are included within the respective detail sheets. Pier, abutment, and retaining walls all appear to be supported by spread footings founded on bedrock.

Bedrock Depth Information

Are there Historical Borings?	Yes ☐ No ☒ Unknown ☐

Historical Boring Information:

Project Name	Distance from Project (ft)	# of Borings	Top of Bedrock Elevation (ft)	Rock Type
Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.
Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.
Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.	Click or tap here to enter text.

Link to Historical Boring Information:	
Is there any bedrock depth information from well data near the project location?	Yes ☒ No ☐

Well Data Information:

Well Report #	Bedrock Depth (ft)	Distance from Project (ft)
WRN: 2537	10	830
WRN: 407	50	1100
WRN: 604	80	1145

Are Bedrock Outcrops Present at the Site?	Yes ☒ No ☐
Bedrock Depth General Comments:	Exposed bedrock is visible within the channel and embankments downstream of the structure. Per record plans, piers, abutments, and retaining wall appear to be supported by spread footings founded on bedrock.

General Site Conditions

Site Visit Conducted?	Yes ☐ No ☒
Date of Site Visit:	N/A
Are there Overhead Utilities at the Site?	Yes ☒ No ☐
Are there environmental Hazards Present at the Site?	Yes ☒ No ☐
Information regarding found Environmental Hazards:	There appears to be an underground storage tank on site for fuel/oil, ID 2710. There are several nearby Hazard sites. The two closest sites have either completed remediation in 2018 or require no further action.
Site Condition Notes:	Under bridge utilities and streetlights are present in bridge inspection site photos. Drill rig impact is not expected due to overhead utilities running parallel to bridge. Bedrock is visible in the downstream channel.

Note that representative site photos are provided in Appendix A.

Recommendations

Are Borings Needed in the Scoping Phase?	Yes ☐ No ☒
Subsurface Investigation Recommendations:	We recommend that a subsurface investigation for this project be undertaken once the scope has been determined. If a full bridge replacement is selected as the preferred alternative, then the proposed pier locations, abutment locations, and retaining wall locations should dictate boring locations

	and depths. Given the shallow bedrock exposed within the channel, and the record plans indication that spread footings on bedrock are supporting the existing structure, it is likely that a series of borings and probes will be needed to profile the bedrock elevation across the structure footprint. Borings will likely need to be advanced from within the existing roadway, and through the bridge deck at proposed pier locations. There appear to be several existing retaining walls at the site; if these walls are to be replaced as part of this project, borings for the retaining walls should be included in the subsurface investigation for the structure.
Foundation & Structure Type Recommendations:	Record plans seem to indicate that the existing foundations are primarily spread footings bearing directly on bedrock. It is likely that any replacement structure will include spread footings on bedrock.

The information provided is utilized from the databases and references noted in the Reference Section below. This form has been completed to the best of staff and reviewer knowledge.

Please reach out to us if you have any questions or concerns.

Staff Name & Title:

Stephen Madden/Geotechnical Engineer	Stephen.madden@vermont.gov/802-595-4916

SPM

Reviewer Name & Title:

Callie Ewald, P.E., Geotechnical Engineer	Callie.ewald@vermont.gov/802-595-4589

CEE

References:

Doll, C. G., 1970, Surficial Geologic Map of Vermont, Vermont Geological Survey, Montpelier, VT.

Ratcliffe, N. M., Stanley, R. S., Gale, M. H., Thompson, P. J., Walsh, G. J., 2011, Bedrock Geologic Map of Vermont, Vermont Geological Survey, Montpelier, VT.

Vermont Agency of Natural Resources Department of Environmental Conservation, Natural Resources Atlas, www.anr.vermont.gov/maps/nr-atlas%20, accessed 11/16/2023.

APPENDIX A

Figure 1. Facing south at northern end of bridge. Note utility alongside bridge for full length, and light pole on bridge.

Figure 2. Facing south at northern end of bridge. Note utility alongside bridge and under abutment.

Figure 3. Facing upstream at structure, note pier locations and utilities

Figure 4. Facing southern abutment

Figure 5. Facing northern abutment. Note utility on bridge and retaining walls adjacent to abutment.

Appendix E: Natural Resources Memo

VERMONT

State of Vermont
Highways-PDB-Environmental
219 N. Main Street
www.aot.state.vt.us

Agency of Transportation

To: Julie Ann Held, VTrans Environmental Specialist
From: Glenn Gingras, VTrans Environmental Biologist
Date: 10/2/2023
Subject: Swanton BF 036-1(16)- Natural Resource ID

I have completed natural resource identification for the above referenced project. My evaluation has included wetlands, wildlife habitat, agricultural soils, and rare, threatened, and endangered species.

Project Area
The area reviewed is located on VT Route 78 at Bridge 6 over the Missisquoi River. I have reviewed roughly 100 feet on both approaches and 50 feet upstream and downstream of the existing bridge crossing. The area is mixed development in an urban area and a dam is located immediately upstream. No field visit was completed since I was familiar with the site.

Project Area of Bridge 6 over the Missisquoi River

Wetlands/Watercourses
No wetlands are present within the project area. The Missisquoi River flows north easterly through the project area. This river is regulated by the State of VT and the US Corps of Engineers.

Wildlife Habitat
There are not many opportunities for wildlife (aquatic and terrestrial) to move through this corridor due to the dam immediately upstream of the structure. Aquatic species are likely present within the Missisquoi River and immediately around the bridge structure. Time of year restrictions for instream work may be a minimization effort for construction if occurring below ordinary high water.

Rare, Threatened and Endangered Species
The project is within the observed summer range of northern long-eared bat (*Myotis septentrionalis*), federally and state endangered. There is suitable habitat in the form of potential roost trees within the study area. The bridge would also be considered as habitat for roosting bat species. I am going to recommend an acoustic survey is completed later in the project development process if there will be any below deck work and/or tree cutting.

A query of the ANR Natural Resource Atlas indicated the following species are mapped near the project and have known presence:

- Cylindrical Papershull, *Anodontoides ferussacianus*, State of VT listed Endangered. *
- Pink Heelsplitter, Potamilus alatus, State of VT listed Endangered.*
- Fragile Papershell, Leptodea fragilis, State of VT listed Endangered.*
- Black Sandshell, *Ligumia recta*, State of VT listed Endangered.*
- Flutedshell, *Lasmigona costata*, State of VT listed Endangered.*
- Pocketbook, *Lampsilis ovata*, State of VT listed Endangered.*
- Giant Floater, *Pyganodon grandis*, State of VT listed Threatened.*
- Spiny Softshell Turtle, *Apalone spinifera*, State of VT listed Threatened.*
- Lake Sturgeon, Acipenser fulvescens, State of VT listed Endangered.*
- Stonecat, *Noturus favus*, State of VT listed Endangered.*
- Eastern Sand Darter, *Ammocrypta pellucida*, State of VT listed Threatened.*
- Riverweed, *Podostemum ceratophyllum*, State of VT Rare*.
- Quillback, *Carpiodes Cyprinus*, State of VT Rare.*
- Bridle Shiner, *Notropis Bifrenatus*, State of VT Rare.*
- Mudpuppy, *Necturus maculosus*, State of VT Rare.*
- Greater Redhorse, *Moxostoma valenciennesi*, State of VT Rare.*
- Shorhead Redhorse, Moxostoma macrolepidotum, State of VT Rare.*
- Silver Redhorse, *Moxostoma anisurum*, State of VT Rare.*
- Rapids Clubtail, *Phanogomphus quadricolor*, State of VT Rare. *
- Silver Lamprey, *Ichthyomyzon unicuspis*, State of VT Rare.*
- American Brook Lamprey, *Lethenteron appendix*, State of VT Rare.*
- Bog Copper, *Lycaena epixanthe*, State of VT Rare.*

Depending on the scope of the project, survey work by RTE species experts may/may not be required. Time of year restrictions may be required for work that occurs within the stream (if any). Surveys for RTE species typically are time sensitive and advanced notice of a year in advance of instream work will be required.

Agricultural Soils:
Massena stony loam is a prime agricultural soil that is mapped on the northwester side of the bridge. The area is highly developed, and no agricultural operations are present within the project area. All other soils are statewide significant.

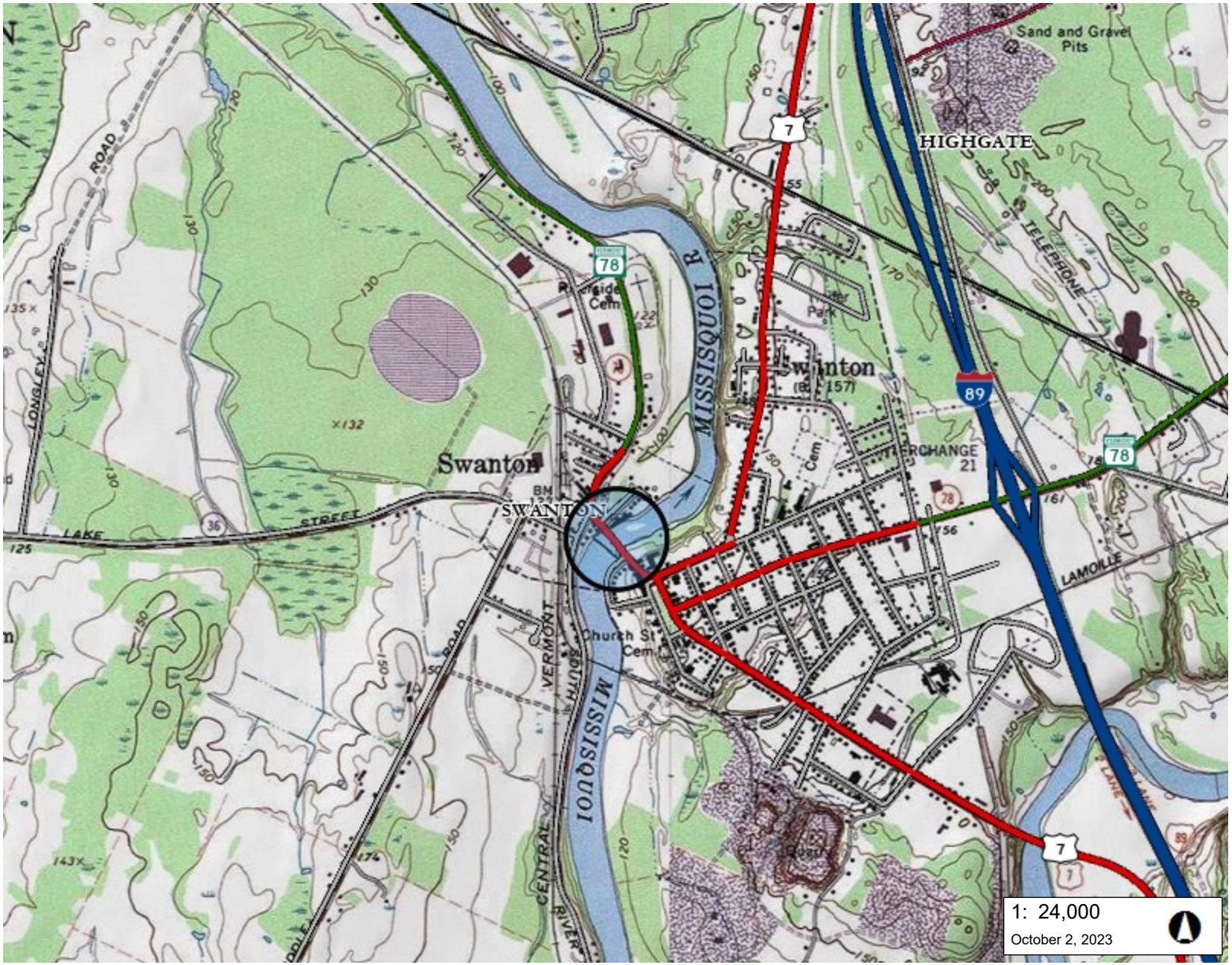
USGS Location Map

VERMONT

Swanton BF 036-1(16)

Vermont Agency of Natural Resources

vermont.gov



LEGEND

Roads

- Interstate
- US Highway; 1
- State Highway
- Town Highway (Class 1)
- Town Highway (Class 2,3)
- Town Highway (Class 4)
- State Forest Trail
- National Forest Trail
- Legal Trail
- Private Road/Driveway
- Proposed Roads

Town Boundary

NOTES

USGS Location

1,219.0 0 610.00 1,219.0 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 2000 Ft. 1cm = 240 Meters

THIS MAP IS NOT TO BE USED FOR NAVIGATION

DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.

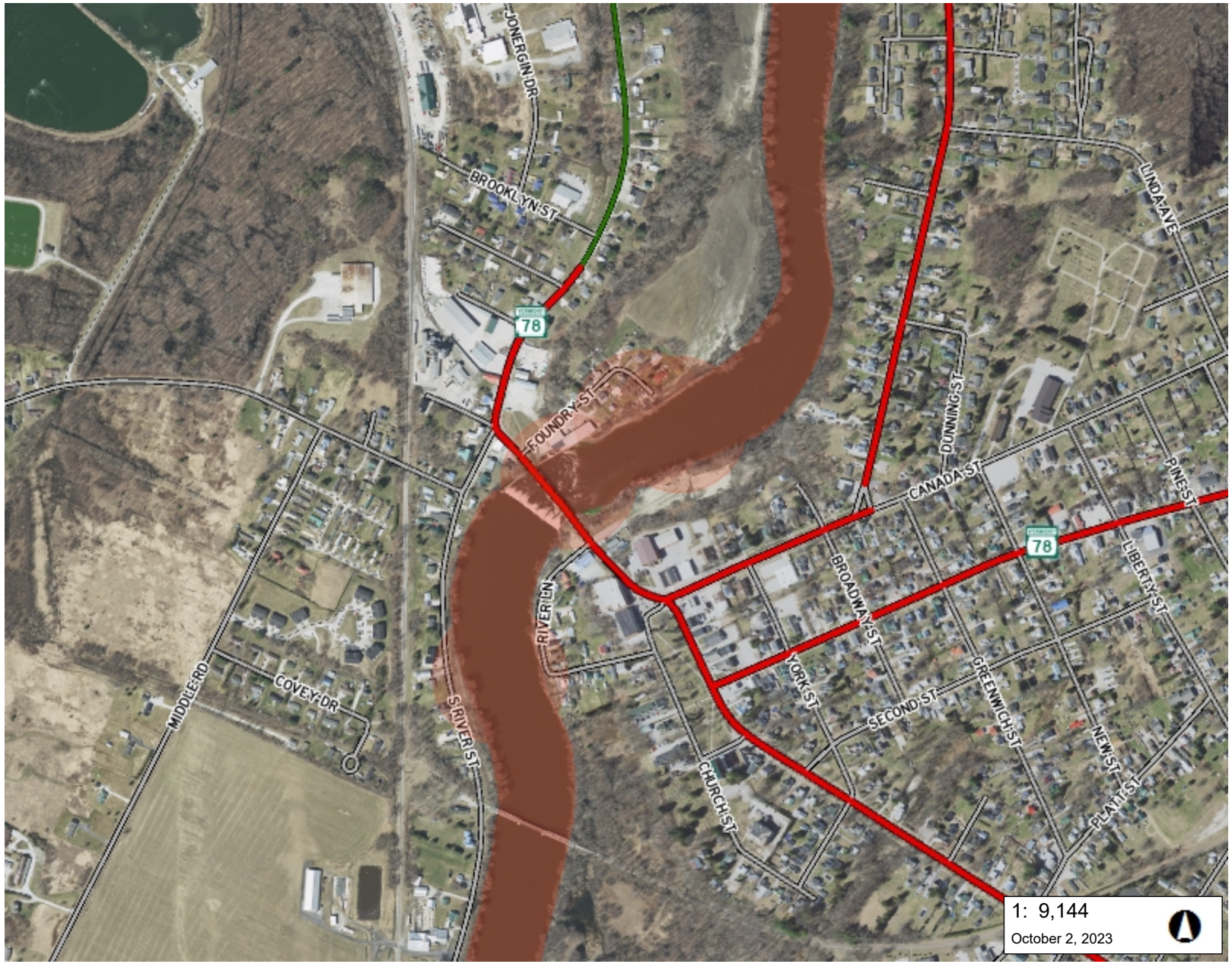
Rare, Threatened and Endangered Species

VERMONT

Swanton BF 036-1(16)

Vermont Agency of Natural Resources

vermont.gov



LEGEND

Rare Threatened and Endange

- RTE Animal
- RTE Plant

Roads

- Interstate
- US Highway; 1
- State Highway
- Town Highway (Class 1)
- Town Highway (Class 2,3)
- Town Highway (Class 4)
- State Forest Trail
- National Forest Trail
- Legal Trail
- Private Road/Driveway
- Proposed Roads

Town Boundary

NOTES

ANR-RTE species

465.0 0 232.00 465.0 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 762 Ft. 1cm = 91 Meters

THIS MAP IS NOT TO BE USED FOR NAVIGATION

DISCLAIMER: This map is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. ANR and the State of Vermont make no representations of any kind, including but not limited to, the warranties of merchantability, or fitness for a particular use, nor are any such warranties to be implied with respect to the data on this map.

Appendix F: Environmental Specialist Resource Memo

State of Vermont
Highways-PDB-Environmental
219 N. Main Street
www.aot.state.vt.us

Agency of Transportation

Date: April 2, 2024
Environmental Specialist: Julie Ann Held
Project: Swanton BF 036-1(16)

6(f) Properties:
There is an adjacent 6(f) Property and mitigation may be required if impacted.

Hazardous Waste:
Multiple known hazardous waste sites are located near the proposed project limits, Site No. 20164685, 20164658, for gasoline, heating oil, underground tanks. There may be a likelihood for hazardous waste to be encountered during ROW and/ or excavation on this project, so coordination with the Hazard Waste Coordinator is recommended once the scope is determined.

Contaminated Soils:
The proposed project is located within a mapped *Urban Background Soils* area (See ANR Atlas Map in the folder). Additional coordination with the Hazard Waste coordinator is recommended. Disturbed soils within this project should be expected to be kept on site, or follow notice to bidders guidance.

Wild Scenic Rivers:
There aren't any designated Wild Scenic Rivers within the project area as this portion of the Missisquoi River is south of the designated Upper Missisquoi River.

Act 250 Permits:
There are adjacent parcels that have Act 250 Permits and may need to be amended if impacted.

FEMA Floodplains:
There are FEMA Floodplains mapped within the project area and a Flood Hazard Area/ River Corridor Permit may be required if there are impacts.

River Corridor:
There are River Corridors mapped within the project area and a Flood Hazard Area/ River Corridor Permit may be required if there are impacts.

Protected Lands:
There aren't any Protected Lands within the project area.

US Coast Guard:
There aren't any US Coast Guard navigable waterways within the project area as there is a dam at the bridge location.

Lakes and Ponds:
There aren't any lakes or ponds within the project area.

Scenic Highway/ Byway:
There aren't any Scenic Highway/ Byways within the project area.

Environmental Justice:
There aren't any EJ populations present within the study area, therefore there isn't any potential to have a disproportionately high and adverse effect.

Other:
There aren't any other resources within the project area.

Appendix G: Archeological Resource Memo

Archaeological Resource Assessment of the Proposed Swanton BF 036-1(16) Project, Swanton, Franklin County, Vermont.

prepared for:

Vermont Agency of Transportation
Barre City Place
219 North Main Street
Barre, VT 05641

prepared by:

Arthur R. Clausnitzer, Jr., Ph.D.
Gemma-Jayne Hudgell, Ph.D.
and
Robert N. Bartone, M.A.

Northeast Archaeology Research Center, Inc.
382 Fairbanks Road
Farmington, Maine 04938

October 27, 2023

Archaeological Resource Assessment of the Proposed Swanton BF 036-1(16) Project, Swanton, Franklin County, Vermont.

Abstract

The Northeast Archaeology Research Center, Inc. (NE ARC) has completed an Archaeological Resource Assessment (ARA) for the proposed Swanton BF 036-1(16) Project in response to the Vermont Agency of Transportation's (VTrans) Work Order Request (WOR) for an Archaeological Resource Identification. The proposed Project is for bridge BR 6 over the Missisquoi River, located on VT Route 78 in the Village of Swanton, Franklin County, Vermont. This ARA is designed to identify all areas that are potentially sensitive with regard to the presence of Native American and Euroamerican archaeological sites within the proposed area of potential effect (APE) of the Project, as defined by VTrans, or to show that the Project APE is not considered sensitive for the presence of cultural resources. Based on the results of the assessment, NE ARC has determined that the proposed APE is sensitive for both pre-contact Native American and historic Euroamerican archaeological sites. Pre-contact Native American sensitivity is based on the Project's location along the Missisquoi River, its proximity to Swanton Falls, and the presence of riverside landforms of the type known to host Native American sites. Historic sensitivity is based on a historic map review, which shows the Euroamerican occupation in the area of the APE, including the potential presence of grist mills and sawmills dating to at least 1748. A previously identified historic archaeological site, VT-FR-0150 (the 19th-20th century George Barney Marble Mill), is also present with the proposed Project APE. Six specific archaeologically sensitive areas (ASAs) were defined within the APE, all considered sensitive for pre-contact and historic archaeological deposits. Any areas of the proposed Project APE not included within one of these six ASAs are not considered sensitive for archaeological deposits due to the presence of heavily disturbed soils, excessive slope, or the presence of standing buildings in the area. A Phase I archaeological survey is recommended prior to any ground-disturbing activities within the six defined ASAs to determine if potentially significant archaeological site(s) are present or to determine that such site(s) are not likely to be present.

Archaeological Resource Assessment of the Proposed Swanton BF 036-1(16) Project, Swanton, Franklin County, Vermont.

Affiliation of Authors

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Gemma-Jayne Hudgell, Ph.D.	Principal Investigator and Assistant Director Northeast Archaeology Research Center, Inc. 382 Fairbanks Road Farmington, Maine 04938
Robert N. Bartone, M.A.	Principal Investigator and Director Northeast Archaeology Research Center, Inc. 382 Fairbanks Road Farmington, Maine 04938

Archaeological Resource Assessment of the Proposed Swanton BF 036-1(16) Project, Swanton, Franklin County, Vermont.

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Archaeological Resource Assessment of the Proposed Swanton BF 036-1(16) Project, Swanton, Franklin County, Vermont.

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Figure 18. View southwest of the southeast quadrant of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont. Visible in this photo is the Marble Mill Park playground, showing its location with the foundation of the former Barney Marble Mill building, part of ASA 2. The bridge is out of frame to the right of the photo.

Figure 19. View of a large deposit of marble fragments within the root system of a large tree growing along the Missisquoi River bank in the southeast quadrant of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont. This tree is located within ASA 2, and the bridge is behind the photo to the right.

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Figure 26. View northeast of the unidentified foundation located in the northeast quadrant of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont. The foundation is located in ASA 6. Note the poor condition and the amount of marble scrap fill. The bridge is located to the left of and behind the photo.

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Figure 28. View northeast of ASA 4 within the APE for the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont. Note the tennis court fence on the extreme left of the photo. ASA 3 is in the far background. The bridge is located to the left of the photo.

Archaeological Resource Assessment of the Proposed Swanton BF 036-1(16) Project, Swanton, Franklin County, Vermont.

I. Introduction

The Northeast Archaeology Research Center, Inc. (NE ARC) has completed an Archaeological Resource Assessment (ARA) for the proposed Swanton BF 036-1(16) Project in response to the Vermont Agency of Transportation's (VTrans) September 8, 2023, Work Order Request (WOR) for an Archaeological Resource Identification (Figure 1). The archaeological work is required in order to meet regulatory requirements including, but not limited to, Section 106 of the National Historic Preservation Act and its implementing regulations. This work must meet the requirements mandated under guidelines determined by the Vermont Division for Historic Preservation (VDHP) (VTSHPO 2017).

The proposed Project is for bridge BR 6 over the Missisquoi River, located on VT Route 78 in the Village of Swanton, Franklin County, Vermont. As of yet, no specific plans have been developed for this Project. VTrans is seeking an assessment to determine if there are known archaeological sites and/or sensitive areas within the immediate area surrounding the bridge, considering the potential for impacts such as a temporary bridge, construction access, staging areas, etc.

This ARA is designed to identify all areas that are potentially sensitive with regard to the presence of Native American and Euroamerican archaeological sites within the proposed area of potential effect (APE) of the Project, as defined by VTrans, or to show that the Project APE is not considered sensitive for the presence of cultural resources (Figure 2). The assessment included the development of brief environmental and cultural backgrounds for the Project, archaeological sensitivity modeling, and a field inspection. The Project area was divided into four quadrants to facilitate the field inspection and maintain standard references, with VT Route 78 and the Missisquoi River forming the Y and X axes, respectively. The combined results of this research were utilized to determine archaeological sensitivity.

Based on the results of the assessment the proposed APE is considered sensitive for both pre-contact Native American and historic Euroamerican archaeological sites. Pre-contact Native American sensitivity is based on the Project's location along the Missisquoi River, its proximity to Swanton Falls, and the presence of landforms known to host Native American sites. Historic sensitivity is based on a historic map review, which shows the Euroamerican occupation of the APE, including the potential presence of grist mills and sawmills dating to at least 1748, as well as the presence of a previously identified historic archaeological site within the proposed Project APE: the 19th-20th century George Barney Marble Mill, VT-FR-0150. Six specific archaeologically sensitive areas (ASAs) were defined within the APE, all considered sensitive for both pre-contact and historic archaeological deposits (Figures

3 and 4; see also Table 1). Phase I archaeological survey is recommended prior to any ground-disturbing activities within the six defined ASAs to determine if potentially significant archaeological site(s) are present or to determine that such site(s) are not likely to be present.

II. Methods

The ARA of the Swanton BF 036-1(16) Project involved background research, archaeological sensitivity modeling, and a field inspection of the Project area. The background research included reviewing available environmental, historical, and archaeological data to determine the general sensitivity of the Project area. Materials reviewed included soil survey data, historical maps, and relevant printed and online literature. This research aimed to establish brief environmental, cultural, and historical contexts for the Project location. Additionally, the Vermont Archaeology Inventory (VAI), available online through the Vermont Online Resource Center (ORC), was reviewed for known pre- and post-contact archaeological sites near the proposed Project. Additional pre-contact sensitivity was conducted using the *Vermont Environmental Predictive Model for Locating Pre-Contact Archaeological Sites*, the results of which are provided in Appendix I.

Note that much of the background research is taken from archaeological work conducted for the VTrans Vermont Route 78 Swanton NH 036-1(1) Project, undertaken by NE ARC (previously the University of Maine at Farmington Archaeology Research Center (UMF ARC)) between 1999 and 2018 (Corey et al. 2002; Cowie et al. 2012; Hudgell et al. 2022; Hudgell and Bartone 2018). The APE for the Vermont Route 78 Swanton NH 036-1(1) Project began almost immediately north of the proposed Swanton BF 036-1(16) Project APE and extended for 9.6 km (6 mi) north along VT Route 78 (Corey et al. 2002). A Phase I survey in 1999 and a supplementary Phase I survey in 2018 for planned utilities did not identify any archaeological resources at the southern end of the NH 036-1(1) Project APE but did not extend into the APE of the proposed Swanton BF 036-1(16) Project (Corey et al. 2002, Hudgell and Bartone 2018).

In addition to the background research, NE ARC Historical Archaeologist and Project Director Arthur R. Clausnitzer, Jr., conducted a field inspection of the Swanton BF 036-1(16) Project APE on October 14, 2023. The field inspection was intended to ground truth the results of the background research and sensitivity modeling and assess the Project area for additional aspects of sensitivity not present on maps or aerial photographs. Features detracting from archaeological sensitivity, such as excessive slopes, wetlands, and areas of disturbance, were also noted during the field inspection. The proposed Project APE was photo-documented during this field inspection.

III. Environmental Setting

Local and regional environmental conditions are briefly summarized here since human lifeways, past and present, are better understood in relation to the ecological settings in which they occur. This overview is also relevant in that it supplies information on the presence or absence of archaeological sites in a given area and the preservation conditions there.

The Project location sits within the Missisquoi River drainage, which covers approximately 2,214 square kilometers (547,080 acres) of northern Vermont and southern Quebec (Figure 5). Specifically, the Project APE straddles the Missisquoi River, an approximately 130 km (80 mi) long transboundary river of Lake Champlain. Rising northwest of Lowell, Vermont, the Missisquoi runs roughly southeast to northwest before emptying into Lake Champlain's Missisquoi Bay at Swanton. Lake Champlain is one of the largest and most important bodies of water in northern New England. Besides its abundant natural resources, Lake Champlain provides direct access to Vermont, New York, and Quebec, while its tributaries provide access to the interior regions of these states and provinces. The Missisquoi River was noted as a convenient and popular route to access the Saint-Francois River drainage, which provided access to the St. Lawrence River and, ultimately, the Atlantic Ocean.

The Project APE is situated within the Champlain Valley biophysical zone, a relatively low, warm, and dry region of Vermont (Figure 6). Located along the eastern shore of Lake Champlain and extending north along the St. Lawrence in Canada and westward into New York, the Champlain Valley shares more traits with the lowlands around the Great Lakes than it does with the Green Mountains or Adirondacks. The average temperature exceeds 70 degrees F in July and is between 18 and 20 degrees F in January. Average precipitation in the Champlain Valley ranges from 28 to 38 inches, depending on proximity to Lake Champlain. The underlying bedrock is composed of Ordovician limestones, dolomites, and shales. The region ranges in elevation from 95 ft above mean sea level (a.m.s.l.) to 1,800 ft a.m.s.l. in the eastern foothills. The soils in the southern reaches of the valley are most often clay and related soil types; the soils in the former river deltas are sandier in composition. The entire valley is considered very good for agricultural use, and the once-extensive forested areas hosted both Northern Hardwood Forest and Valley Clayplain Forest matrix communities, including several natural communities found only within the Champlain Valley (Thompson and Sorenson 2005).

The proposed Swanton BF 036-1(16) Project lies within the northern area of the Champlain Valley; bridge BR 6 sits at an elevation of roughly 37 meters (122 ft) above mean sea level (a.m.s.l.), while the elevation within the Project APE varies from 33.5 to 40.8 meters (110 to 134 ft) a.m.s.l. The falls on the Missisquoi River, although altered by the Swanton Dam, drop almost 3.35 meters (11 ft) within the Project APE, emphasizing the hydropower the falls once provided.

According to information from the United States Department of Agriculture, the soils in and around the are predominantly sandy loams or loam, with Deerfield fine sandy loam forming the majority of the Project APE (USDA 2023) (Figure 7). The Deerfield series consists of deep, moderately well-drained soils formed from glaciofluvial deposits on outwash terraces, deltas, and plains (USDA 2018). Also found within the Project APE are Massena stony loam and Munson silt loam. Both of these soil types are poorly drained and usually found on till plains or on lake or marine plains (USDA 1997, 2006). In the Project APE, these soils are concentrated to the northwest side of the APE, with the Munson soils along the river and the Massena soils further away. The landforms within the proposed Swanton BF 036-1(16) Project APE are river terraces, but these are comprised mainly of till and glacial outwash, rather than alluvium; alluvial river terraces are found within the floodplain and building delta further downriver. While not subjected to the same level of flooding, these outwash/till terraces can be inundated by infrequent flood events such as a 100-Year Flood, potentially leaving depositional layers within the terrace soils.

IV. Cultural Setting and Sensitivity Modeling

General Native American Context

The Native American history of Vermont and the broader New England region is divisible into four major periods (Haviland and Power 1994; Petersen 1995) (Figure 8). These include the following:

- Paleoindian period, ca. 9000-7000 B.C
  - Early Paleoindian period, ca. 9000-8300 B.C.
  - Middle Paleoindian Period, ca. 8300-8100 B.C.
  - Late Paleoindian period, ca. 8100-7000 B.C.
- Archaic period, ca. 7000-1000 B.C
  - Early Archaic period, ca. 7000-5500 B.C.
  - Middle Archaic period, ca. 5500-4000 B.C.
  - Late Archaic period, ca. 4000-1000 B.C.
- Woodland period, ca. 1000 B.C.-A.D. 1550
  - Early Woodland period, ca. 1000-100 B.C.
  - Middle Woodland period, ca. 100 B.C.-A.D. 1000
  - Late Woodland period, ca., A.D. 1000-1550
- Contact period, ca. A.D. 1550-1750

The first human entrants into the region came during the Paleoindian period (ca. 9000-7000 B.C.), which is further divided into Early, Middle, and Late subperiods based on artifact typology and patterns of resource procurement and settlement location that reflect the rapidly changing postglacial environment of the time. Paleoindian populations are generally believed to have been small groups of semi-nomadic hunter-gatherers who were adapted to residence and subsistence in tundra and tundra-woodland environments.

The transition to a closed forest across most of the region after ca. 8,000-7,000 B.C. roughly corresponded with the beginning of the subsequent Archaic period. Evidence of Archaic period occupations is generally more common than that of the Paleoindian period; however, Archaic sites predating 4,000-3,000 B.C. are rare in the region. Archaic populations are generally considered hunter-gatherer groups utilizing a broad spectrum of resources in evolving, increasingly forested Holocene environments. Settlements were focused along rivers and streams, and a general trend toward larger populations became pronounced. The Archaic period is also generally subdivided into three subperiods, reflecting technological and sociological changes.

The final major pre-contact period, the Woodland period, is likewise divisible into three subperiods: Early, Middle, and Late. The introduction of ceramics into the Northeast is the primary criterion for the distinction between Archaic and Woodland cultures, and the three subperiods are again

distinguished in part by changes in pottery manufacture, style, and decoration (Petersen and Hamilton 1984). Evidence of all three subperiods is present in regional contexts. However, the Middle Woodland period remains the best known, primarily from excavations of stratified sites on the Winooski and Missisquoi Rivers (Corey et al. 2002; Cowie et al. 2012; Haviland and Power 1994; Hudgell et al. 2022; Petersen 1980; Petersen and Power 1983), and additionally due to the highly diagnostic nature of the pots of this period. These were covered entirely in surficial decoration, thus making it easy for even small sherds to be attributable to a Middle Woodland occupation.

The early portion of historical times is known in New England as the Contact period (ca. A.D. 1600-1750), when local Native American populations first entered recorded history through interaction with Europeans. The Contact period is typified by material culture traits of both traditional Native American and European origin. European goods rapidly replaced traditional technologies as they became available. This was a dynamic period wrought with violence, disease, and hardship, leading to the near collapse of traditional lifeways. In northern New England, some Native populations, rapidly dispossessed of much of their hunting and farming lands, moved to more remote locations away from European settlement or joined other native groups to achieve viable communities. In contrast, some populations were less successful in negotiating the disastrous times of the Contact period. The specific Contact period context for the Project is provided further below.

Project-Specific Native American Context and Sensitivity

While not as archaeologically rich as Addison County to the south, likely due more to a lack of research rather than a lack of Native American use and occupation, Franklin County does host numerous pre-contact archaeological sites. In particular, a large number of sites are found along the banks of the Missisquoi River, which is not surprising as the river is documented as being an important travel corridor for Abenaki and other Native American groups. While there are no currently documented pre-contact Native American sites within the specific area of the proposed Swanton BF 036-1(16) Project APE, there are over 30 sites located within a five-kilometer (3-mile) radius, nine of which are located within 1.6 kilometers (one mile). These nine are summarized in Table 2 and described below. These sites generally represent relatively small, isolated finds consisting of either single or small numbers of artifacts. Few diagnostic artifacts were recovered, but what is present suggests a mix of Archaic and Woodland period occupations.

Four of the most proximate sites (VT-FR-0040, VT-FR-0039, VT-FR-0042, and VT-FR-0053) are known from William Ross' collecting activities in the early 20th century. VT-FR-0042 was reported as a burial from an undetermined period, but no other information was provided. The other three sites appear to represent small, temporary campsites dating from the Archaic and Woodland periods. They produced a

mix of chert and quartzite flakes, complete and incomplete biface points, and hammerstones, suggesting that tool manufacture or retouching was undertaken at these sites.

Of the remaining proximate sites, VT-FR-0350, VT-FR-0285, and VT-FR-0286 represent small sites, producing small quantities of artifacts, including a knife blade, chert flakes, and a triangular chert point. VT-FR-0127 and VT-FR-0346 are slightly larger, each producing numerous flakes, with the former producing one complete and one broken biface along with fire-cracked rock, while the latter produced ceramic sherds and calcine bone.

Two other notable nearby sites are VT-FR-0318, the Headquarters Site, and VT-FR-0326, the Porcupine Site. Located on the southern bank of the Missisquoi floodplain, approximately 3.4 km (2.1 mi) downstream from the proposed Project APE, both sites were excavated in several episodes by the UMF ARC/NE ARC, revealing large, deeply stratified multi-component sites producing thousands of artifacts dating from the Middle Archaic through to the Contact periods (Corey et al. 2002; Cowie et al. 2012; Hudgell et al. 2022). Besides greatly expanding on the knowledge of pre-contact Native American use and occupation of the region, these sites show the importance of the Missisquoi River throughout the pre-contact period and the concurrent potential for significant sites along its banks.

Also of note is the Boucher Site, VT-FR-0026, located in Highgate, Vermont, approximately 1.9 km (1.18 mi) downstream from the proposed Project APE. This site is an Early Woodland period cemetery with a number of human burials. Both inhumations and cremations are present with radiocarbon dates ranging from 885-115 B.C. (Heckenberger et al. 1990; Robinson 2015). The burials contained a vast array of ceremonial items, often including copper beads, which allowed for exceptional preservation of a range of perishable materials from textiles to leather. This site is significant as one of the few well-documented Early Woodland sites in northern Vermont, and again speaks to the importance of the Missisquoi River in the pre-contact period.

In addition to a record of documented archaeological sites, the VDHP's *Environmental Predictive Model for Locating Precontact Archaeological Sites* assisted in the determination of Native American archaeological sensitivity for the Project. This is a paper score system that assigns values to various environmental factors that may be present within a given Project area. For the proposed Swanton BF 036-1(16) Project, factors present which contribute to a positive score include the Project's location along the Missisquoi River on glacial outwash terraces, the proximity of the Swanton Falls and a nearby head of draw, its location within the natural travel corridor between Lake Champlain and the St. Lawrence, the proximity of extant or historic wetlands, and the large number of known sites along the Missisquoi River. Together, this adds up to a total score of 90, well above the threshold of 32 required for an area to be considered sensitive for pre-contact archaeological deposits.

The predictive model also allows for negative factors, including excessive slope or erosion and the presence of previously disturbed land. Due to the level of historic Euroamerican development within the Project APE (discussed below) and more recent developments, there is the possibility that some portions of the APE may exhibit a level of disturbance that would have destroyed the integrity of pre-contact Native American deposits along this part of the river. However, the possibility that intact deposits remain in areas of the APE that were not as heavily disturbed, or below the level of disturbance, cannot be discounted, and for this reason the negative modifier for potential disturbance within the APE has not been applied.

General Contact Period Native American Context and Archaeological Sensitivity

The area around Swanton is also noted for the level of contact period Native American activity in the region, particularly during the early to mid-17th and 18th centuries. In particular, both the Headquarters (VT-FR-0318) and Porcupine (VT-FR-0326) sites noted above are known to be part of the location of the Abenaki village of Missisquoi (Mazipskoík), and a brief history of that village is warranted. Most of the following discussion is taken from the Phase III report for the Headquarters and Porcupine sites (Hudgell et al. 2022).

It is generally agreed that the Abenakis are the descendants of the Late Woodland peoples who inhabited the same region prior to the arrival of the Europeans (Haviland and Power 1994:157). Two Abenaki villages survived late enough to be mentioned in historic sources: Winoskék on the Winooski, and Mazipskoík (Missisquoi), located along both sides of the Missisquoi River (Mazipskoisibo) between the fishing falls at Takwahohganek (or Taquahunga; Swanton Center, the location of the Project APE) and the Missisquoi Delta, including along Monument Road in Highgate and North River Street (Route 78), and in the area of the Headquarters and Porcupine sites. Mazipskoík was part of an extended trade network reaching from the Atlantic Ocean to the Great Lakes, and the Abenaki Nation describe how Missisquoi people were connected to and intermarried with other Abenaki/Wabenaki communities as well as Iroquoian peoples to the west (Abenaki Nation of Missisquoi 2022).

Through the 17th century, travelers reported bands of Native peoples at Missisquoi. Native guides informed Samuel de Champlain of corn fields on the eastern shore of Bitawbagw (Lake Champlain) in 1609, and in 1615, a French missionary travelled on Bitawbagw and the Missisquoi River to “the village at the falls”. While the ‘village’ appears to be generally documented farther downstream, in the area of the floodplain and Missisquoi Delta (and area of the Headquarters and Porcupine sites), this statement suggests that at least some form of village was present at the falls at Takwahohganek – and thus potentially within the Project APE (Figure 9).

Jesuits established missions along Ktsitekw (the St. Lawrence) to the north and along the Penobscot and Kennebec rivers and coast to the east, and during the 1660s the Abenaki were in general retreat to Quebec due to wars with the Iroquois (Abenaki Nation of Missisquoi 2022). Ultimately, France strategically established missions on all the major river drainages in northern New England to aid in protecting Quebec's southern flank. Although the social dynamics of these times were complex and difficult to accurately depict, for the most part the Abenakis were allied with the French, and the Iroquois with the English, hence the Abenaki search for refuge in New France. During the 1680s and 1690s, Native people travelled between Schaghticoke (on the Hoosic River), Kwenitekw, Missisquoi, Winooski, Sillery, and Odanak, and intermarriages were common.

The eighteenth century saw various population changes at Missisquoi, summarized thus: a period associated with the dominance of Chief Greylock (ca. 1712-1730); a period of epidemic and its aftermath (ca. 1730-1740); establishment of the mission at Missisquoi ca. 1743-4 by Jesuit Etienne Lauverjat; abandonment of Missisquoi and movement of people to St. Francis (ca. 1743-1760), followed by their return (1763-1775); and again, a retreat to St. Francis around 1775 at the start of the American Revolution (Calloway 1990). By the early 1700s, it appears that two contemporaneous sites were located at Missisquoi including a fortified location – possibly Greylock's "Indian Castle" – as well as a more traditional village. Less nucleated Abenaki villages often included palisaded forts to which people could retreat in times of war. These forts, constructed via embedding vertically set logs into a trench, appeared much like "castles" to Europeans, and an "Indian Castle" is recorded on various 16th century maps for the Abenaki at Missisquoi (Brassier 1776; Collins 1765; Sauthier 1779; Sotzmann 1796) – this is located well downstream (at least 2 miles) of the Project APE, within the Missisquoi Delta. During the series of French and English wars which occurred around this time, the stockade, with the village inside, apparently served as a staging ground for raids by the French and Abenaki on English settlements. The village and fort were abandoned at some point in the mid-18th century. Although the Abenaki returned following the end of hostilities between the French and English, continuing conflict with English settlers and the outbreak of the American Revolution eventually caused the Abenaki to again withdraw to Quebec.

Given the documented presence of an Abenaki village near the proposed Swanton BF 036-1(16) Project APE including the area of the Headquarters and Porcupine sites (and other sites of the same date located within the wider Missisquoi Delta – per the VAI), the documented activity at the fishing falls at Takwahohganek (Taquahunga; Swanton Center), and the continued use of the Missisquoi River as a travel corridor by both Native American and Euroamerican people, the proposed APE is considered sensitive for the presence of contact-period archaeological deposits.

General Post-Contact Historical Context

The first recorded European settlement in what is now Swanton was not by English colonizers but by the French. Under a grant given to Sieur Phillipe-Rene le Gardeur de Beauvais, Jr., in July of 1734, a small occupation was established at Takwahohganek/Taquahunga Falls (Swanton Falls); however, this grant reverted to the Crown domain in 1741 as the grantee failed to make any improvements to the land. A second grant was given in 1748 to Nicolas-Rene Levasseur, a naval contractor who had previously visited the area. Levasseur is said to have cut a channel through the rocks along the river to establish a sawmill, from which he shipped pine timber to Quebec. A village of 50 huts grew up around the sawmill, but following the surrender of New France in 1759, most of these settlers withdrew from the region (Ledoux 1988).

The English occupation of Swanton began the same way as much of the 18th-century settlement of Vermont did, with one of New Hampshire governor Benning Wentworth's New Hampshire Grants. The charter for the area, which now contains Swanton, was issued in 1763, and the developing township was allegedly named for an American-born British army officer, Captain William Swanton, who had been active in the region during the French and Indian War. None of the original grantees of the Wentworth charter settled in the region, choosing to sell their shares to other parties instead. The first actual settler of English descent was Simon Metcalfe, who arrived in the area around 1767 with a grant from New York, one of the competing series of land grants that were issued during the dispute over the Vermont territories. He either built or purchased a sawmill located at Swanton Falls and, by 1771, had managed to acquire approximately 30,000 acres, which were formed into the township of Prattsburgh and included parts of present-day Swanton, Highgate, Sheldon, and St. Albans (see Figure 9). As is the case with most of the New York grants, following the American Revolution and the formation of the United States of America, these were put aside in favor of the New Hampshire grants. This meant that by 1786, Prattsburgh and Metcalfe's holdings were dissolved, and Ira Allan, younger brother of the infamous Ethan Allen, claimed possession of much of Swanton by virtue of holding 59 of the original 64 shares created by the New Hampshire Charter (Ledoux 1988).

Much of the early Euroamerican history of Swanton was driven by its falls and the ability of those falls to power machinery. Levasseur and Metcalfe built sawmills along the river (see Figure 9), and even after the end of their proprietorships, mills and other water-powered industries remained a significant part of Swanton's economy. The 1796 Whitelaw map, for example, shows both a grist mill and a sawmill along the Missisquoi River (Figure 10) (Whitelaw 1796). The 1857 Walling and 1871 Beers maps show mills clustered along the river (Figures 11 and 12) (Beers 1871; Walling 1857). The most substantial of these was the George Barney Marble Mill, which operated a marble sawing mill and other related infrastructure in the town from about the 1850s until the 1940s. Following World War II, the mill

industry slowly declined. Today, only the dam and the former Vermont Marble Company mill on the north side of the river remain as a visual reminder of Swanton's industrial past.

Project-Specific Post-Contact Historical Context and Archaeological Sensitivity

Due to its location adjacent to Swanton Falls, it could be said that the history of Swanton is the history of the Project APE. As the primary source of hydropower in the town, the falls attracted entrepreneurs who sought to build their wealth on the back of the river's power. The most notable of these industries is the George Barney Marble Mill, the remains of which are visible today and are incorporated into a small riverside park (Figure 13). There is also a historical marker commemorating the mill operations; this marker also serves as a convenient reference point for VT-FR-0150, the VDHP designation for the George Barney Marble Mill archaeology site. This site encompasses much of the southeast quadrant of the Project APE, including the foundation remains and other features, including the now-filled raceway (Figure 14). Portions of this quadrant and the southwest quadrant are included within the Swanton Village State Historic District (Figure 15).

Reviewing the historic maps mentioned previously and late 19th and early 20th Sanborn Fire Insurance Maps amply demonstrate the amount of and persistence of mills and other industries along the Missisquoi River in proximity to falls. As mentioned previously, the map of Takwahohganek/Taquahunga Falls (see Figure 9) shows the area of Metcalfe's mill and farm; and the 1796 Whitelaw map (see Figure 10) shows a grist mill and sawmill along the river in Swanton. Although the exact location is ambiguous on the Whitelaw map, the need for waterpower to run the machines means these structures would have to be located close to or at the falls. However, the maps from the 1857 and 1871 atlases of Franklin County are less ambiguous. The 1857 map of Swanton Falls lists various mills and other industries along the Missisquoi River. In the southeast quadrant alone are a stone mill, sash and blind manufacturer, tannery, woolen mill, sawmill, and foundry. A grist mill and store are located in the southwest quadrant, a blacksmith's shop in the northwest, and a workshop, stone mill, and other shops in the northeast (Walling 1857) (see Figure 11). The 1871 map shows George Barney's marble sawmill for the first time, along with other factories and mills, including a sash and door factory, grist mills, a furniture shop, and a wagon shop (Beers 1871) (see Figure 12).

The Sanborn Fire Insurance Maps for Swanton were first published in 1892, and last published in 1930 and continue to show the importance of the river-powered industries along the rivers. The Barney Marble Mill, which was taken over by the Vermont Marble Company around 1900, dominated the southern bank, with the cutting mill located in the southeast quadrant of the Project APE and various supporting structures in the southwest, along with a grist mill. The northeast quadrant was home to the Robin Hood Ammunition Company from 1898 until 1909, when the company relocated to another

location within Swanton; the Vermont Marble Company would build a new sawing mill in this area by 1930. The original Barney mill continued operation while also being used for the finishing and boxing of the final products (Figures 16 and 17) (Sanborn Map Company 1892, 1897, 1904, 1909, 1920, 1930). The mills closed in the 1940s, and while the new sawmill building still stands, the George Barney Mill was removed. The former location of the Barney Mill was assessed as part of the development of Marble Mill Park, and recorded as an archaeology site (VT-FR-0150) in 1977 due to its significance and eligibility for inclusion on the NRHP (Neudorfer 1977; Setchel and Prahl 1977).

The map evidence and historical records show that the area in and around the proposed Project APE has been used for nearly two centuries to support water-driven industrial development. Although later construction, including the George Barney and Vermont Marble Company marble mills, have served to obscure the older mills and industries, there is the possibility that features of these earlier structures could have survived and are present within the proposed Project APE. Combined with the Project APE containing a portion of the Swanton Village Historic District and the prior designation of the George Barney Mill as an archaeological site, VT-FR-0150, the Project APE is considered sensitive for post-contact Euroamerican archaeological deposits related to the early settlement and industrial history of Vermont.

V. Field Inspection

NE ARC historical archaeologist and Project director Arthur R. Clausnitzer, Jr. visited the APE for the proposed Swanton BF 036-1(16) Project on October 14, 2023. The purpose of this visit was to ground truth the results of the background research and investigate the site for any features not noted on maps, aerial photos, and other research. Features detracting from archaeological sensitivity, such as excessive slopes, wetlands, and areas of disturbance, were also noted during the field inspection. During the visit, the six ASAs were defined and recorded. The Project APE was photo-documented, and GIS reference points were taken using ArcGIS Field Maps during the visit.

Project Description

The proposed Swanton BF 036-1(16) Project APE is located along VT Route 78 and bridge BR 6 in Swanton, Vermont. The APE for is an irregularly shaped area consisting of approximately 54,596 square meters (13.58 acres). However, the actual ground area is smaller due to the APE straddling the Missisquoi River (see Figure 2). As mentioned, the Project area was divided into four quadrants, with VT Route 78 and the Missisquoi River forming the Y and X axes, respectively. Thus, the southwest quadrant of the Project APE is south of the Missisquoi and west of Route 78.

The southeast quadrant of the APE contains the remains of the George Barney Marble Mill, which is now a somewhat dilapidated public recreation space known as Marble Mill Park. This includes a moderately sized parking area, skate park, playground, and tennis court (see Figure 13). There are also several areas of open grass and easy access to the riverbank from this quadrant. Evidence of the site's past as a marble-cutting mill is scattered across the quadrant and includes building foundations, deposits of marble chips, and the remains of what may have been a chimney stack or boiler feature (Figures 18 and 19). Additionally, a historical marker provides context for the mill's history and is a convenient reference point for the location of VT-FR-0150, the archaeological site associated with the George Barney Mill.

The southwest quadrant of the APE contains a small parking area with a scenic overlook of the dam and a small grassy open space with a boat launching area along the river (Figures 20 and 21). It also includes part of the urban area on the south side of River Lane. Most of this area is occupied by the Veterans of Foreign Wars Post and associated parking lot. Based on historical maps and partially confirmed by a historical plaque near the scenic overlook, this area once contained a grist mill and storage buildings associated with the Barney Mill.

The current Swanton Dam was built circa 1929 to replace a heavy timber structure dated to the late 19th century. Constructed approximately 10 to 15 feet (3 to 4.5 meters) downstream from the older structure, the dam was built to provide water power to the grist and marble mills on both sides of the

river. Built of concrete, the dam ranges in height from three feet to nine feet (one to three meters) and is approximately 335 feet (102 meters) long. Immediately adjacent to the dam is the BR 6 bridge, an approximately 92-meter (300 ft) steel and concrete bridge spanning the Missisquoi River (Figure 22).

The northwest quadrant of the proposed Project APE is the smallest overall area. The most notable feature of this area is the flume for the former Vermont Marble Company building, which is located in the northeast quadrant. A similar flume was constructed on the southern bank to feed the Barney Marble building but was removed/filled during the construction of the current bridge. During the site visit, it was noted that a structure appeared to have been removed recently, indicated by a cordoned-off foundation hole (Figure 23). A review of publicly available aerial imagery suggests the building was removed circa 2021-2022. The remaining area of this quadrant consists of the grassy rear yards of two residential buildings. The 1857 and 1871 historical maps and several Sanborn Fire Maps show a blacksmith's shop and other businesses in this area, but these may overlap with the footprint of extant houses, and as such, the remains of former buildings may be preserved beneath existing structures or within their yard spaces.

The northeast quadrant includes the 1920s Vermont Marble Company mill building, the only surviving structure from Swanton's industrial era (Figure 24). Currently, the building is being used as commercial space, including an automotive repair shop. This quadrant also encompasses a small public park and a gravel parking area associated with the nearby Swanton Lumber Company (Figure 25). The historical maps show several structures this quadrant, including storage and support buildings for the Robin Hood Ammunition Company and dwelling houses. The field inspection also located a concrete foundation or structure in the wooded area north of Foundry Street (Figure 26). Its original purpose is unknown, but it may be related to an unlabeled structure on the 1930 Sanborn Map. The remaining structure is in poor condition and is largely filled with marble scraps.

VI. Archaeological Sensitivity

The proposed APE for the Swanton BF 036-1(16) Project is considered sensitive for pre-contact Native American archaeological sites based on the Project's location along the Missisquoi River, its proximity to Swanton Falls, and the presence of landforms known to host Native American sites, all of which are known positive contributing factors for pre-contact sites. While no pre-contact Native American sites are documented within the proposed APE or its immediate surroundings, the banks of the Missisquoi River are known to have been the location of pre-contact activity for thousands of years, and the absence of documented sites in the proposed Project APE most likely reflects the fact that no archaeological survey work has been undertaken in this specific area. While there is apparent disturbance due to the historic industrial activity within the proposed APE, the degree and extent of disturbance is undefined, and as such, there remains the potential for intact pre-contact deposits to be present.

In sum, background research and sensitivity modeling indicate that parts of the proposed APE for the Swanton BF 036-1(16) Project exhibit a high degree of archaeological sensitivity for pre-contact or contact period sites. Expected site types include:

1) Native American sites of the Woodland period, ca. 1000 B.C.-A.D. 1600 and Contact period, ca. A.D. 1600-1750, located near rivers, streams and wetlands.

2) Sites of greater antiquity (Archaic age or older, ca. 8500-1000 B.C.) on landforms of Late Pleistocene or Early Holocene age, potentially located within the Project area.

The proposed APE for the Swanton BF 036-1(16) Project is also considered to be sensitive for post-contact Euroamerican archaeology. This is due to the documented level of mid-to-late 19th and early 20th-century industrial activity at Swanton Falls, the potential for the remains of 17th and early-18th century contact-period sites and the remains of documented mid-18th and early 19th-century industrial activities, and the presence of archaeological site VT-FR-0150 (the remains of the 19th-20th century George Barney Marble Mill) within the southeast quadrant of the proposed Project APE.

As mentioned in previous sections, six ASAs were delineated as a result of the background research and field inspection (see Figures 3 and 4). A single ASA was set in each of the southwest, northwest, and northeast quadrants. The southeast quadrant was divided into three adjacent ASAs based on differential physiographic characteristics and other information. Table 1 briefly summarizes each ASA and provides information on the size and sensitivity of each area, and more detailed descriptions and explanations are provided below.

ASA 1

ASA 1 is located in the southwest quadrant of the proposed Project APE and consists of a small public park and boat launch area (see Figure 21). Based on the Walling, Beers, and Sanborn maps, this ASA once contained storage and other auxiliary structures for the Barney Marble Mill. A grist mill and pump house, also marked on the Sanborn maps, were located where the parking lot and dam overlook are now positioned. Visible disturbances include powerline poles and waterline hookups, which are located closer to the road, so the portions of the ASA nearer to the river are potentially less disturbed. Although questions about the construction and removal of earlier dams, changes in the road configuration, and erosion and/or filling of the riverbanks exist, this 1,182 square meter area has a high potential for the presence of intact pre-contact archaeological materials. At the same time, historical materials related to the nearby grist mills and the Barney Marble Mill are also likely to be present.

ASA 2

ASA 2 is located in the southeast quadrant of the proposed Project APE. Encompassing approximately 4,908 square meters, ASA 2 stretches from the Marble Mill Park parking on the east side of Route 78 west to the tennis courts and from the Missisquoi River to a steep bank (old terrace edge?) on the park's southern boundary. Previously documented site VT-FR-0150, the George Barney Marble Mill site, is located within this ASA, which includes the filled-in remains of the Barney Mill raceway, parts of the mill foundation, which now contain a skate park and playground, and other associated features (see Figures 13 and 18). Based on the field inspection, substantial amounts of fill, predominantly waste marble fragments, are present within the ASA (see Figure 19). As stated before, however, pre-contact deposits may be buried underneath the fill layers and in other parts of the ASA that may have experienced less disturbance, such as the grassy area on the south side of the park pathway adjacent to the steep bank.

ASA 3

Also located in the southeast quadrant of the proposed Project APE, ASA 3 is an approximately 1,060 square meter area encompassing the grassy lawn and parts of the overgrown riverbank to the north of the tennis courts (Figure 27). Its eastern edge is in line with the east edge of the proposed Project APE. Its western boundary is in line with the western edge of the tennis courts, immediately adjacent to the eastern edge of ASA 2. The separation between ASA 2 and ASA 3 is due to the field inspection showing that this is the approximate extent of features that can be directly related to the Barney Marble Mill. This is further reinforced by the historic and Sanborn maps, which show that, except for some circa 1930 storage buildings, there was no active historic development along this portion of the proposed Project

APE. As such, ASA 3 has a higher potential for intact pre-contact deposits than ASA 2 while maintaining the potential for significant historic deposits.

ASA 4

ASA 4 is the third ASA located within the southeast quadrant of the proposed Project APE. Encompassing an approximately 867 square meter grassy area immediately east of the tennis courts to the eastern edge of the proposed Project APE, ASA 4 is adjacent to ASA 3 on its northern boundary and the steep bank between the park and the neighboring residential area on its southern boundary (Figure 28). As with ASA 3, this area does not appear to be within the footprints of former buildings, though this does not mean it was not used for storage or dumping activities by the marble mills. However, because of the lack of documented historic use and its proximity to the river downstream of the falls, this ASA has some of the highest potential for intact pre-contact archaeological deposits of the six ASAs within the proposed Project APE.

ASA 5

ASA 5 is located in the northwest quadrant of the proposed Project APE, encompassing approximately 984 square meters of the rear yards of the properties at 5 and 9 S River Street (see Figure 23). The historical maps show several different structures located in this approximate area between 1857 and 1930, including a sawmill, blacksmith's shop, woodworking shop, grocer, storage, and tenement buildings. Secondary deposits related to these industries and occupations may be present within the ASA. There is also moderately high potential for pre-contact archaeological deposits; however, like ASA 1, the impact of construction and removal of earlier dams, changes in the road configuration, and erosion and/or filling of the riverbanks may have an adverse impact on any such deposits.

ASA 6

ASA 6 is the largest of the delineated ASAs at approximately 5,140 square meters. This area included a small park or green space at 2 N River Street and a portion of the gravel parking lot associated with the lumber yard located in part at 11 N River Street (see Figure 25). Located on the north side of Foundry Street, across the road from the circa 1930 Vermont Marble Company mill, this ASA also contains the unidentified concrete foundation feature noted previously (see Figure 26). The 1857 Walling map indicates that this ASA was part of the property owned by B. Scott, who had two buildings on the property. By 1871, the property was owned by R. (or H.) Skinner, who had a single building located near the intersection of what is now Foundry and Depot Streets. The 1909 Sanborn fire insurance map shows a series of auxiliary buildings related to the Robin Hood Ammunition factory in place of this house,

including a generator room containing a dynamo, what may be a boiler building with an attached coal room, and a loading room building. Also within the ASA were the grain elevator and storage facilities for the E. W. Bailey and Co. grist mill. By 1920, the Robin Hood Ammunition buildings were gone, but the E. W. Bailey buildings were still standing by 1930. A dwelling is also noted behind the grist mill buildings along N River Street on all of the Sanborn maps. Therefore, there is the potential for archaeological deposits related to the ammunition factory and grist mill-related buildings, as well as domestic deposits from the mid-to-late 19th and early 20th centuries. As with the other ASAs, there exists the possibility that pre-contact archaeological deposits are buried beneath the historic period deposits, and ASA 6 is considered moderately sensitive for such deposits. This is particularly true in the southeast area of the ASA, where less disturbance may have occurred.

Non-Sensitive Areas

The remaining areas of the proposed Project APE not encompassed by one of the delineated ASAs are considered not sensitive for archaeological materials, particularly those from the pre-contact period. This is either due to the presence of standing structures (i.e., the V.F.W. in the southwest quadrant or the former Vermont Marble Company mill in the northeast quadrant), landscape or environmental reasons (the steep slope on the southern edge of the southeast quadrant), or excessive disturbance (the open foundation hole in the northwest quadrant or the filled in raceway and parking area in the southwest quadrant).

VII. Conclusions and Recommendations

NE ARC has completed an Archaeological Resource Assessment (ARA) for the proposed Swanton BF 036-1(16) Project in response to the VTrans September 8, 2023, Work Order Request (WOR) for an Archaeological Resource Identification. The proposed Project is for bridge BR 6 over the Missisquoi River, located on VT Route 78 in the Village of Swanton, Franklin County, Vermont.

Based on the results of the assessment, NE ARC has determined that the proposed APE is sensitive for both pre-contact Native American and historic Euroamerican archaeological sites. Pre-contact Native American sensitivity is based on the Project's location along the Missisquoi River, its proximity to Swanton Falls, and the presence of landforms known to host Native American sites. Historic sensitivity is based on a historic map review, which shows Euroamerican occupation and activity in the area of the APE, including the potential presence of grist mills and sawmills dating from at least 1748. A previously identified historic archaeological site is also present with the proposed Project APE: VT-FR-0150, the George Barney Marble Mill, established ca. 1850 and remaining in use until at least the 1940s. Six specific archaeologically sensitive areas (ASAs) were defined within the APE, all considered sensitive for pre-contact and historic archaeological deposits. Any areas of the proposed Project APE not included within one of these six ASAs are considered not sensitive for archaeological deposits due to the presence of obvious and substantial disturbance, excessive slope, or the presence of standing buildings in the area. Phase I archaeological survey is recommended prior to any ground-disturbing activities within the six defined ASAs to determine if potentially significant archaeological site(s) are present or to determine that such site(s) are not likely to be present.

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Tables and Figures

Table 1. *Archaeologically sensitive areas (ASAs) within the area of potential effect (APE) for the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont.*

ASA #	Notes	Area (sq. m.)
1	grassy lot west of parking area on the west side of RT 78	1181.99
2	Marble Mill Park from parking area to tennis courts, from river bank to sloped bank	4908.38
3	area between current tennis courts and river, including grassy areas and river bank/slope	1060.76
4	grassy area to west of tennis courts. north boundary immediately adjacent to ASA 3	866.76
5	grassy yards of 5 and 9 S River Street	983.98
6	large area of ne quarter, including all of 2 n river street within proposed APE and part of 11 n river street	5140.34

Table 2. Pre-contact archaeological sites located within 1.6 kilometers of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont.

Site Number	Site Name	Time Period	Description	Distance (km)
VT-FR-0350	Bigelow Site	undetermined	single ovate, uniface chert knife	1.08
VT-FR-0285	n/a	Late Woodland	1 chert triangular point, 2 pieces of pottery, 2 pieces of bone	1.54
VT-FR-0286	n/a	undetermined	2 chert flakes and 1 possible hammerstone	1.46
VT-FR-0040	Cemetery Bend	undetermined	also Ross FS #37. hammerstones, unfinished bifaces, and chert flake located. Additional field work recovered quartzite and chert flakes, and chert biface frament	0.98
VT-FR-0039	Pinewood Hill	Woodland general	also Ross FS #36. small camp with triangular, notched, and stemmed points, scrapers, pottery beads (?), chisel	1.29
VT-FR-0053	Swanton Bend	Archaic, Middle-Late Woodland	also Ross FS #59. small camp with notched points.	1.21
VT-FR-0042	Arthur Sterns Site	undetermined	burial, no other data available	1.28
VT-FR-0127	Fournier	undetermined	small site on bluff overlooking Missisquoi River. Many chert flakes, 1 biface, 1 biface fragment, FCR	1.27
VT-FR-0346	Spear Unit 1	Middle-Late Woodland	2 loci present, producing ceramic sherds, flakes, and calcine bone.	1.56

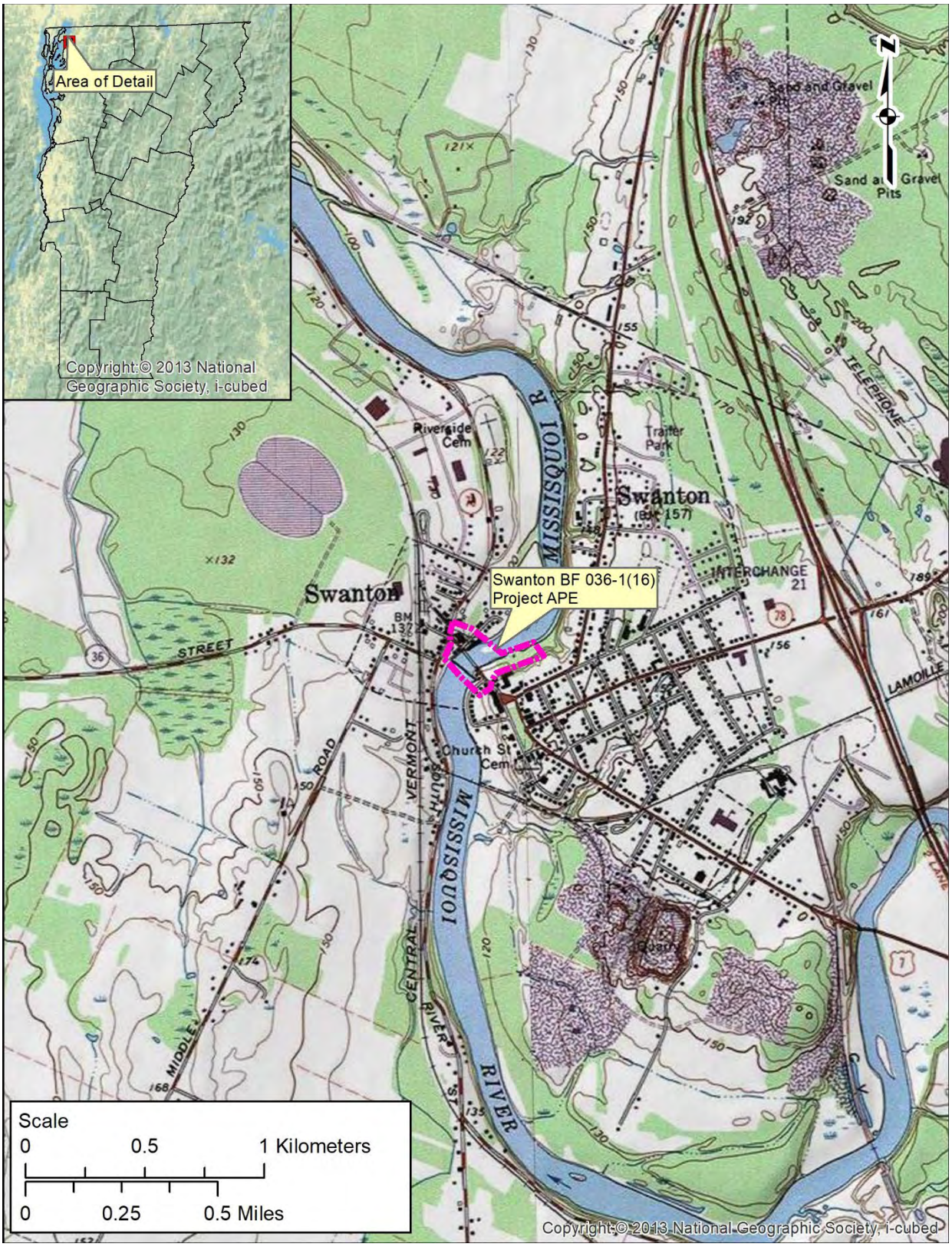


Figure 1. Topographic map showing the location of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont.

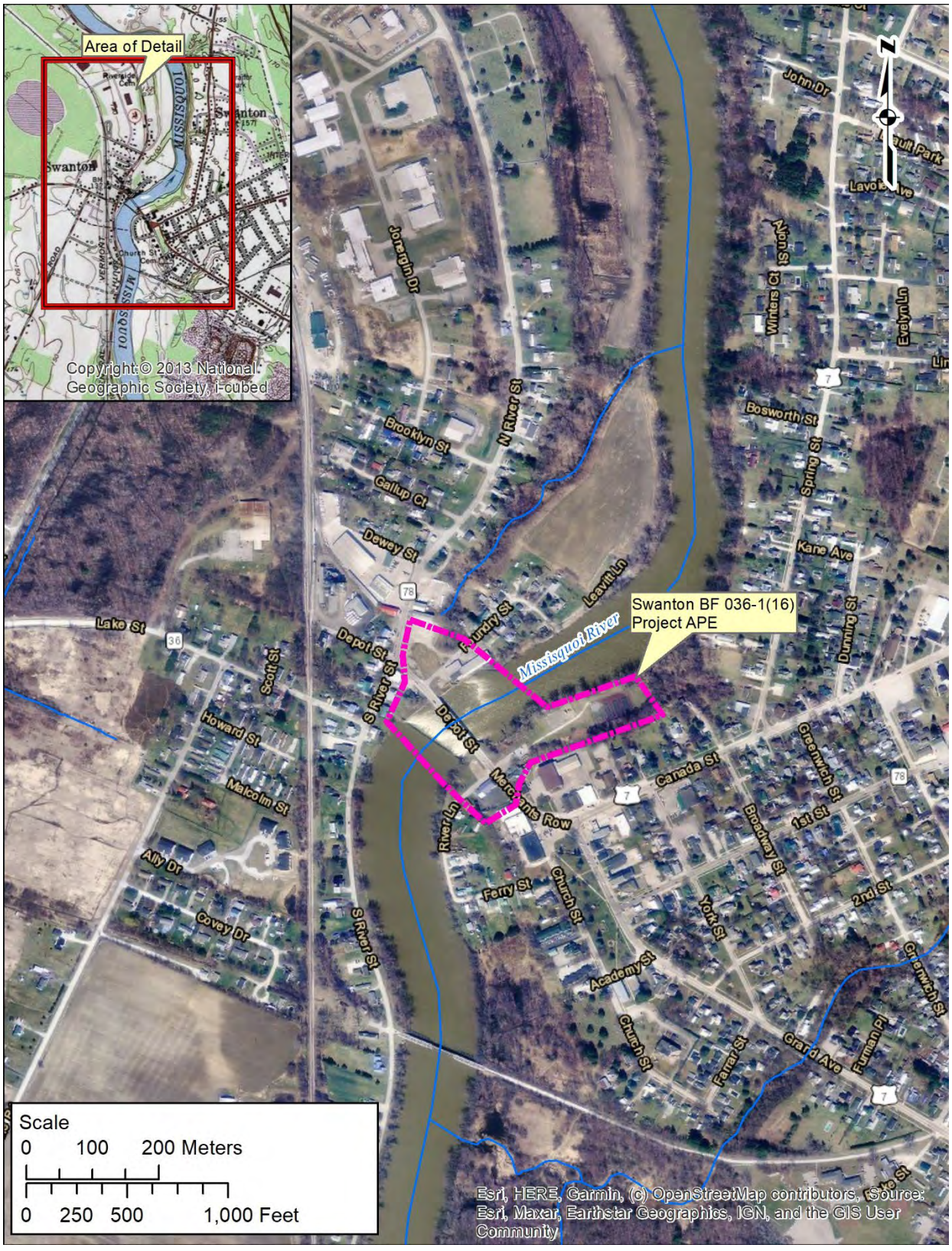


Figure 2. Aerial photograph showing the area of potential effect of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont.

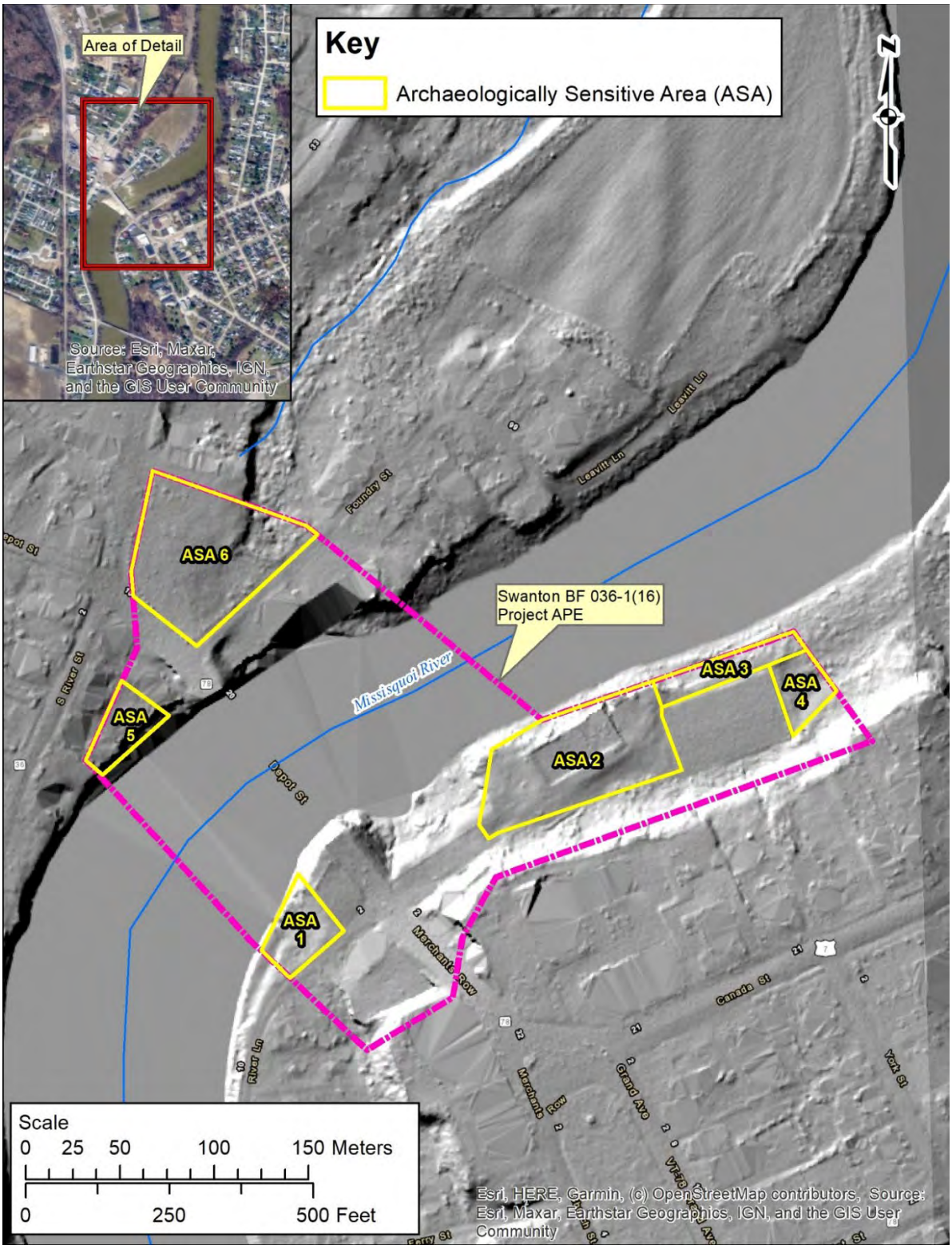


Figure 3. LiDAR image showing the delineated archaeologically sensitive areas (ASAs) for the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont. This image shows the underlying landscape present in the proposed Project APE.

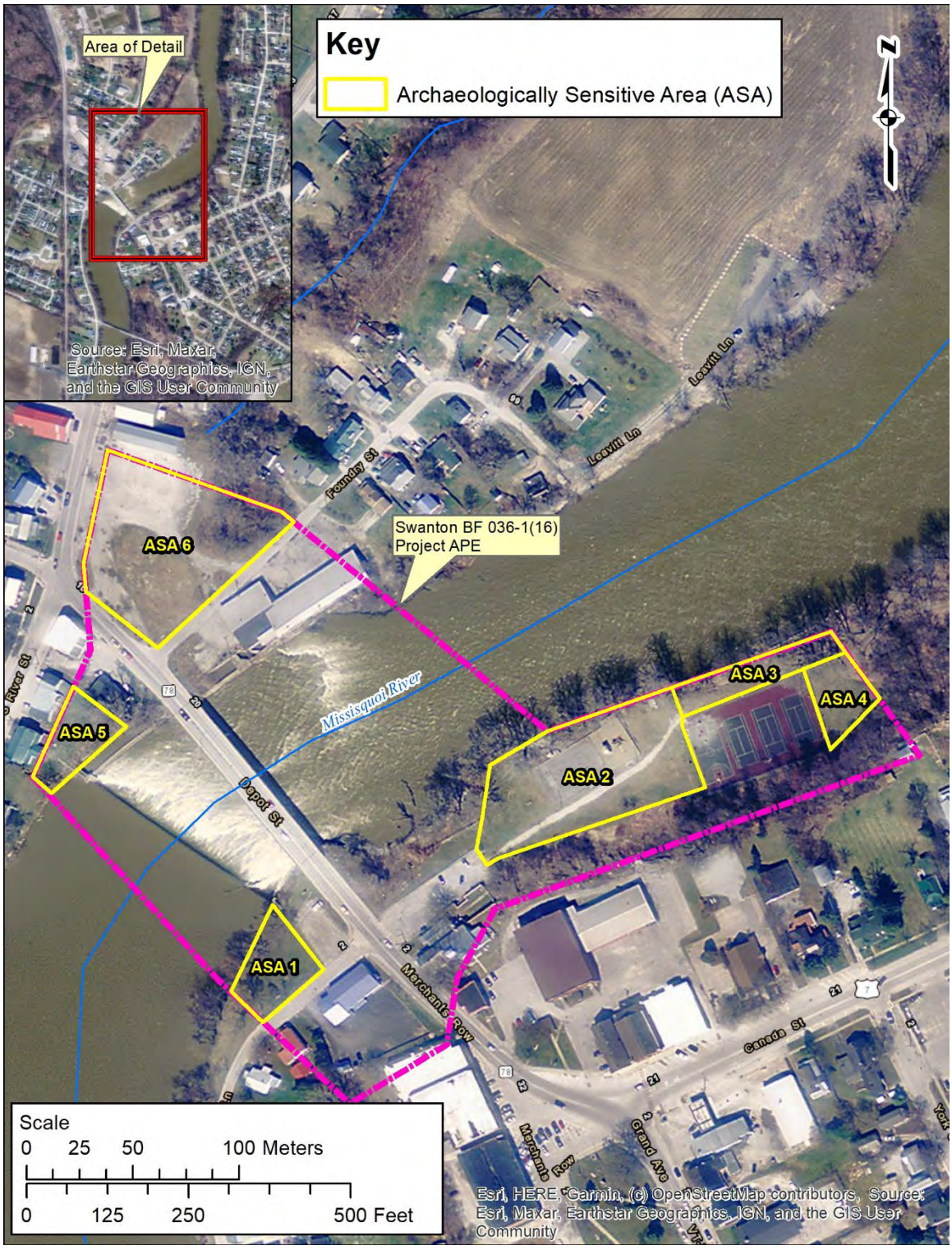


Figure 4. Aerial image showing the delineated archaeologically sensitive areas (ASAs) for the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont. This image shows the extent of current build-up and development within the proposed Project APE. Note Marble Mill Park and the foundation of the George Barney Marble Mill in the bottom left (southeast quadrant) of the proposed APE.

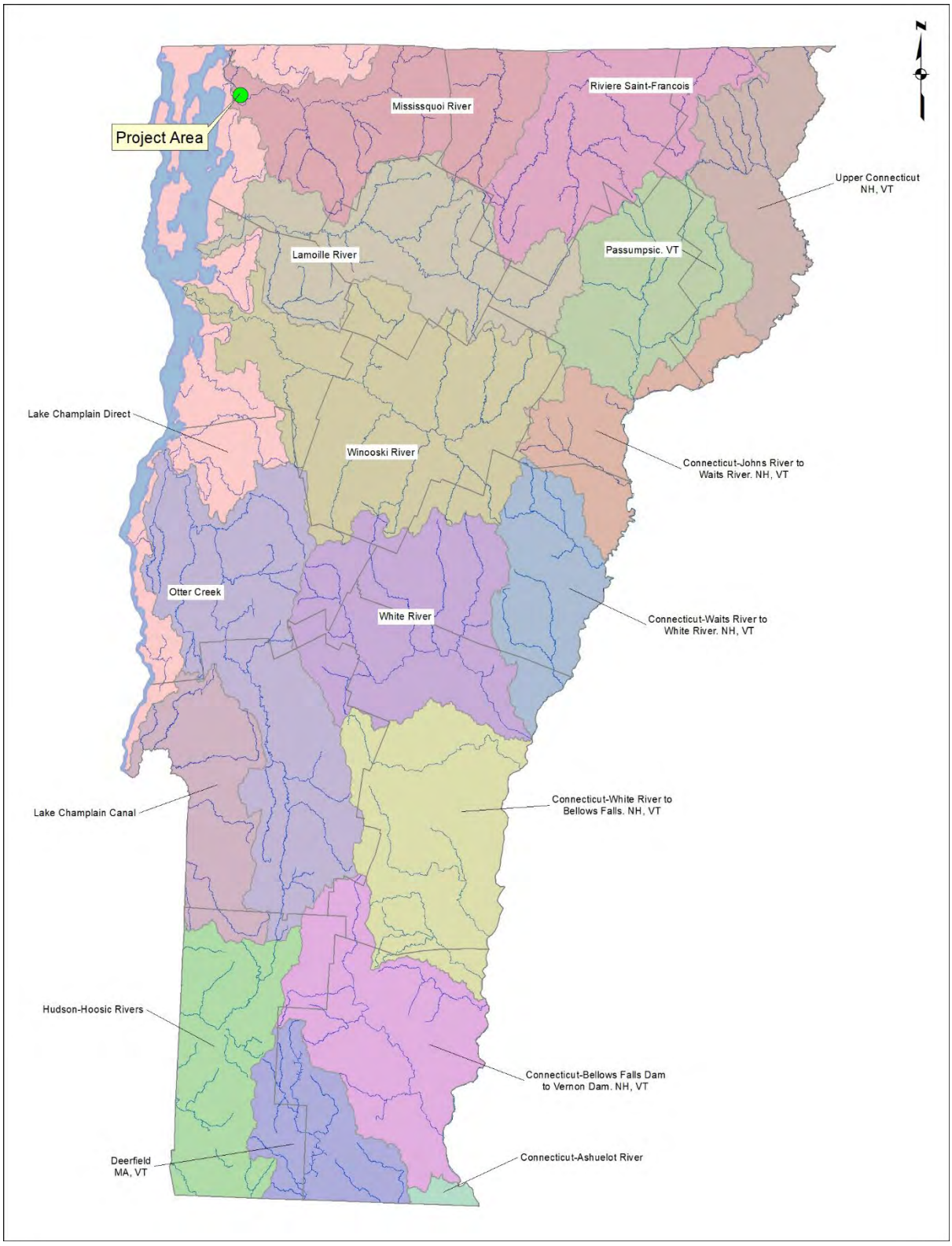


Figure 5. Map of the major watersheds of Vermont showing the location of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont within the Missisquoi River drainage.

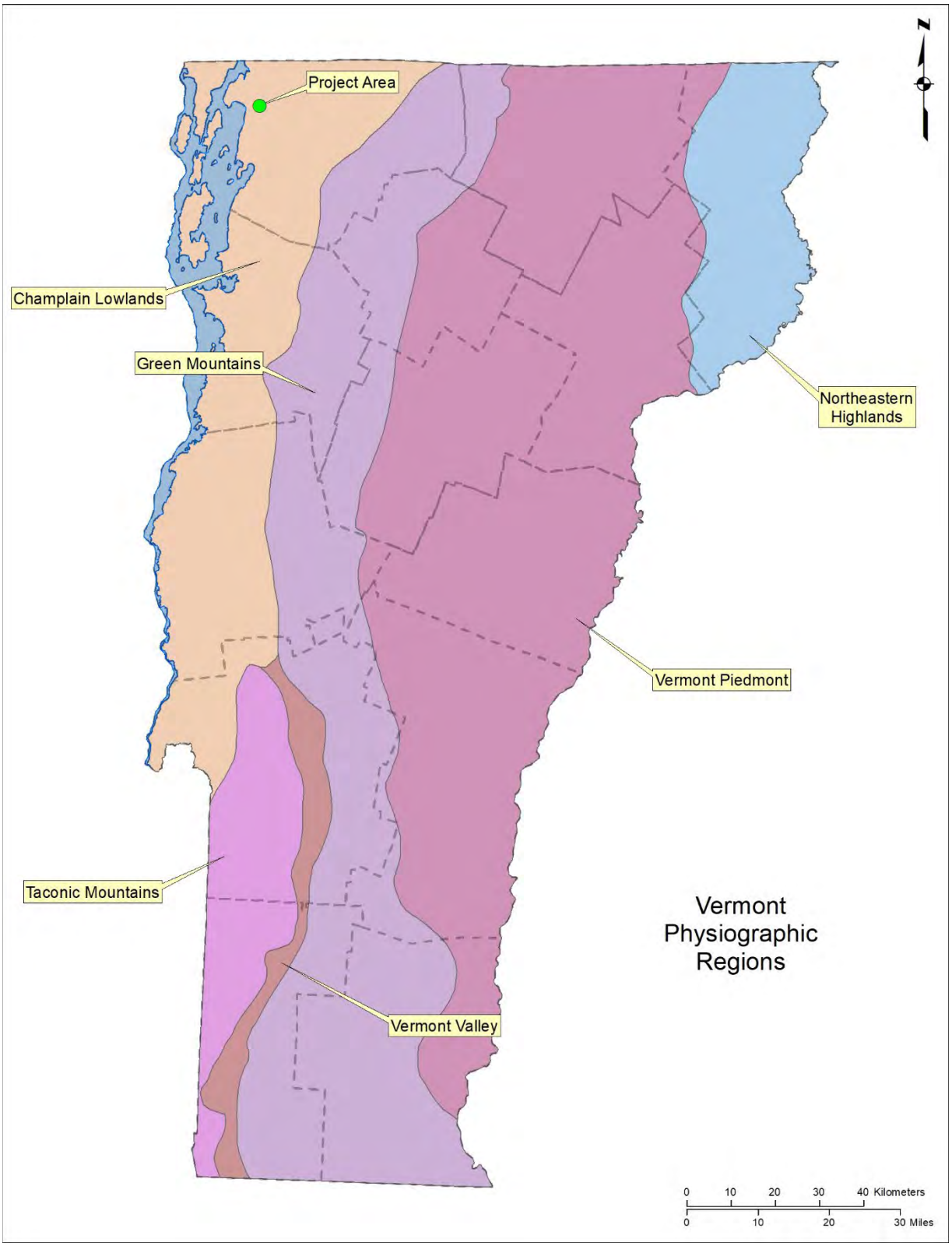


Figure 6. Map of the major biophysical regions of Vermont showing the location of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont within the Champlain Valley region.

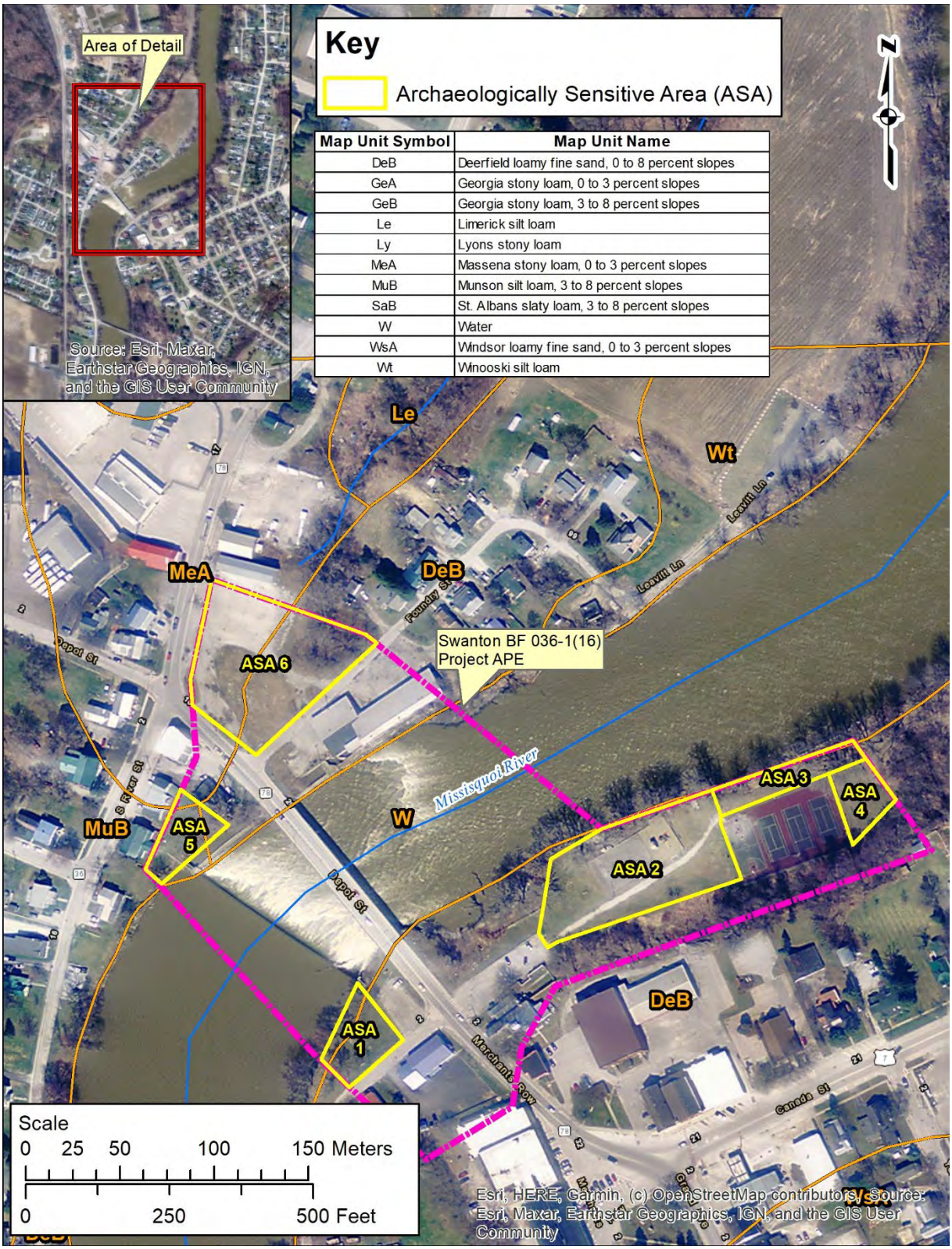


Figure 7. Map of the soil types present in the APE of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont.

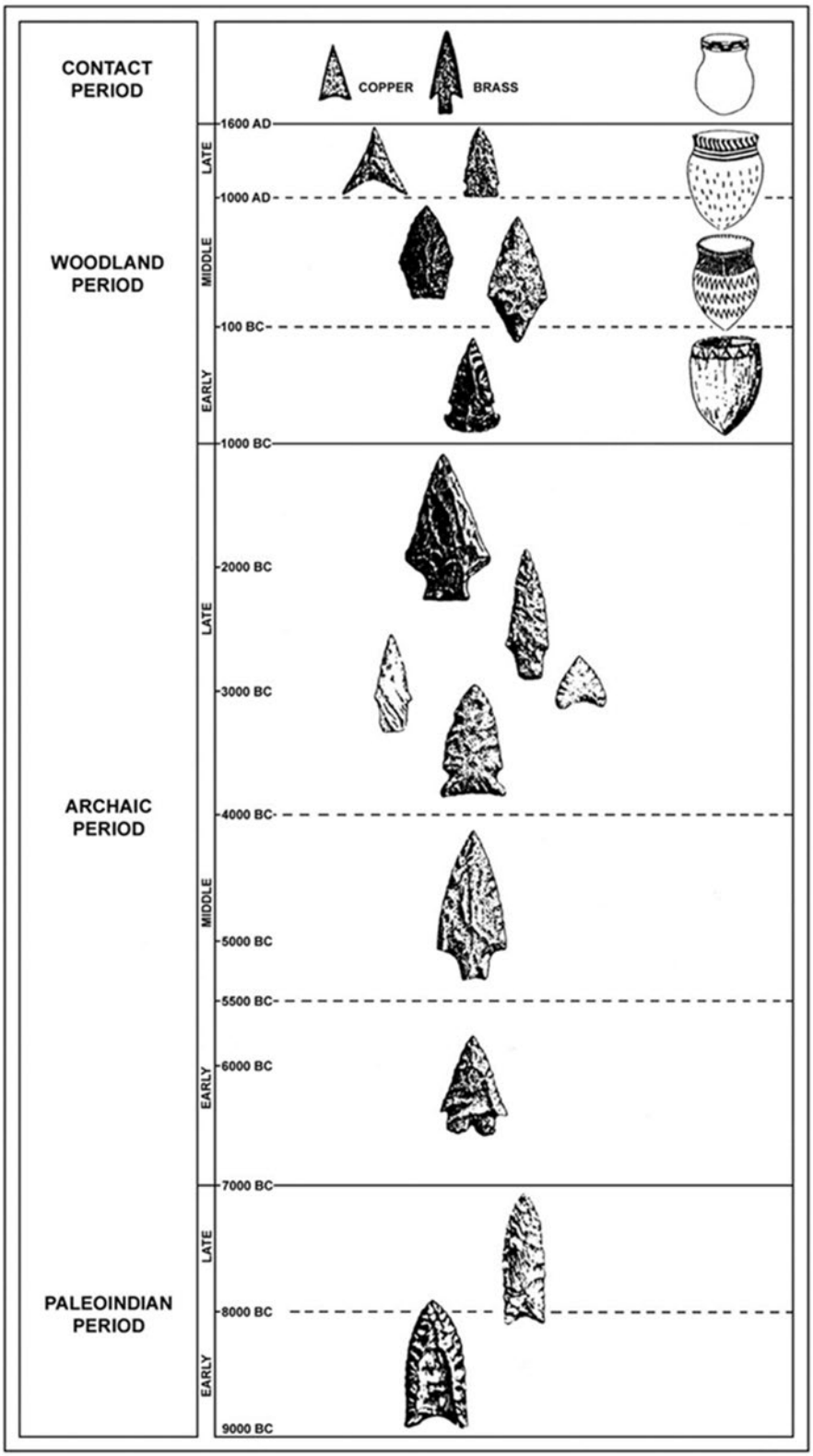


Figure 8. Cultural timeline for Northern New England Native American prehistory and early history.

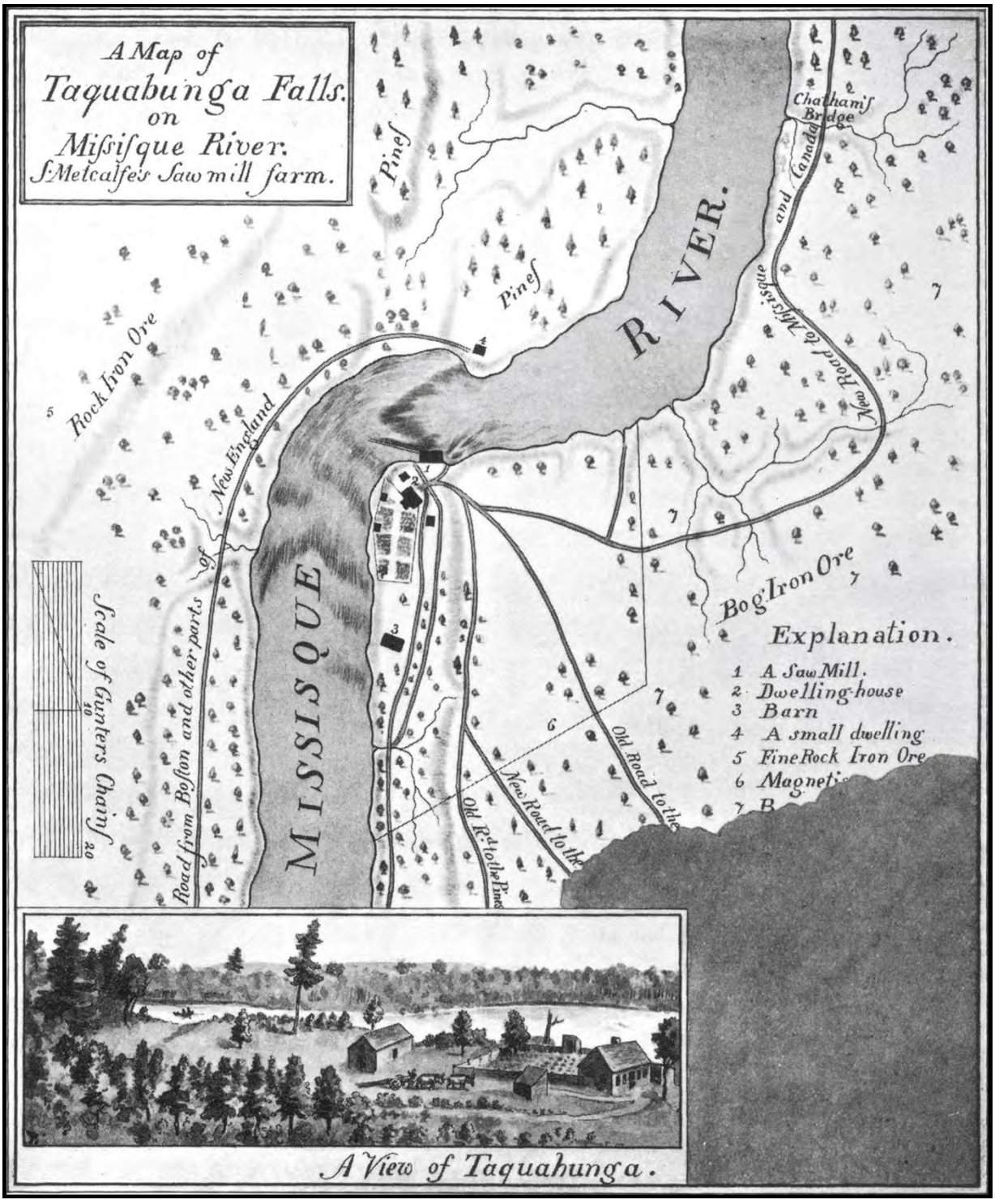


Figure 9. A map and view of Taquahunga (Takwahohganek) Falls (Swanton Falls), on the Missisquoi River in the area of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont (Crockett 1921: facing pg. 40).

Figure 10. Excerpt from the 1796 Whitelaw map showing a sawmill and grist mill within the approximate location of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont. Note the grist mill and sawmill location circled in red.

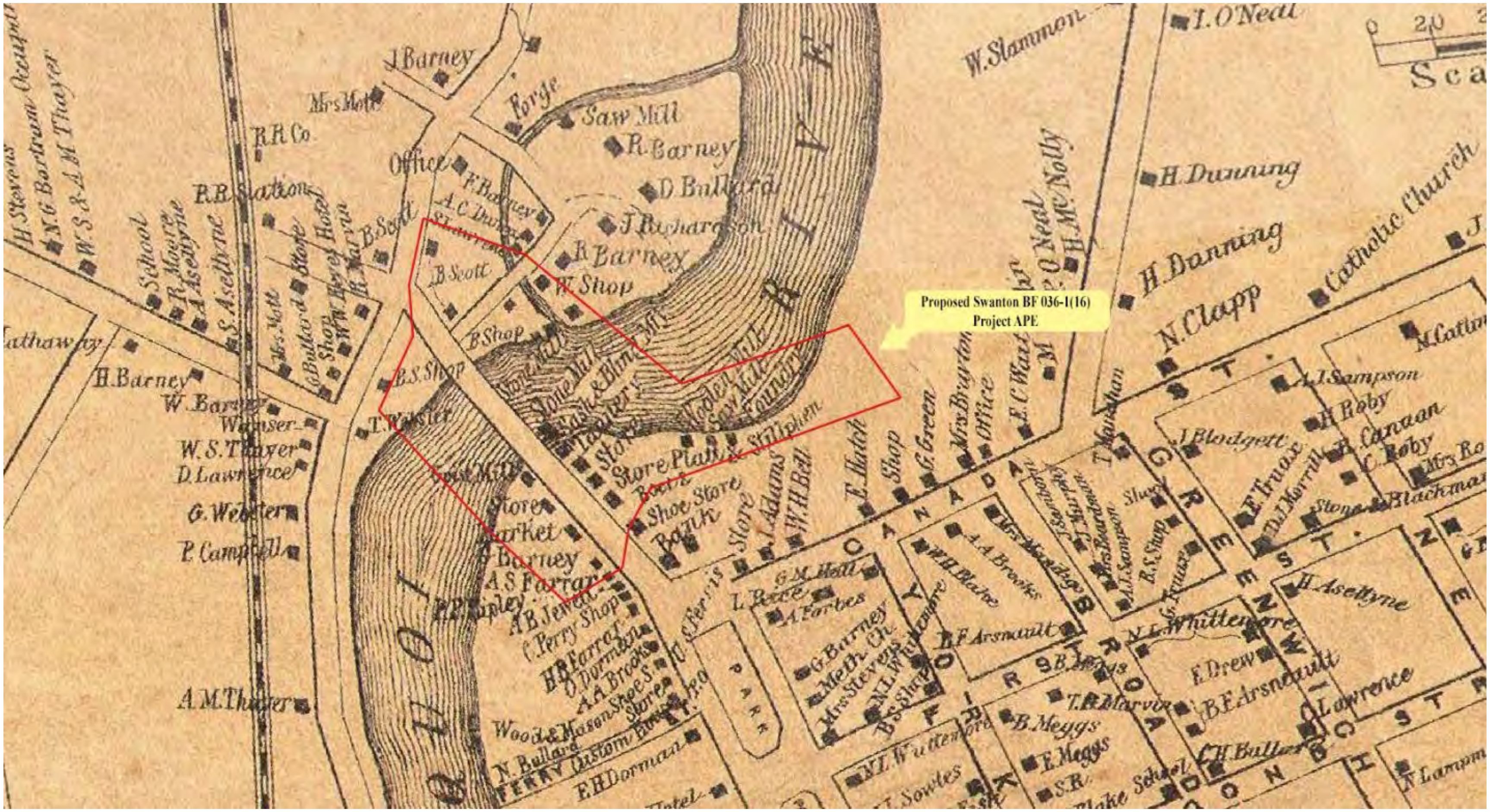


Figure 11. Excerpt from the 1857 Walling map of Swanton Falls showing the area of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont. Note the number of mills and other industries clustered around the falls. The proposed Project APE is highlighted in red.

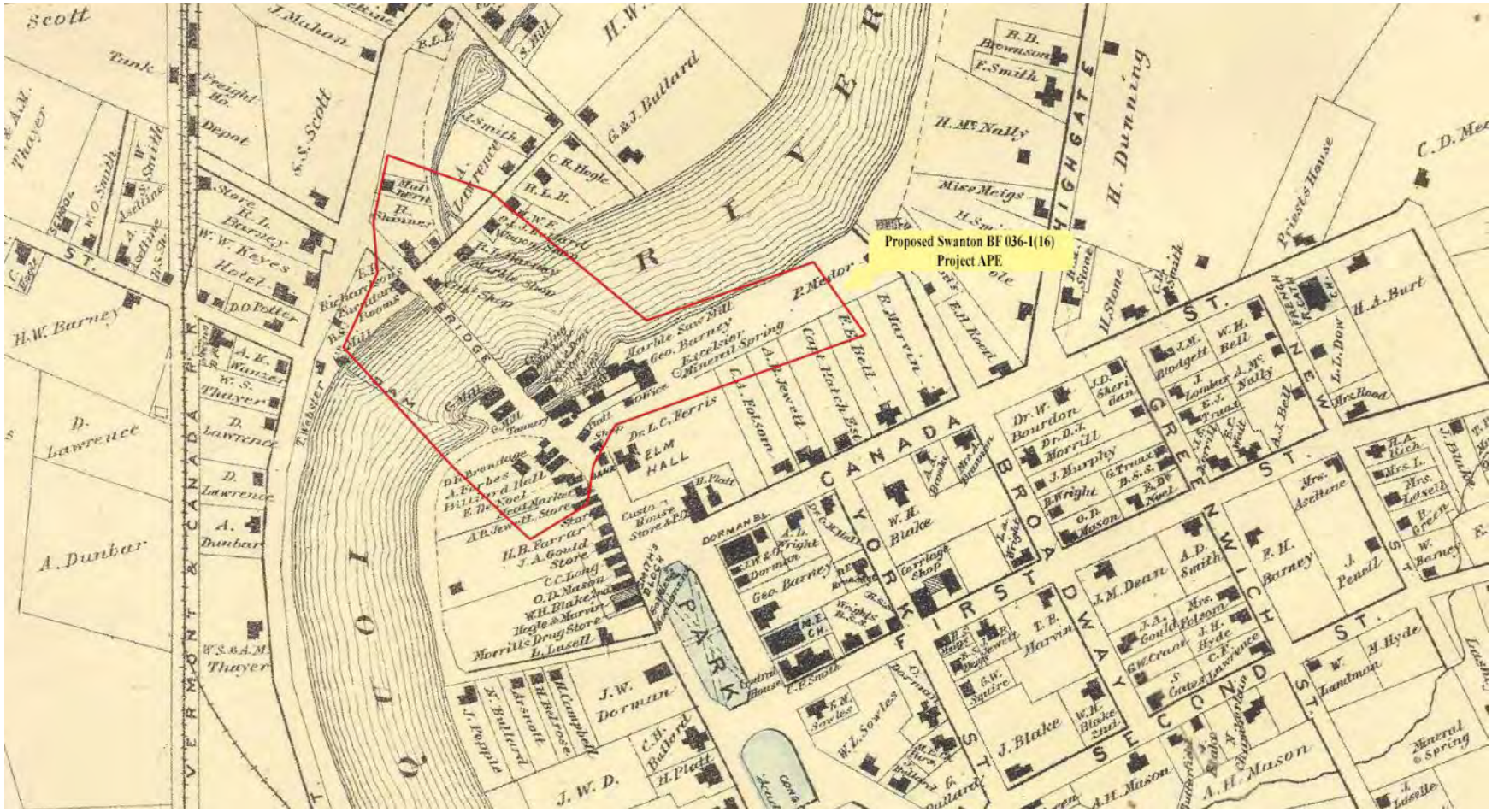


Figure 12. Excerpt from the 1871 Beers map of Swanton Village showing the area of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont. Note the number of mills and other industries, including the George Barney Marble Mill, clustered around the falls. The proposed Project APE is highlighted in red.

Figure 13. View northeast of the southeast quadrant of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont, showing Marble Mill Park and playground. Note the historical marker in the center background, concrete canoe sculpture on the left, and the large stone and concrete feature in the rear center of the photo. ASA 2 encompasses this area from the river on the left to the sloped bank on the right, to the tennis court in the far background. The bridge is located to the right of and behind the photo.

Figure 14. View of the historical marker for the George Barney Marble Mill, located in the southeast quadrant of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont. This marker also marks the location of VT-FR-0150, which encompasses most of Marble Mill Park and is included within ASA 2. The bridge out of frame to the top left of the photo.

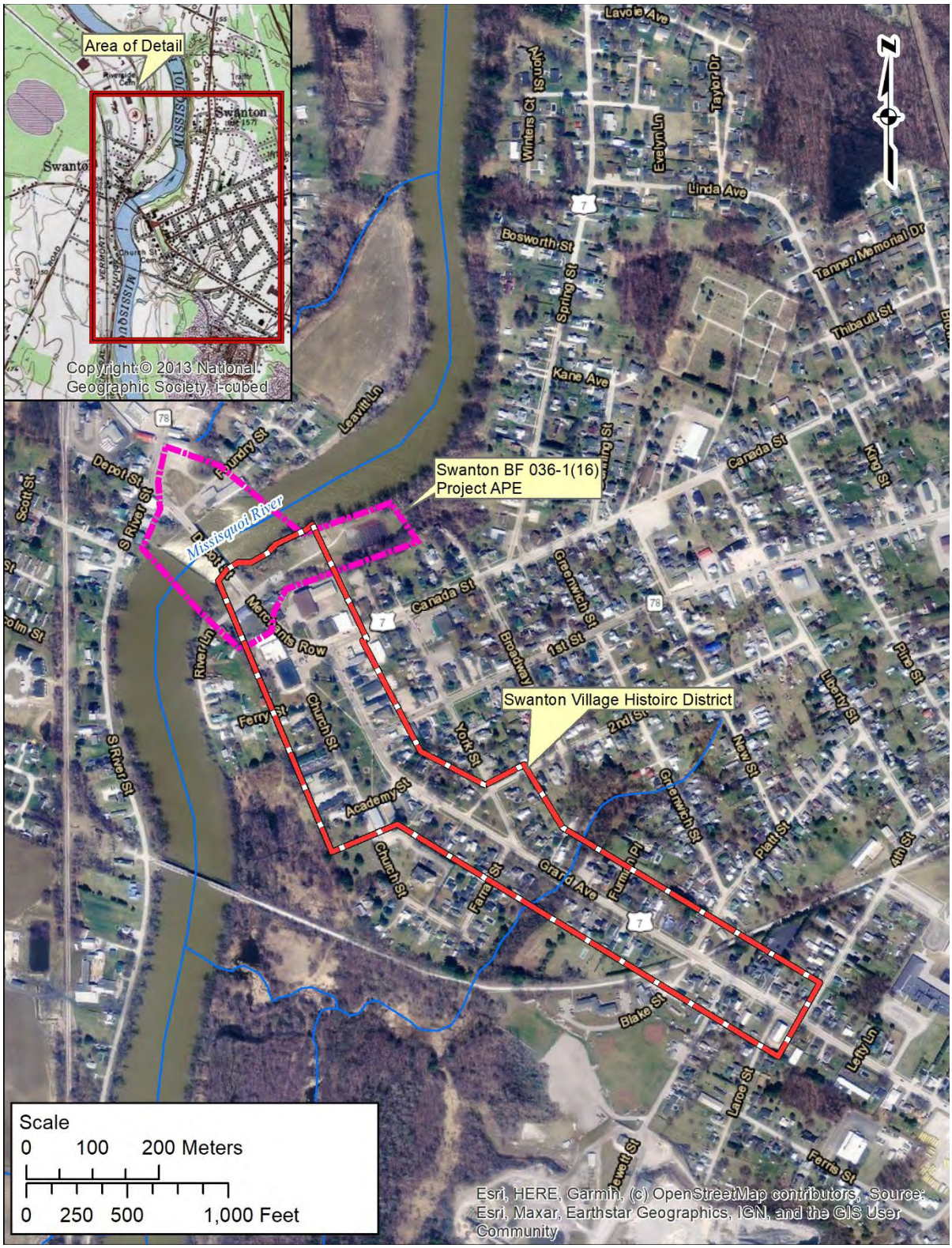


Figure 15. Aerial photograph showing the boundaries of the Swanton Village State Historic District and its relationship for the APE of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont.

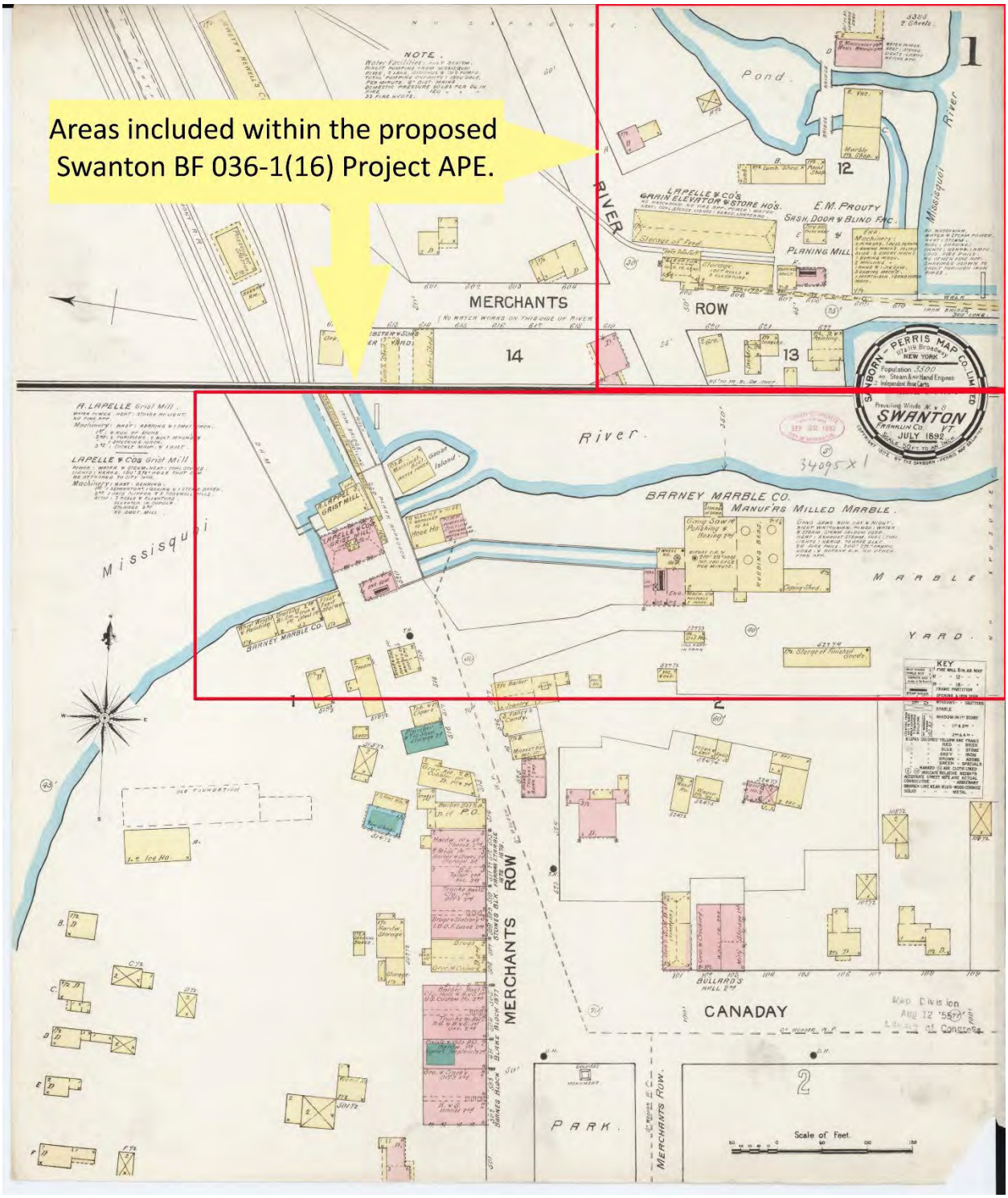


Figure 16. Excerpt from the 1892 Sanborn Fire Map for Swanton, showing the location of the George Barney Marble Mill and other businesses within the APE of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont.

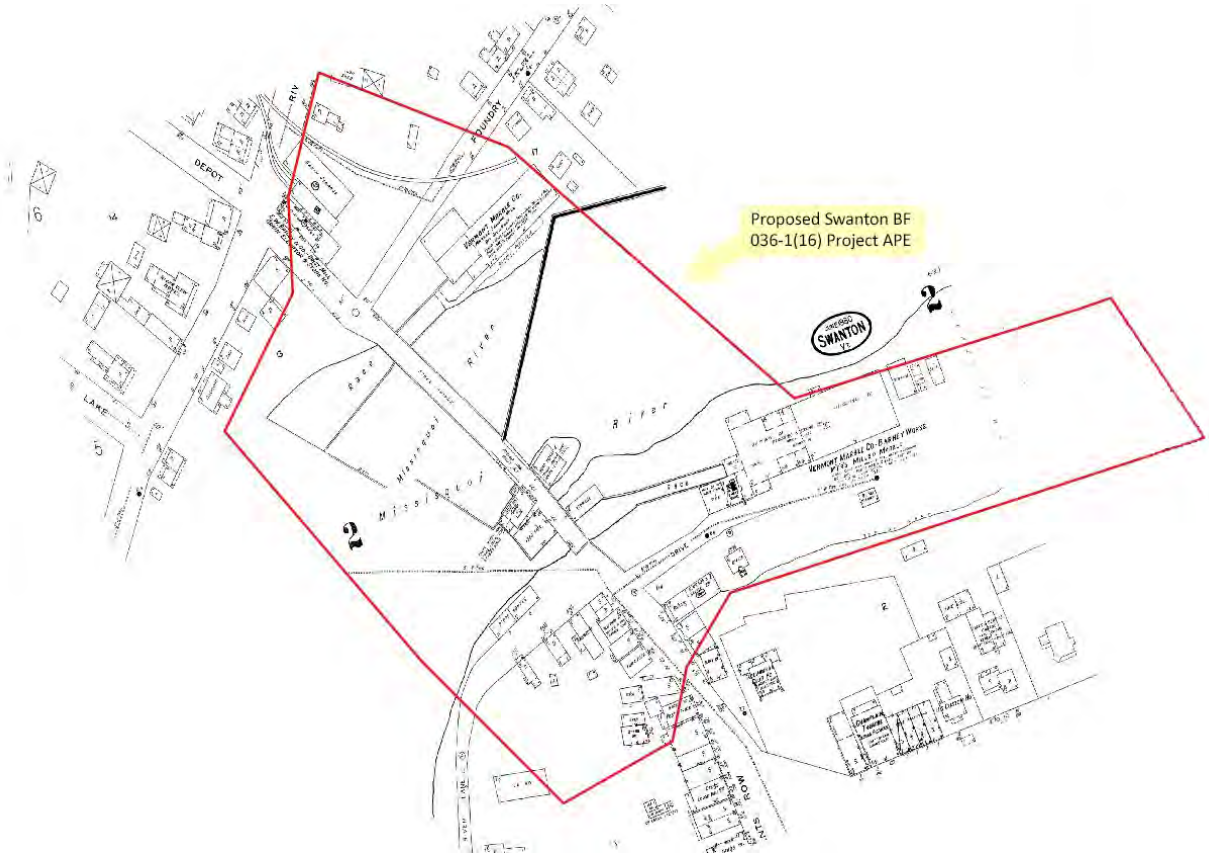


Figure 17. Excerpt from the 1930 Sanborn Fire Map for Swanton, showing the location of the Vermont Marble Company and George Barney Marble Mills within the APE of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont. Note that this is a composite image of two pages so that the proposed Project APE could be cleanly illustrated.

Figure 18. View southwest of the southeast quadrant of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont. Visible in this photo is the Marble Mill Park playground, showing its location with the foundation of the former Barney Marble Mill building, part of ASA 2. The bridge is out of frame to the right of the photo.

Figure 19. View of a large deposit of marble fragments within the root system of a large tree growing along the Missisquoi River bank in the southeast quadrant of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont. This tree is located within ASA 2, and the bridge is behind the photo to the right.

Figure 20. View northwest from the southwest quadrant of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont. The photo was taken from the scenic overlook of the Swanton Dam adjacent to ASA 1. Note the bridge on the right of the photo.

Figure 21. View west of the southwest quadrant of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont, including the boat launch area. The photo shows ASA 1 and was taken from the small parking area adjacent to Route 78. The bridge is located out of frame to the right of and behind the photo.

Figure 22. View west of bridge BR 6 from the southeast quadrant of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont. The photo was taken from the river bank immediately north of ASA 3.

Figure 23. View southwest of the northwest quadrant of the APE of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont, showing the foundation hole left from the removal of a building. ASA 5 includes the lawn visible in the background. The bridge is behind the photographer.

Figure 24. View northeast of the northeast quadrant of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont, showing the former Vermont Marble Company marble cutting mill building. The photo was taken from the Route 78 bridge, the guardrail of which is visible in the lower left corner.

Figure 25. View northeast of the northeast quadrant of the APE for the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont. The small park and gravel parking area comprise ASA 6. The bridge is located behind the photographer.

Figure 26. View northeast of the unidentified foundation located in the northeast quadrant of the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont. The foundation is located in ASA 6. Note the poor condition and the amount of marble scrap fill. The bridge is located to the left of and behind the photo.

Figure 27. View east of the southeast quadrant of the APE for the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont. The ASA 3 includes the grassy area on the right and the overgrown river bank on the left of the photo. The bridge is located to the left of the photo.

Figure 28. View northeast of ASA 4 within the APE for the proposed Swanton BF 036-1(16) Project in Swanton, Franklin County, Vermont. Note the tennis court fence on the extreme left of the photo. ASA 3 is in the far background. The bridge is located to the left of the photo.

Appendix I

VERMONT DIVISION FOR HISTORIC PRESERVATION

Environmental Predictive Model for Locating Pre-contact Archaeological Sites

Project Name Swanton Bridge - Overall **County** Franklin **Town** Swanton
DHP No. **Map No.** **Staff Init.** **Date** October 16 2023

Additional Information Overall sensitivity for all four quarters

Environmental Variable	Proximity	Value	Assigned Score
A. RIVERS and STREAMS (EXISTING or RELICT):			
1) Distance to River or Permanent Stream (measured from top of bank)	0- 90 m 90- 180 m	12 6	12
2) Distance to Intermittent Stream	0- 90 m 90-180 m	8 4	
3) Confluence of River/River or River/Stream	0-90 m 90 –180 m	12 6	
4) Confluence of Intermittent Streams	0 – 90 m 90 – 180 m	8 4	
5) Falls or Rapids	0 – 90 m 90 – 180 m	8 4	8
6) Head of Draw	0 – 90 m 90 – 180 m	8 4	8
7) Major Floodplain/Alluvial Terrace		32	
8) Knoll or swamp island		32	
9) Stable Riverine Island		32	
B. LAKES and PONDS (EXISTING or RELICT):			
10) Distance to Pond or Lake	0- 90 m 90 -180 m	12 6	
11) Confluence of River or Stream	0-90 m 90 –180 m	12 6	
12) Lake Cove/Peninsula/Head of Bay		12	
C. WETLANDS:			
13) Distance to Wetland (wetland > one acre in size)	0- 90 m 90 -180 m	12 6	6
14) Knoll or swamp island		32	
D. VALLEY EDGE and GLACIAL LAND FORMS:			
15) High elevated landform such as Knoll Top/Ridge Crest/ Promontory		12	
16) Valley edge features such as Kame/Outwash Terrace**		12	12

17) Marine/Lake Delta Complex**		12	
18) Champlain Sea or Glacial Lake Shore Line**		32	
E. OTHER ENVIRONMENTAL FACTORS: 19) Caves /Rockshelters		32	
20) [•] Natural Travel Corridor [ ] Sole or important access to another drainage [ ] Drainage divide		12	12
21) Existing or Relict Spring	0 – 90 m 90 – 180 m	8 4	
22) Potential or Apparent Prehistoric Quarry for stone procurement	0 – 180 m	32	
23)) Special Environmental or Natural Area, such as Milton acquifer, mountain top, etc. (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well)		32	
F. OTHER HIGH SENSITIVITY FACTORS: 24) High Likelihood of Burials		32	
25) High Recorded Site Density		32	32
26) High likelihood of containing significant site based on recorded or archival data or oral tradition		32	
G. NEGATIVE FACTORS: 27) Excessive Slope (>15%) or Steep Erosional Slope (>20)		- 32	
28) Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence (such as a gravel pit)		- 32	
**** refer to 1970 Surficial Geological Map of Vermont** **Total Score:** 90			
Other Comments :			
0- 31 = Archeologically Non- Sensitive **32+ = Archeologically Sensitive**			

Appendix H: Historic Resource Memo

VERMONT

Vermont Agency of Transportation
Project Delivery Bureau - Environmental Section
Barre City Place
Tel: 802.595-3744

To: JulieAnn Held, Environmental Specialist

From: Judith Williams Ehrlich, VTrans Historic Preservation Officer

Date: April 1, 2024

Subject: Historic Resource Identification for Swanton BF 036-1(16)

I have completed a resource identification (ID) for Swanton BF 036-1(16). At this time, the project is anticipated to include the repair or replacement of Bridge No. 6 which carries VT Route 78 over the Missisquoi River in Swanton.

This Resource Identification effort is being undertaken to provide information to the VTrans designers working on a proposed improvement project. Toward that end, VTrans Cultural Resources staff have identified potential resources within a broad preliminary Area of Potential Effect to ensure the designers are aware of all cultural resources that could possibly be affected by a project. Once the project is defined at the Conceptual Design phase, Cultural Resources staff will be able to determine a formal Area of Potential Effect for purposes of Section 106 and 22 VSA § 14.

WSP completed a resource identification survey for historic resources within an anticipated project Area of Potential Effect (APE). Their report is titled, "Historic Resources Identification Survey, Bridge No. 6 over Missisquoi River, VT Route 78, Swanton BF 036-1(16)." I have reviewed the report and concur with WSP's recommendations regarding the historic and Section 4(f) resources.

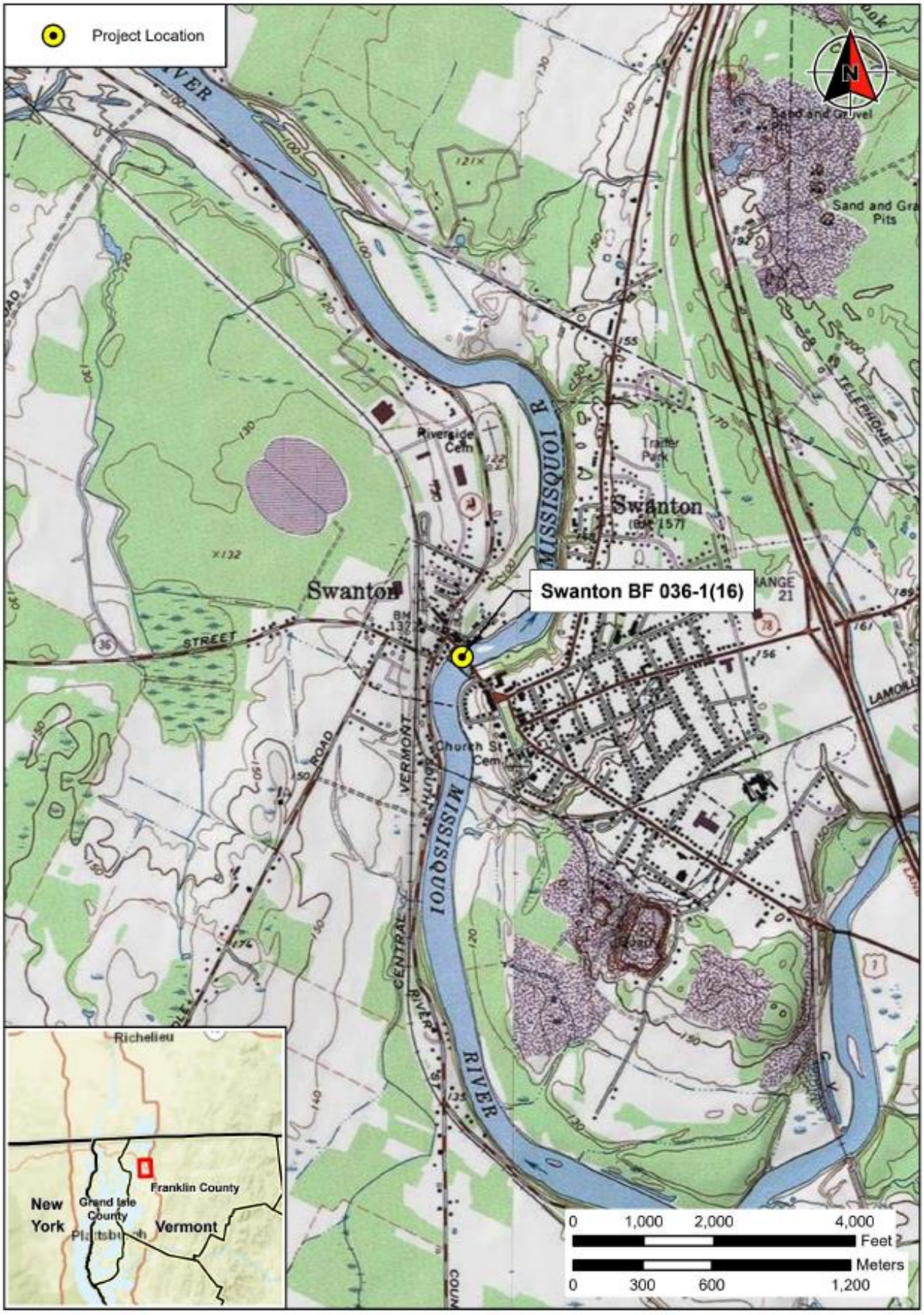
According to the report, the APE contains twelve potential historic resources. Of these, WSP recommends that the Swanton Village Historic District, the Swanton Dam, and a mill are considered historic and eligible for listing in the National Register of Historic Places. They also recommended that Bridge No. 6 is not historic. I concur with these recommendations.

WSP also noted that in addition to the historic resources that are also considered Section 4(f) resources, there are two additional 4(f) resources: the town-owned Marble Mill Park and Goose Point Park that are located at either end of Bridge No. 6.

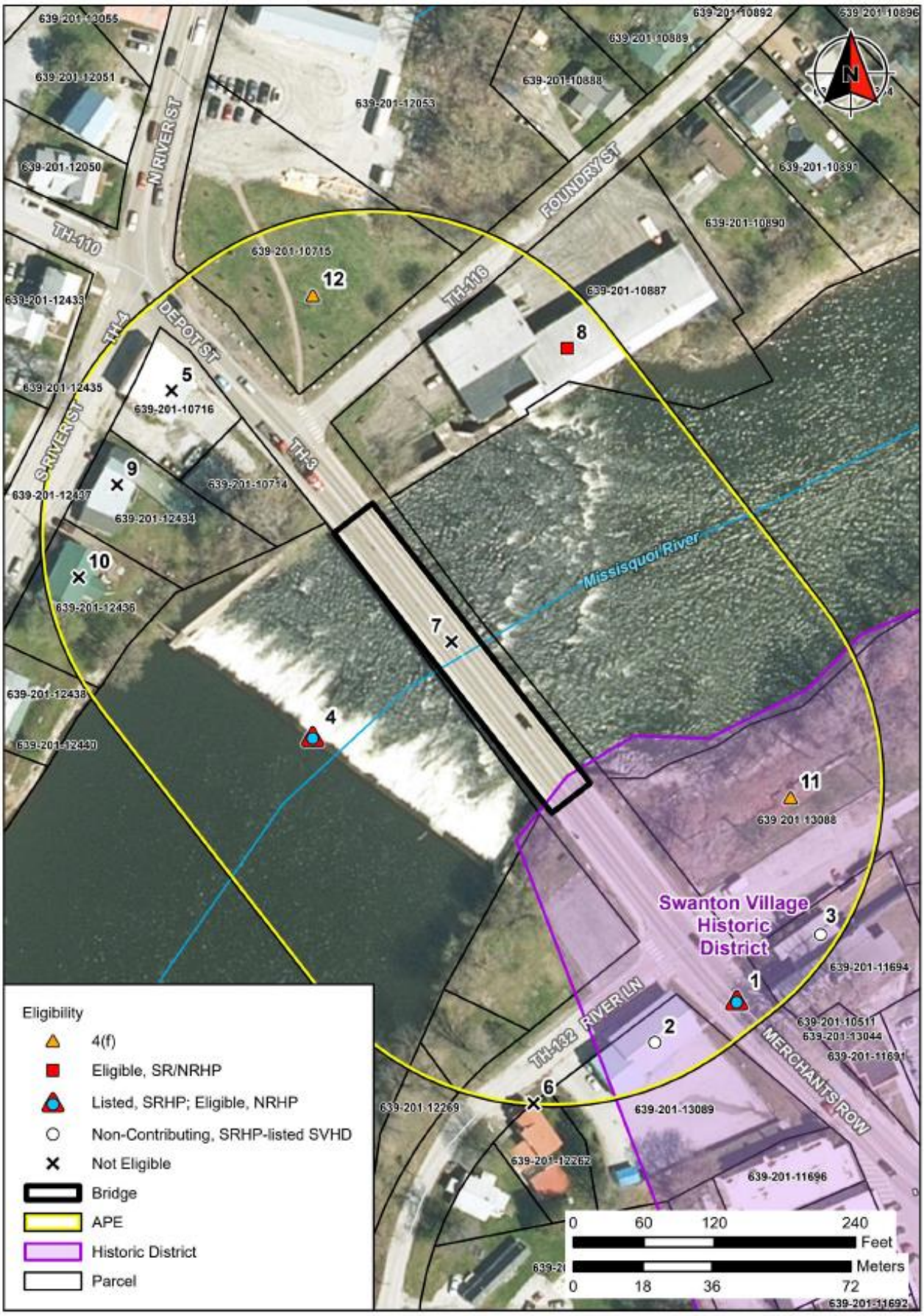
As the project develops, care should be taken to avoid impacting the historic and 4(f) resources as much as possible. If impacts are unavoidable, then care should be taken to keep them as minimal as possible, which will also help to ensure the Section 106 and Section 4(f) reviews go smoothly.

Please see below for additional details regarding all twelve potential resources. WSP also provided a dgn and shape files that map these resources.

Please do not hesitate to contact me should you require additional information.



Project location map. Image from WSP report.



Locations of surveyed architectural/engineering resources in the APE. Historic and Section 4(f) resources are noted. Image from WSP report.

Bridge No. 6, Swanton. Image from WSP report.

NRHP ELIGIBILITY RECOMMENDATIONS FOR PREVIOUSLY AND NEWLY IDENTIFIED HISTORIC ARCHITECTURAL AND SECTION 4(F) RESOURCES IN APE

MAP ID (Swanton-)	RESOURCE NAME	LOCATION	PREVIOUS ELIGIBILITY	WSP ELIGIBILITY OPINION	PHOTOGRAPH
1	Swanton Village Historic District	Multiple, Swanton	Listed, SRHP	Listed, SRHP; Eligible, NRHP	
2	VFW Hall	8 Merchants Row, Swanton	Non-Contributing, SRHP-listed SVHD	Not Eligible	
3	House	5 Merchants Row, Swanton	Contributing, SRHP-listed SVHD	Not Eligible	
4	Swanton Dam	Swanton Falls, Missisquoi River, Swanton	Listed, SRHP	Eligible	
5	Bruyette's	3 South River Street, Swanton	Listed, SRHP	Not Eligible	
6	House	7 River Lane, Swanton	Not Evaluated	Not Eligible	
7	Swanton Bridge No. 6 over Missisquoi River	VT Route 78, Swanton	Not Evaluated	Not Eligible	

Details from WSP report (Part One)

MAP ID (Swanton-)	RESOURCE NAME	LOCATION	PREVIOUS ELIGIBILITY	WSP ELIGIBILITY OPINION	PHOTOGRAPH
8	Mill	4 Foundry Street, Swanton	Not Evaluated	Eligible	
9	Multifamily Residence	5 South River Street, Swanton	Not Evaluated	Not Eligible	
10	Multifamily Residence	9 South River Street, Swanton	Not Evaluated	Not Eligible	
11	Marble Mill Park	1 Merchants Row, Swanton	4(f)	N/A	
12	Goose Point Park	Northeast Corner of Vermont Route 78 and Foundry Street, Swanton	4(f)	N/A	

Details from WSP report (Part Two)

Appendix I: Stormwater Resource Memo

State of Vermont
Environmental Section
219 North Main Street
Barre, Vermont 05641
Vtrans.vermont.gov

Agency of Transportation

[phone] 802-498-5787

To: Project File
From: Heather Voisin, VTrans Green Infrastructure Engineer
Date: October 9, 2023
Subject: Swanton BF 036-1(16) - Stormwater Resource ID Review

Project Description: I have reviewed the project area for Swanton BF 036-1(16) for stormwater related regulatory and water quality concerns. This project consists of work on the VT Route 78 (BR 6) that spans the Missisquoi River in the Village of Swanton, VT. My evaluation has included the review of existing imagery and mapping (ANR Natural Resource Atlas, VTrans Operational Stormwater Permits, and Google StreetView) to capture existing stormwater features and existing drainage.

Regulatory Considerations
Depending on the amount of redeveloped or expanded impervious surfaces involved in this project, there may be a need for an Operational Stormwater permit. If so, this project would qualify for using Chapter 6 of the 2017 Vermont Stormwater Management Manual as a Public Linear Transportation Project. There do not appear to be any existing Operational Stormwater permits directly adjacent to the site area. All the surrounding roads are considered Hydrologically Connected Road Segments.

The following are not noteworthy stormwater regulatory concerns at this time.

The project site does not include an impaired (303(d) list) or stressed waters.

Existing Drainage
Based on a review of Google Street view, it appears that much of the roadway within the proposed limits is curbed with drain inlets.

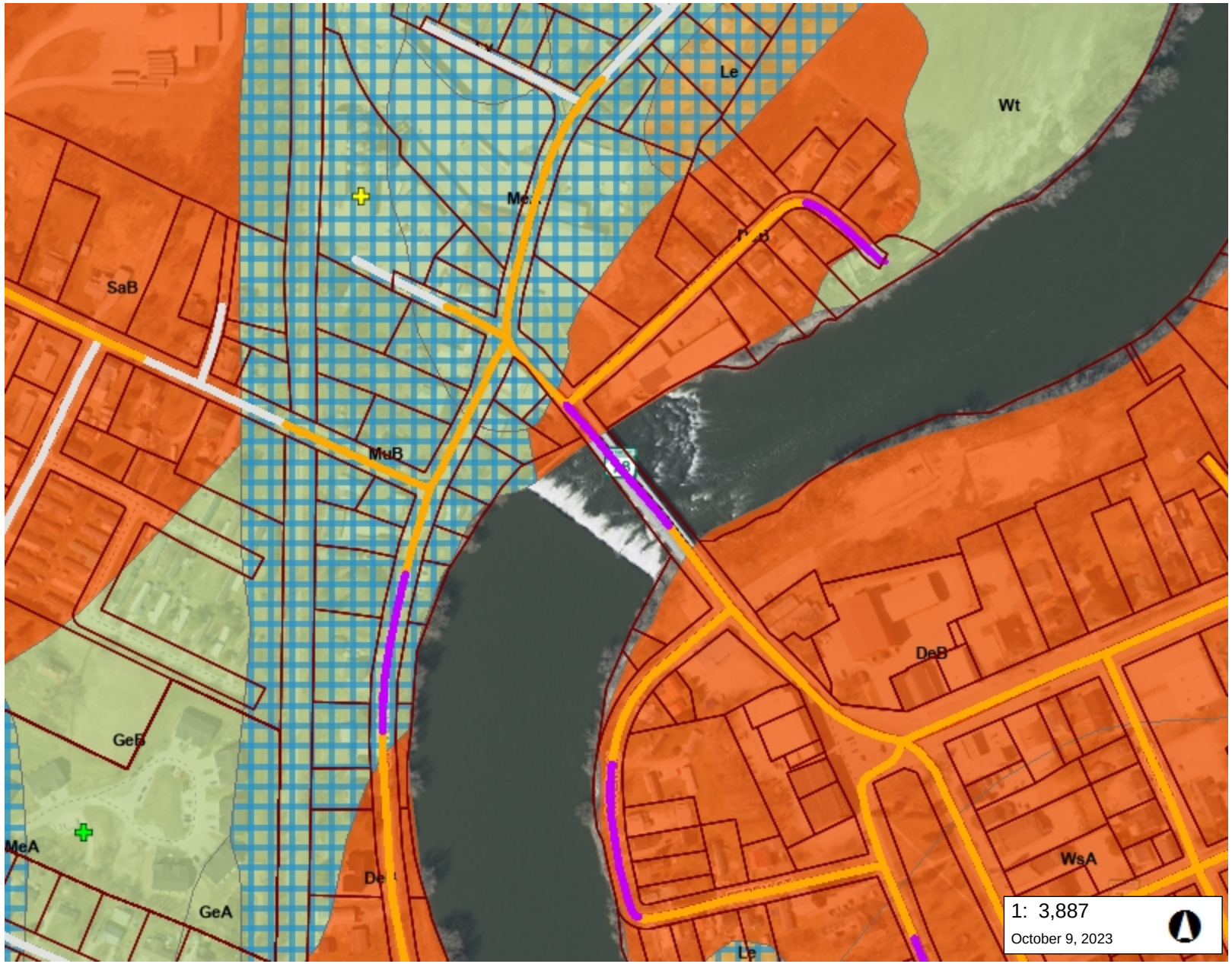
Design Considerations
In the event that stormwater features are proposed to meet permitting requirements or otherwise, soils throughout the project corridor are labeled as Hydrologic Soil Group A, which is well-suited to infiltrating practices.

VERMONT

SW Resource ID

Vermont Agency of Natural Resources

vermont.gov



LEGEND

Stormwater Permits (Issued)
- Operational
- Construction
- Industrial - NOI
- Industrial - NOX
- Other

Hydrologically Connected Roa (MRGP)
- Yes
- Yes (Catch Basin)
- No

Stormwater Impaired Watershe

Soils - Hydrologic Groups
- A
- A/D
- B
- B/D
- C
- C/D
- D

Parcels (standardized)

Roads
- Interstate
- US Highway; 1
- State Highway
- Town Highway (Class 1)
- Town Highway (Class 2,3)
- Town Highway (Class 4)

NOTES

Map created using ANR's Natural Resources Atlas

197.0 0 98.00 197.0 Meters

WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 324 Ft. 1cm = 39 Meters

THIS MAP IS NOT TO BE USED FOR NAVIGATION

Appendix J: Landscape Resource Memo

VERMONT
AGENCY OF TRANSPORTATION

State of Vermont | Agency of Transportation
Environmental Section
219 North Main
Barre, VT 05641
Vtrans.vermont.gov

To: Project File
From: Bonnie Kirn Donahue, *VTrans Landscape Architect*
Date: October 24, 2023
Project: **Swanton BF 036-1(16) 22J402**
Subject: Landscape (LA) Clearance for Resource ID

I have reviewed the proposed area for **Swanton BF 036-1(16) 22J402**, and found the following:

SITE DESCRIPTION
Bridge 6 on VT 78 is located in an urban area in downtown Swanton. The existing bridge serves as an important gateway to the historic village. In recent years, grassroots community efforts have focused on improvements and planning studies to rehabilitate parks on both ends of the bridge, and on bridge beautification.

EXISTING CONDITIONS
The following items/conditions were found on site that could influence design decisions:

1. Riparian buffer:
    a. This project includes work within a riparian area and may benefit from a planting plan.

2. Trees to protect:
    a. This project includes trees that should be protected.
        i. Trees along Marble Mill Park
        ii. Trees in the park adjacent to Depot/Foundry Streets.
        iii. Trees adjacent to residences
        iv. Trees at the parking area off River Lane.

3. Special site features:
    a. This project includes special site features that should be protected.
        i. Marble Mill Park
        ii. Parking area w/ informational sign off River Lane
        iii. The community park adjacent to Depot/Foundry Streets.
        iv. **Goose Point Park** (a public fishing access and parking area) off of Foundry Street

4. Plants observed: (this is not a complete list of species on site)
    a. Desktop review. No species were identified. See natural resources clearance.

5. Invasive species observed: (this is not a complete list of species on site)
    a. Desktop review. No invasive species were identified. See natural resources clearance.

6. Accessibility & Active Transportation:
    a. This project includes accessible sidewalks and crosswalks that should be protected.
    b. This project includes bicycle facilities that should be protected.
    c. This project would benefit from the addition or improvement of accessible sidewalks, crosswalks, and/or bicycle facilities.
    d. This project would benefit from lower speeds supported by pedestrian design accommodations.

COMMUNITY RESOURCES

Per the 2018 Swanton Town Plan the following municipal policies and goals apply to this project:

1. Expand Outdoor Recreation Opportunities, River Access, Bike-ability and Bike Tourism (page 94-94)
2. Improve Traffic, Walkability, and Parking Downtown (page 95)
3. Beautify Downtown (Page 96)
4. Redevelop the Marble Mill Park and Playground (page 97)

RECOMMENDATIONS

1. Consult closely with the community on bridge beautification priorities, and vision for parks and public spaces on both sides of the bridge.
2. Minimize tree clearing in this area.
3. Minimize disturbance in the riparian buffer.
4. Develop a riparian planting plan for any disturbed riparian areas on this project.
5. Tree protection shall be used for any trees with canopies within the area of construction, including:
    a. Trees along Marble Mill Park
    b. Trees in the park adjacent to Depot/Foundry Streets.
    c. Trees adjacent to residences
    d. Trees at the parking area off River Lane.
6. Protect, maintain, and improve the accessibility, function, and safety of active transportation infrastructure:
    a. Improvements to bicycle experience. Connect the bridge to larger regional bike trails.
    b. Maintain sidewalk access on both sides of bridge.
    c. Connect sidewalks with parks and sidewalk network on both ends of bridge.
7. If invasive species are found, develop a plan for managing invasive species in the project area.

NOTES

1. I am available to assist with landscape architectural design, including planting plans, plant lists, hardscape/pedestrian access plans, etc. (bonnie.donahue@vermont.gov).

ATTACHMENTS

See page 3.

Figure 1: Master Plan for Marble Mill Park by Wagner Hodgson. For more information, see: https://wagnerhodgson.com/projects/marble-mill-park/

Appendix K: Community Input

Local & Regional Input Questionnaire

Project Summary

This project, BF 036-1(16), focuses on bridge 6 on VT Route 78 in Swanton Village, Vermont. The bridge is deteriorating and needs either a major maintenance action or replacement. Potential options being considered for this project include targeted repairs, deck replacement, deck and superstructure replacement, or a new bridge. It is possible that VTrans will recommend a road closure and detour traffic away from the project site for the duration of the work. Efforts will be made to limit the detour to State roads.

Community Considerations

1. Are there regularly scheduled public events in the community that will generate increased traffic (e.g. vehicular, bicycles and/or pedestrians), or may be difficult to stage if the bridge is closed during construction? Examples include annual bike races, festivals, parades, cultural events, weekly farmers market, concerts, etc. that could be impacted? If yes, please provide approximate date, location and event organizers' contact info.

   The Swanton Community has a very active events and activities schedule throughout the year. The months of May-September typically have the most traffic generating events, but the Village is a very busy place year-round. Traffic to these activities can be rerouted to a detour without great hardship, but it will be important to consider traffic flow into the Marble Mill Park which abuts the B-6 to allow for the use of the tennis/pickle ball courts and playground which are heavily used with an estimated 1,500 visits this season. It is possible that a different access to the park could be created for short-term use. A link to the 2023 recreation calendar is 2023 Community Calendar *WORKING DOCUMENT.

2. Is there a "slow season" or period of time from May through October where traffic is less or no events are scheduled?

   There is a slow season for the Recreation Department event schedule starting in October however, the School District Schedule resumes with associated extracurricular activities, during that time. Fall foliage and apple picking tours pick up during this time. The B-6 bridge is a primary route for visits to Grand Isle County's orchards via Route 78. Traffic and events schedules may slow down during the winter months of November to March.

   A recent B-6 inspection 8/8/23 report included 2018 Average Daily Traffic of 10,800 vehicles. 15% of that number, or 1,620 ADT, was estimated to be truck traffic which would presumably remain steady throughout the year.

3. Please describe the location of the Town garage, emergency responders (fire, police, ambulance) and emergency response routes that might be affected by the closure of the

bridge, one-way traffic, or lane closures and provide contact information (names, address, email addresses, and phone numbers.

Swanton Town garage is located at 221 First Street. The contact is Town Administrator, Kevin Lapan, 802-309-8300, highwaydept@swantonvermont.org.

Swanton Village garage is located at 120 First Street. The contact is Public Works Director, Dean Ryan, 802-582-2630, dean.ryan@swanton.net .

Swanton Village Fire Department is located at 120 First Street. The contact is Fire Chief, Jason Cross 802-309-3815, svfd@swanton.net & crossfire1981@yahoo.com .

Swanton Village Police Department is located at 120 First Street. The contact is Police Chief, Mattew Sullivan 802-868-4100, matthew.sulivan@vermont.gov .

Missisquoi Valley Rescue Ambulance Service is located at 120 First Street. The contact is 802-868-2352.

All of these agencies will be affected by the traffic changes related to the bridge repair and replacement.

4. Are there businesses (including agricultural operations and industrial parks) or delivery services (fuel or goods) that would be adversely impacted either by a detour or due to work zone proximity?

   All businesses in the Village will be impacted by the bridge work. The Central Business District is adjacent to the bridge and the detour will greatly diminish the traffic flow to their businesses.

   Many commercial/industrial businesses are located on Route 78 on the northwestern side of the bridge, and they rely on truck deliveries. They may experience an impact resulting from additional miles on delivery routes.

5. Are there important public buildings (town hall, community center, senior center, library) or community facilities (recreational fields, town green, etc.) close to the project?

   The B-6 Bridge is in the designated Village Center and closure will impact the operations for the Library, Municipal Town Offices, Municipal Village Offices, Village Electric Department, Recreation Department, Village Park, Notch Health Care Center, Senior Center/apartments, Abenaki Tribal Headquarters, Swanton Border Patrol Headquarters, Elementary School, Swanton Historical Society Museum, banks, churches, restaurants, retail stores, grocery store and convenience stores. See attached Designated Village Map for more details.

6. What other municipal operations could be adversely affected by a road/bridge closure or detour?

   Canada Street/ US Route 7 is the direct route for local traffic to the Canadian Border Crossing in Highgate Springs. The traffic coming through the border in anticipated to increase by 30% when the Canadian Interstate 35 is completed to Highgate Springs.

7. Are there any town highways that might be adversely impacted by traffic bypassing the construction on other local roads? Please indicate which roads may be affected and their condition (paved/unpaved, narrow, weight-limited bridges, etc), including those that may be or go into other towns.

   To be determined.

8. Is there a local business association, chamber of commerce, regional development corporation, or another downtown group that we should be working with? If known, please provide name, organization, email, and phone number.

   Swanton Chamber of Commerce, Adam Paxman-802-868-7200, website www.swantonchamber.com

9. Are there any public transit services or stops that use the bridge or transit routes in the vicinity that may be affected if they become the detour route?

   Green Mountain Transit has a daily route from Alburgh that utilizes the bridge. They are increasing their presence in Swanton and will be offering on demand transit as part of a feasibility study. The route schedule is available at this link https://ridegmt.com/wp-content/uploads/FGI2020.pdf

   There is an IBM commuter bus that operates out of the Village Park and Ride at 120 First Street. It is unclear where the ridership is from, but it likely includes residents from West Swanton who would cross the bridge to arrive at the commuter bus.

Schools

1. Where are the schools in your community and what are their yearly schedules (example: first week in September to third week in June)?

   Swanton Elementary School and Missisquoi Valley Union Middle and High School are the two local schools. Both schools' bus routes will be affected by the bridge work. The contact for the

MVDS School District is Superintendent, Julie Regimbal, 802-868-4967, regimbal@MVSDschools.org.

School began on August 29/30th this year and is expected to start at a similar time next year. The last anticipated day is June 14th. The Middle and High School calendar is located on the district website at this link: https://www.mvsdschools.org/apps/events/2023/9/?id=0&id=3

The Elementary School calendar is located on the website at this link: https://swa.mvsdschools.org/apps/events/?id=0

2. Is this project on specific routes that school buses or students use to walk to and from school?

   While this bridge is not on a formal Safe Routes to School Route, it has pedestrian walkways on both sides of the bridge and is the connection from West Swanton to the Village Center and may be a pedestrian or bicycle route.

   Swanton Elementary is working with Rise VT to establish 'Walk to School' Days. For more information on proposed walking routes contact Amy Brewer, NMC Lifestyle Medicine Educator, 802-524-1296, abrewer@nmcinc.org

3. Are there recreational facilities associated with the schools nearby (other than at the school)?

   There are recreation fields at the Elementary School located at 24 Fourth Street.

   The Swanton Recreation Department is located at 16 Jewett Street and surrounded by sports fields.

   Marble Mill Park located adjacent to the eastern end of the bridge, near 2 Merchants Row, is a heavily used outdoor playground with tennis/pickleball court.

   There is also a Fish and Wildlife Boat access adjacent to the Bridge's western end, 45 Foundry Street, that has steady vehicular and pedestrian traffic.

Pedestrians and Bicyclists

1. What is the current level of bicycle and pedestrian use on the bridge?

   Unknown.

2. Are the current lane and shoulder widths adequate for pedestrian and bicycle use?

   Unknown

3. Does the community feel there is a need for a sidewalk or bike lane on the bridge?

   Yes, based on input from a public planning process during the Village scoping study 2022.

4. Is pedestrian and bicycle traffic heavy enough that it should be accommodated during construction?

   Unknown

5. Does the Town have plans to construct either pedestrian or bicycle facilities leading up to the bridge? Please provide any planning documents demonstrating this (scoping study, master plan, corridor study, town, or regional plan).

   The Village recently completed a Village Scoping Study to improve traffic patterns which included the following components in the scope of work.

   - **Support improvements and expansion of the sidewalk network in Swanton Village to ease pedestrian travel and safety.**
   - **Encourage improvements to bicycle and pedestrian safety within the Village and along Route 78.**

   The Study indicated that the B-6 bridge is an important connection to the Lamoille Valley Rail Trail and the Northern Forest Canoe Trail and should consider pedestrian and bicycle traffic.

   Funding has been secured from the Transportation Alternatives Program for design and implementation of minor upgrades for pedestrian and bicycle traffic flow including crosswalk improvements at the eastern end of the bridge as depicted in the attached plans (see #2). image.

6. In the vicinity of the bridge, is there a land use pattern, existing generators of pedestrian and/or bicycle traffic, or zoning that will support development that is likely to lead to significant levels of walking and bicycling?

   The completion of the Lamoille Valley Rail Trail (LVRT) that runs through the village is anticipated to increase pedestrian and bicycle traffic in the Village.

   The renovation of the Champlain Theater, 1 Canada Street, into a restaurant is expected to increase walking and bicycle traffic in the Village.

Design Considerations

1. Are there any concerns with the alignment of the existing bridge? For example, if the bridge is located on a curve, has this created any problems that we should be aware of?

   We are not aware of any issues.

2. Are there any concerns with the width of the existing bridge?

   We are not aware of any issues.

3. Are there any special aesthetic considerations we should be aware of?

   We are not aware of any issues.

4. Does the location have a history of flooding? If yes, please explain.

   The area suffered from flooding caused by ice jams on the Missisquoi in 2018.

5. Are there any known Hazardous Material Sites near the project site?

   There are known Brownfield Sites on both ends of the bridge.

6. Are there any known historic, archeological and/or other environmental resource issues near the project site?

   There is an ongoing archaeological assessment for the water line river crossing that evaluated the area around the Fish and Wildlife Boat Access and Webster Terrace by Charles Knight, Crown Consulting.

7. Are there any utilities (water, sewer, communications, power) attached to the existing bridge? Please provide any available documentation.

   There is a village water line attached to the bridge. The Village is creating a new line and is under contract to drill under the Missisquoi River near the Fish and Wildlife Boat Launch to create a new water line to replace the one on the bridge.

   There is also a Vermont Gas line located on the bridge.

8. Are there any existing, pending, or planned municipal utility projects (communications, lighting, drainage, water, wastewater, etc.) near the project that should be considered?

   There are no utility projects planned for the area around the bridge.

9. Are there any projects related to the upstream dam (Swanton dam) existing, pending, or planned at this time?

   There are no projects planned for the upstream Swanton Dam.

10. Are there any other issues that are important for us to understand and consider?

    The Swanton VFW is located at the eastern end of the bridge and may be impacted by the closure. An easy detour to their site is available by Ferry Street, but the disturbance at the bridge may be a deterrent to bar customers and event bookings.

Land Use & Zoning

1. Please provide a copy of your existing and future land use map or zoning map, if applicable.

   See attached.

2. Are there any existing, pending, or planned development proposals that would impact future transportation patterns near the bridge? If so, please explain.

   We are not aware of any development proposals that would impact traffic patterns at the bridge.

3. Is there any planned expansion of public transit or intercity transit service in the project area? Please provide the name and contact information for the relevant public transit provider.

   Green Mountain Transit has a daily route from Alburgh that utilizes the bridge. They are increasing their presence in Swanton and will be offering on demand transit as part of a feasibility study. The route schedule is available at this link https://ridegmt.com/wp-content/uploads/FGI2020.pdf.

Communications

1. Please identify any local communication outlets that are available for us to use in communicating with the local population. Include weekly or daily newspapers, blogs, radio,

public access TV, Facebook, Front Page Forum, etc. Also include any unconventional means such as local low-power FM.

See attached list.

2. Other than people/organizations already referenced in this questionnaire, are there any others who should be kept in the loop as the project moves forward?

Vermont State Police
Alburgh Rescue
Alburgh Town Clerk
Missisquoi Wildlife Refuge
Border Patrol
IBM Commuter Bus

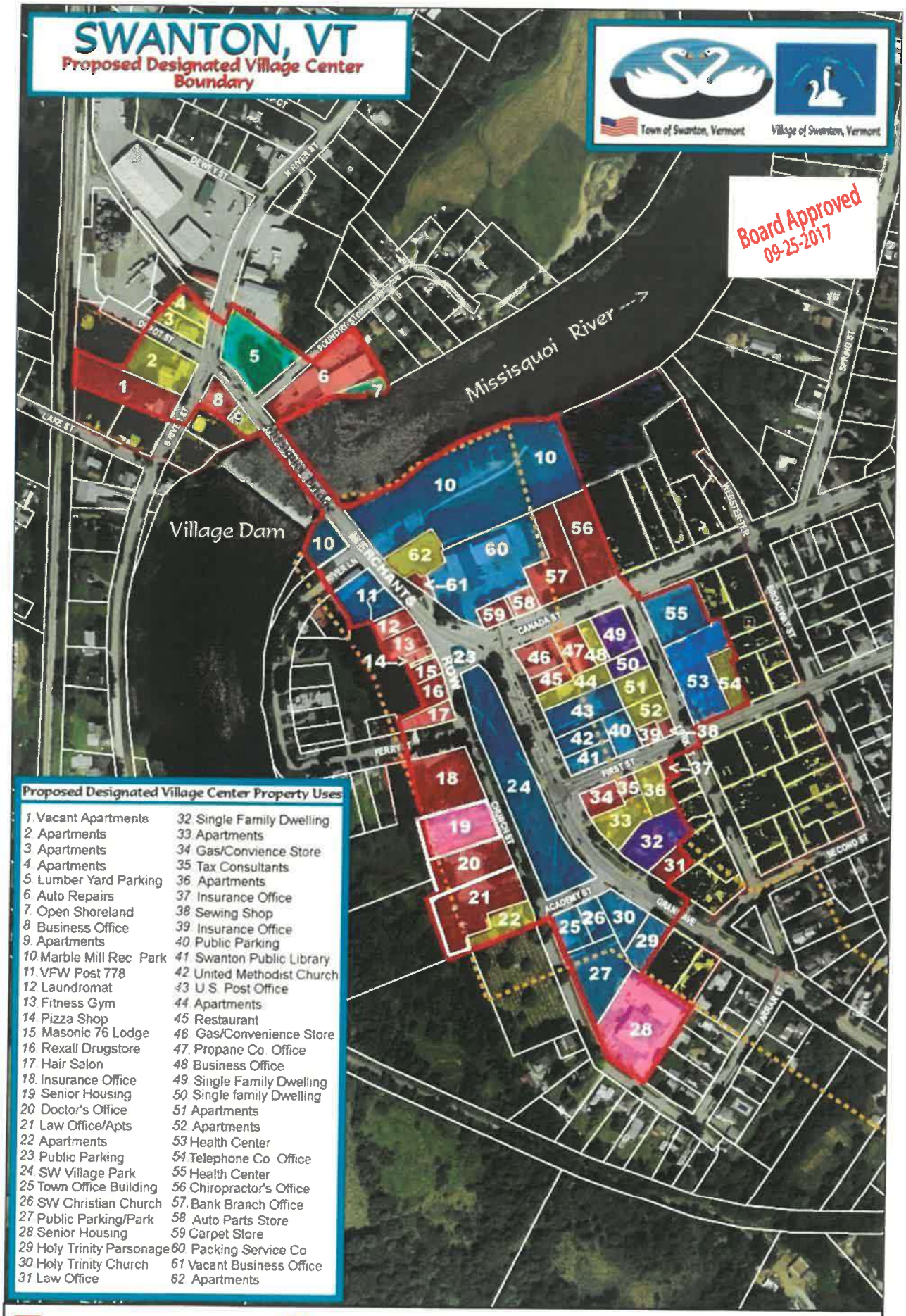
SWANTON, VT

Proposed Designated Village Center Boundary

Town of Swanton, Vermont

Village of Swanton, Vermont

Board Approved
09-25-2017



Proposed Designated Village Center Property Uses

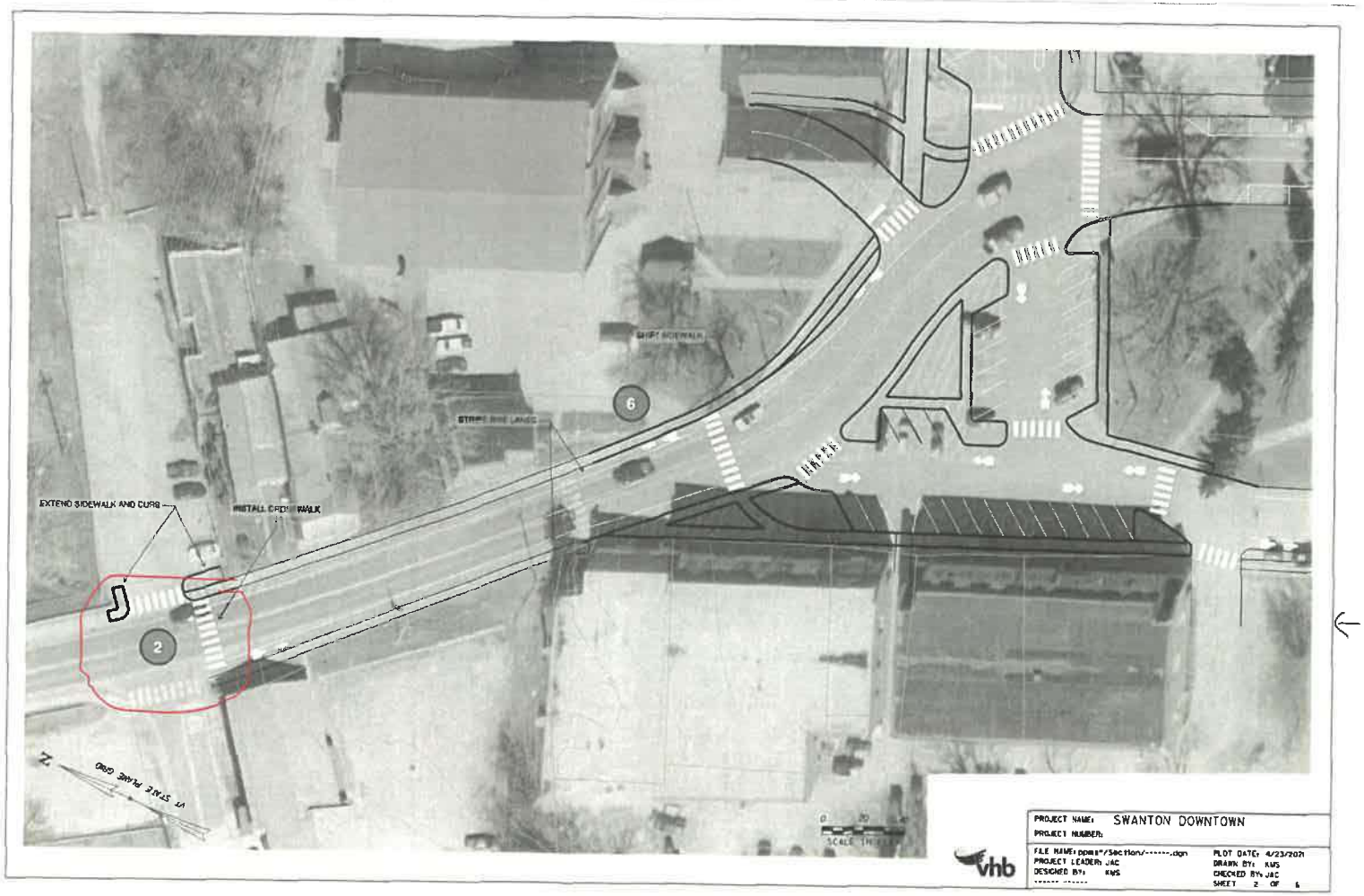
1. Vacant Apartments
2. Apartments
3. Apartments
4. Apartments
5. Lumber Yard Parking
6. Auto Repairs
7. Open Shoreland
8. Business Office
9. Apartments
10. Marble Mill Rec Park
11. VFW Post 778
12. Laundromat
13. Fitness Gym
14. Pizza Shop
15. Masonic 76 Lodge
16. Rexall Drugstore
17. Hair Salon
18. Insurance Office
19. Senior Housing
20. Doctor's Office
21. Law Office/Apts
22. Apartments
23. Public Parking
24. SW Village Park
25. Town Office Building
26. SW Christian Church
27. Public Parking/Park
28. Senior Housing
29. Holy Trinity Parsonage
30. Holy Trinity Church
31. Law Office
32. Single Family Dwelling
33. Apartments
34. Gas/Convience Store
35. Tax Consultants
36. Apartments
37. Insurance Office
38. Sewing Shop
39. Insurance Office
40. Public Parking
41. Swanton Public Library
42. United Methodist Church
43. U.S. Post Office
44. Apartments
45. Restaurant
46. Gas/Convenience Store
47. Propane Co. Office
48. Business Office
49. Single Family Dwelling
50. Single family Dwelling
51. Apartments
52. Apartments
53. Health Center
54. Telephone Co. Office
55. Health Center
56. Chiropractor's Office
57. Bank Branch Office
58. Auto Parts Store
59. Carpet Store
60. Packing Service Co
61. Vacant Business Office
62. Apartments

Village Center Designated Boundary
Historic District Boundary
Commercial
Apartments
Undeveloped/Open
Public/Institutional
Senior Housing
Single Family Dwelling

N

100 0 100 200 300 400 Feet

Figure 25: Preferred Conceptual Plan (Continued; Short-Term Projects)



DELINEATE PARKING

OUTREACH AVENUES				
ST. ALBANS MESSENGER	JOSH ELLERBROCK	jellerbrock@oroukemediagroup.com	419-615-2441	news story
	RACHEL MACHIA	rmachia@orourkemediagroup.com	802-528-6778	advertisements
NORTHWEST ACCESS TV	RICHARD COWPERTHWAITE	bluedevil1705478@yahoo.com	802-582-1505	For The Record' Show
	PAUL SNYDER	info@northwestaccess.tv	802-782-8676	request events be filmed
ABC CHAMPLAIN VALLEY TV	BROOKE DEVINE	news@mychamplainvalley.com	802-660-9333	Assignment Editor
NBC BURLINGTON	TIP LINE	newstips@mynbc5.com		news tips
NBC BURLINGTON	ORAN SCHONFELD	OSchonfeld@hearst.com		Assistant News Director
VT DIGGER	SHAUN ROBINSON	srobinson@vtdigger.org		news story
SEVEN DAYS	RACHEL HELLMAN	rhellman@sevendaysvt.com		town stories
SEVEN DAYS	COURTNEY LAMKIN	courtney@sevendaysvt.com		public safety stories
MVU TECH CLASS	RICHARD BALLARD	richard.ballard@mvsdschools.org	802-868-7311 x 215	help with video content
RADIO WVMT 96.3 morning talk show	HOST- KURT WRIGHT	Kurt@WVMTRadio.com	888-414-0303	
FRONT PORCH FORUM				
FACEBOOK/ Instagram				
WEBSITE				
ELECTRONIC SIGN				

Appendix L: Crash Data

5-Year Crash History 2020 - 2024

Crash Date	Town	Address	AOT Route	Crash Type	Collision Direction	Weather	Report Numb	Reporting Agenc	Road Gr	AOT Acti	Animal	Time of I	Intersection With	Impairmer	Involving	Reporting Agency	Road Characteristics	Road Condition	Street Address	Surface Condition	Coordinates
April 3, 2022 at 7:40 PM	Swanton	66 Canada St	CANADA ST	Injury	Single Vehicle Crash	Clear	22SW000508	Swanton PD.	6	999.99	None/Other	Night	New Street	Alcohol	None	VT0060300	Not at a Junction	None	66 Canada St	Dry	44.92147031284694,-73.11875976892253
April 3, 2022 at 7:40 PM	Swanton	66 Canada St	CANADA ST	Injury	Single Vehicle Crash	Clear	22SWAF000069	Swanton PD.	6	999.99	None/Other	Night	New Street	Alcohol	None	VT0060300	Not at a Junction	None	66 Canada St	Dry	44.92147031284694,-73.11875976892253
May 25, 2023 at 3:05 PM	Swanton	New Beginnings Fitness	MERCHANTS ROW	Property Damage Only	Rear End	Clear	23SW0009983	Swanton PD.	6	999.99	None/Other	Day	Grand Avenue	None	None	VT0060300	Not at a Junction	None	New Beginnings Fitness	Dry	44.919246202675296,-73.12562592361024
US 7																					
April 30, 2022 at 1:17 PM	Swanton	517 Saint Albans Rd	US-7	Injury	Rear End	Clear	22A2002153	VSP - A2 St. Albans	10	0.92	None/Other	Day	Comstock Rd	None	None	VTVSP0700	Not at a Junction	None	517 Saint Albans Rd	Dry	44.860885003391076,-73.0965883578828
April 30, 2023 at 10:00 AM	Swanton	2-6 Grand Ave	US-7	Property Damage Only	Same Direction Sideswipe	Clear	23SW000800	Swanton PD.	11	5.854	None/Other	Day	Merchants Row	None	None	VT0060300	Not at a Junction	None	2-6 Grand Ave	Dry	44.9192078786902,-73.12512300667632
April 5, 2022 at 9:01 PM	Swanton	179 St. Albans Rd	US-7	Injury	Single Vehicle Crash	Clear	22SW000525	Swanton PD.	10	3.13	None/Other	Night	Woods Hill Rd	None	None	VT0060300	Not at a Junction	None	179 St. Albans Rd	Dry	44.89113217470378,-73.0906489473467
December 11, 2022 at 4:28 PM	Swanton	455-463 St Albans Rd	US-7	Injury	Single Vehicle Crash	Freezing P	22SW002237	Swanton PD.	10	1.442	None/Other	Day	Dawns Way	None	None	VT0060300	Not at a Junction	Road Surface Condition(wet, icy, snow, slush, etc)	455-463 St Albans Rd	Snow	44.8682461524241,-73.09825568256112
December 23, 2020 at 5:31 PM	Swanton	362 Swanton Rd North Of	US-7	Injury			20SA011562	St. Albans PD.	10	2.301	None/Other	Night	Highgate Rd	None	None	VT0060100		None	362 Swanton Rd North Of		44.88029595301106,-73.09659124161507
December 28, 2022 at 5:50 AM	Swanton	9 Grand Ave	US-7	Injury		Clear	22SW002336	Swanton PD.	11	5.864	None/Other	Night	Canada Street	None	Pedestrian	VT0060300	Four-way Intersection	None	9 Grand Ave	Dry	44.91932918496328,-73.1252370490607
December 30, 2022 at 1:06 PM	Swanton	Canada Street	US-7	Property Damage Only	Head On	Clear	22SW002169	Swanton PD.	11	5.951	None/Other	Day	York Strweet	None	None	VT0060300	Not at a Junction	None	Canada Street	Dry	44.91985847986565,-73.12392543995354
December 4, 2021 at 8:43 PM	Swanton	147 St. Albans Rsd	US-7	Property Damage Only	Single Vehicle Crash	Freezing P	21SW02742	Swanton PD.	10	3.33	None/Other	Night	Woods Hill Rd	None	None	VT0060300	Not at a Junction	Road Surface Condition(wet, icy, snow, slush, etc)	147 St. Albans Rsd	Ice	44.89380523625273,-73.09220936047528
December 4, 2023 at 4:37 PM	Swanton	105-135 St Albans Rd	US-7	Property Damage Only	Right Turn and Thru, Broadside ^<--	Freezing P	23SW002544	Swanton PD.	10	3.424	None/Other	Day	Woods Hill	None	None	VT0060300	T - Intersection	Road Surface Condition(wet, icy, snow, slush, etc)	105-135 St Albans Rd	Snow	44.895056956542824,-73.0929503323997
December 5, 2022 at 6:47 PM	Swanton	Saint Albabs Road	US-7	Injury	Left Turn and Thru, Angle Broadside -->v--	Clear	22SW002203	Swanton PD.	10	3.73	None/Other	Night	Beebe Road	None	None	VT0060300	Other - Explain in Narrative	None	Saint Albabs Road	Dry	44.89915871637406,-73.09543253301703
February 14, 2020 at 6:08 AM	Swanton	387 St Albans Rd	US-7	Property Damage Only		Clear	20A200720	VSP - A2 St. Albans	10	1.795	None/Other	Day	Penell Rd	None	Heavy Truck	VTVSP0700	T - Intersection	None	387 St Albans Rd	Dry	44.87342243696118,-73.09804694193184
February 15, 2021 at 2:11 PM	Swanton	221 SAINT ALBANS RD	US-7				21A200547	VSP - A2 St. Albans	10	2.84		Day	Rosie's			VTVSP0700			221 SAINT ALBANS RD		44.88722203090441,-73.09168103371145
February 20, 2021 at 10:17 PM	Swanton	St. Albans Rd	US-7	Property Damage Only	Single Vehicle Crash	Clear	21SW00414	Swanton PD.	10	3.41	None/Other	Night	Woodshill Road	Alcohol	None	VT0060300	T - Intersection	None	St. Albans Rd	Dry	44.8948691723082,-73.09283714371699
February 23, 2022 at 1:14 PM	Swanton	Route 7	US-7	Injury	Left Turn and Thru, Angle Broadside -->v--	Clear	22A2000866	VSP - A2 St. Albans	10	3.72	None/Other	Day	Beebe Road	None	None	VTVSP0700	T - Intersection	None	Route 7	Dry	44.8990259415291 6,-73.09534736031036
February 25, 2021 at 8:18 PM	Swanton	362 Swanton Rd North Of	US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	21SA001244	St. Albans PD.	10	2.17	None/Other	Night	Highgate Rd	None	None	VT0060100	T - Intersection	None	362 Swanton Rd North Of	Dry	44.87876042621908,-73.09813694922083
February 3, 2021 at 1:15 PM	Swanton	65 St Albans Rd	US-7	Injury	Rear End	Freezing P	21A200383	VSP - A2 St. Albans	10	4.17	None/Other	Day	Assid Dr	None	None	VTVSP0700	Not at a Junction	Road Surface Condition(wet, icy, snow, slush, etc)	65 St Albans Rd	Snow	44.90504704278187,-73.09877767360297
February 4, 2022 at 9:52 AM	Swanton	138 St Albans Rd	US-7	Property Damage Only	Left Turn and Thru, Broadside v<--	Freezing P	22A2000531	VSP - A2 St. Albans	10	3.37	None/Other	Day	Woods Hill Rd	None	Heavy Truck	VTVSP0700	Not at a Junction	Road Surface Condition(wet, icy, snow, slush, etc)	138 St Albans Rd	Snow	44.894336158972536,-73.09252169451278
February 5, 2020 at 7:34 AM	Swanton	SAINT ALBANS RD & MAPLE GROVE EST	US-7				20A200558	VSP - A2 St. Albans	10	1.287		Day				VTVSP0700			SAINT ALBANS RD & MAPLE GROVE EST		44.86595775125 4484,-73.09826434650324
January 10, 2021 at 1:43 PM	Swanton	Canada Street	US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	21SW00078	Swanton PD.	11	5.87	None/Other	Day	Grand Avenue	None	None	VT0060300	T - Intersection	None	Canada Street	Dry	44.91938952173269,-73.12532590495884
January 20, 2022 at 7:43 AM	Swanton	74 Grand Avneue	US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	22SW000093	Swanton PD.	11	5.45	None/Other	Day	Furman Place	None	None	VT0060300	Not at a Junction	Other - Explain in Narrative	74 Grand Avneue	Wet	44.91561034818559,-73.11941671686135
January 25, 2020 at 8:33 AM	Swanton	552 ST ALBANS RD	US-7	Injury	Single Vehicle Crash	Clear	20A200381	VSP - A2 St. Albans	10	0.571	None/Other	Day	MOUNTAIN VIEW DR	None	None	VTVSP0700	Other - Explain in Narrative	None	552 ST ALBANS RD	Dry	44.856318217202606,-73.09353861875394
July 16, 2020 at 2:25 PM	Swanton		US-7	Property Damage Only	Single Vehicle Crash	Clear	20A203124	VSP - A2 St. Albans	10	2.602	None/Other	Day		None	None	VTVSP0700	Not at a Junction	None		Dry	44.88415949331063,-73.09385202535499
July 24, 2022 at 6:41 PM	Swanton	45 Spring Street	US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	22SW001369	Swanton PD.	11	6.456	None/Other	Day	Linda Avenue	None	None	VT0060300	Driveway	None	45 Spring Street	Dry	44.9258893334709,-73.12001841421493
July 31, 2020 at 7:43 PM	Swanton	First Street	US-7	Property Damage Only	Other - Explain in Narrative	Clear	20SW01846	Swanton PD.	11	5.774	None/Other	Night	Grand Avenue	None	None	VT0060300	Not at a Junction	None	First Street	Dry	44.918161782604486,-73.12441230614454
June 13, 2021 at 1:58 PM	Swanton	9 Grand Avenue	US-7	Property Damage Only	Same Direction Sideswipe	Clear	21SW01433	Swanton PD.	11	5.84	None/Other	Day	Canada Street	None	None	VT0060300	Not at a Junction	None	9 Grand Avenue	Dry	44.9190315531471,-73.12498508563448
June 27, 2020 at 3:02 PM	Swanton	Spring Street	US-7	Injury	Rear End	Clear	20SW01497	Swanton PD.	11	6.07	None/Other	Day	Canada Street	None	None	VT0060300	T - Intersection	None	Spring Street	Dry	44.92052085598825,-73.12175024325646
June 3, 2021 at 3:17 PM	Swanton	US ROUTE 7	US-7				21A201919	VSP - A2 St. Albans	10	5.51		Day	HUMPHREY RD			VTVSP0700			US ROUTE 7		44.91605020012843,-73.12038342010854
June 30, 2021 at 2:08 AM	Swanton	100 SAINT ALBANS RD	US-7				21A202363	VSP - A2 St. Albans	10	3.76		Night				VTVSP0700			100 SAINT ALBANS RD		44.8995527314532 8,-73.095685793306
March 1, 2022 at 7:26 PM	Swanton	197 St. Albans Rd	US-7	Property Damage Only	Head On	Rain	22SW000336	Swanton PD.	10	3	None/Other	Night	Woodshill Rd	None	None	VT0060300	Not at a Junction	None	197 St. Albans Rd	Wet	44.88931628563998,-73.09038413786284
March 11, 2021 at 9:42 AM	Swanton	137 St Albans Rd	US-7	Property Damage Only	Right Turn and Thru, Broadside ^<--	Clear	21A200815	VSP - A2 St. Albans	10	3.39	None/Other	Day	Woods Hill Rd	None	None	VTVSP0700	T - Intersection	None	137 St Albans Rd	Dry	44.89460301312921,-73.0926807591702
March 14, 2020 at 12:43 PM	Swanton	Grand Avenue	US-7	Injury	Left Turn and Thru, Angle Broadside -->v--	Clear	20SW00618	Swanton PD.	11	5.867	None/Other	Day	Merchants Row	None	None	VT0060300	Y - Intersection	None	Grand Avenue	Dry	44.91936509628896,-73.12527443570266
March 17, 2023 at 5:47 PM	Swanton	346-352 St Albans Rd	US-7	Injury	Same Direction Sideswipe	Rain	23SW000482	Swanton PD.	10	2.134	None/Other	Day	Penel Rd	None	Motorcycle	VT0060300	Not at a Junction	Road Surface Condition(wet, icy, snow, slush, etc)	346-352 St Albans Rd	Wet	44.87824772188073,-73.09845735015924

5-Year Crash History 2020 - 2024

Crash Date	Town	Address	AOT Route	Crash Type	Collision Direction	Weather	Report Numb	Reporting Agenc	Road Gr	AOT Acti	Animal	Time of I	Intersection With	Impairmer	Involving	Reporting Agency	Road Characteristics	Road Condition	Street Address	Surface Condition	Coordinates
March 22, 2023 at 4:36 PM	Swanton	290 St. Albans RD	US-7	Injury	Same Direction Sideswipe	Clear	23SW000522	Swanton PD.	10	2.255	None/Other	Day	290 St. Albans RD	None	Motorcycle	VT0060300	Not at a Junction	None	290 St. Albans RD	Dry	44.87972210018028,-73.09716477386773
March 3, 2020 at 4:38 AM	Swanton	200 SAINT ALBANS RD	US-7				20A201011	VSP - A2 St. Albans	10	2.97		Night				VTVSP0700			200 SAINT ALBANS RD		44.88892014270742,-73.09057300391787
May 14, 2021 at 5:30 PM	Swanton	Grand Avenue	US-7	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	21SW01087	Swanton PD.	11	5.88	None/Other	Day	Memorial Drive	None	None	VT0060300	Other - Explain in Narrative	None	Grand Avenue	Dry	44.919448634277096,-73.12521308671539
May 26, 2023 at 7:42 PM	Swanton	Merchants Row	US-7	Property Damage Only	Opp Direction Sideswipe	Clear	23SW000991	Swanton PD.	11	5.87	None/Other	Night	Canada Street	None	None	VT0060300	Not at a Junction	None	Merchants Row	Dry	44.91938754396787,-73.12532811382495
May 28, 2020 at 4:36 AM	Swanton	98 US-7	US-7	Property Damage Only	Single Vehicle Crash	Clear	20A202234	VSP - A2 St. Albans	10	3.827	None/Other	Night	Beebe Rd	None	None	VTVSP0700	Not at a Junction	None	98 US-7	Dry	44.90042487090334,-73.09627465559666
May 5, 2020 at 12:43 PM	Swanton	First Street	US-7	Property Damage Only	Rear End	Cloudy	20SW01074	Swanton PD.	10	5.785	None/Other	Day	Grand Avenue	None	None	VT0060300	T - Intersection	None	First Street	Dry	44.91830074876731,-73.12450595120414
May 9, 2021 at 11:36 AM	Swanton	34 Canada Street	US-7	Injury	Rear End	Clear	21SW01041	Swanton PD.	10	6.06	None/Other	Day	Spring Street	None	None	VT0060300	T - Intersection	None	34 Canada Street	Dry	44.920466391988334,-73.12193519138884
November 21, 2023 at 3:59 PM	Swanton	105-135 St Albans Rd	US-7	Injury	Single Vehicle Crash	Clear	23SW002455	Swanton PD.	10		None/Other	Day	Beebe Road	None	Pedestrian	VT0060300	Not at a Junction	None	105-135 St Albans Rd	Dry	44.89825437758704,-73.09487285454773
October 13, 2020 at 10:09 AM	Swanton	St. Albans Road	US-7	Property Damage Only	Rear End	Rain	20A204506	VSP - A2 St. Albans	10	3.406	None/Other	Day	Woods Hill Road	None	None	VTVSP0700	T - Intersection	None	St. Albans Road	Wet	44.894815939368414,-73.09280586628421
October 24, 2020 at 9:05 PM	Swanton	580 St. Albans Rd	US-7	Property Damage Only	Single Vehicle Crash	Clear	20SW02642	Swanton PD.	10	0.356	Deer	Night	Mountain View Dr	None	None	VT0060300	Not at a Junction	None	580 St. Albans Rd	Dry	44.85358574138437,-73.09171798752934
October 9, 2022 at 12:10 AM	Swanton	197-213 St Albans Rd	US-7	Injury	Single Vehicle Crash	Cloudy	22SW001857	Swanton PD.	10	2.993	None/Other	Night	Town Highway 51	Alcohol	None	VT0060300	Not at a Junction	None	197-213 St Albans Rd	Wet	44.88921822057578,-73.09042555579471
September 15, 2023 at 12:35 PM	Swanton	120 First Street	US-7	Property Damage Only	Rear End	Clear	23SW001933	Swanton PD.	11	999.99	None/Other	Day	Elm Street	None	None	VT0060300	Other - Explain in Narrative	None	120 First Street	Dry	44.92129776014811,-73.11237428218135
September 22, 2021 at 8:56 AM	Swanton	383-255 US-7	US-7	Injury	Single Vehicle Crash	Clear	21A203701	VSP - A2 St. Albans	10	2.06	None/Other	Day	Cedar Ledge Ests	None	None	VTVSP0700	Not at a Junction	None	383-255 US-7	Dry	44.8772322118732,-73.09846125368418
September 25, 2023 at 6:16 AM	Swanton	520-528 St Albans Rd	US-7	Property Damage Only	Left Turn and Thru, Angle Broadside -->v--		23A2005696	VSP - A2 St. Albans	10		None/Other	Day	Comstock Rd	None	None	VTVSP0700	T - Intersection	None	520-528 St Albans Rd	Dry	44.86102570331775,-73.09669092792751
September 29, 2021 at 3:31 PM	Swanton	137 St Albans Rd	US-7	Property Damage Only	Left Turn and Thru, Head On ^v--	Clear	21A203836	VSP - A2 St. Albans	10	3.38	None/Other	Day	Woods Hill Rd	None	None	VTVSP0700	T - Intersection	None	137 St Albans Rd	Dry	44.894470047168035,-73.09260219474264
VT-78																					
April 10, 2022 at 12:24 PM	Swanton	108 1st St	VT-78	Property Damage Only	Single Vehicle Crash	Rain	22SW000570	Swanton PD.	10	7.3	None/Other	Day	King St	None	None	VT0060300	Parking Lot	None	108 1st St	Wet	44.92095421248225,-73.114084654831
April 16, 2021 at 10:58 AM	Swanton	VT-78	VT-78				21A201264	VSP - A2 St. Albans	10	3.13		Day	Louies Landing			VTVSP0700			VT-78		44.95798157436191,-73.16643454441709
April 29, 2022 at 5:00 PM	Swanton	38 N River St	VT-78	Property Damage Only		Clear	22SW000723	Swanton PD.	10	6.32	None/Other	Day	Brooklyn St	None	None	VT0060300	T - Intersection	None	38 N River St	Dry	44.924275366829654,-73.12661583994763
April 3, 2023 at 8:23 AM	Swanton	125-139 1st St	VT-78	Property Damage Only	Rear End	Cloudy	23SW000593	Swanton PD.	10	7.419	None/Other	Day	Robinhood Dr.	None	Heavy Truck	VT0060300	Four-way Intersection	None	125-139 1st St	Dry	44.921420981254116,-73.11176042883473
April 30, 2021 at 10:05 AM	Swanton	7 North River Street	VT-78	Property Damage Only	Rear End	Rain	21SW00960	Swanton PD.	10	6.5	None/Other	Day	Depot Street	None	None	VT0060300	Four-way Intersection	None	7 North River Street	Wet	44.92198835055027,-73.12850702382462
April 5, 2023 at 7:24 AM	Swanton	690-734 N River St	VT-78	Property Damage Only	Single Vehicle Crash	Cloudy	23MV003248	DMV	10	1.505	None/Other	Day	Church Rd	Alcohol	Heavy Truck	VTDMV0000	Not at a Junction	None	690-734 N River St		44.9702559875767,-73.19061486728344
August 2, 2022 at 2:08 PM	Swanton	166 First Street, Swanton VT 05488	VT-78	Property Damage Only	Left Turn and Thru, Angle Broadside -->v--	Clear	22SW001427	Swanton PD.	10	7.505	None/Other	Day	Robinhood Drive, Swanto	None	None	VT0060300	Not at a Junction	None	166 First Street, Swanton VT 05488	Dry	44.921765033239,-73.1100451989792
August 21, 2023 at 12:08 PM	Swanton	103-103 1st St	VT-78	Injury	Left Turn and Thru, Angle Broadside -->v--	Clear	23SW001701	Swanton PD.	11	7.285	None/Other	Day	King St	None	Motorcycle	VT0060300	Not at a Junction	None	103-103 1st St	Dry	44.92089815205167,-73.11437604514616
August 27, 2021 at 7:59 AM	Swanton	569 N RIVER ST	VT-78				21A203322	VSP - A2 St. Albans	10	2.93		Day				VTVSP0700			569 N RIVER ST		44.96007059454669,-73.16910027772423
August 3, 2022 at 11:58 AM	Swanton	25 1st St	VT-78	Injury	No Turns, Thru moves only, Broadside ^<	Clear	22SW001432	Swanton PD.	11	6.828	None/Other	Day	1st St	None	None	VT0060300	Crossover	None	25 1st St	Dry	44.91869386435066,-73.12301083377963
August 3, 2023 at 1:00 PM	Swanton	85-95 1st St	VT-78	Property Damage Only	Rear End	Clear	23SW001541	Swanton PD.	11	7.166	None/Other	Day	First St / Liberty St	None	Motorcycle	VT0060300	Not at a Junction	None	85-95 1st St	Dry	44.920448882779006,-73.11668603456064
August 3, 2023 at 2:20 PM	Swanton	2-10 1st St	VT-78	Injury	Rear End	Clear	23SW001542	Swanton PD.	11	6.782	None/Other	Day	Grand Ave	None	None	VT0060300	Not at a Junction	None	2-10 1st St	Dry	44.91843033769364,-73.12385904539474
August 3, 2023 at 3:49 PM	Swanton	85-95 1st St	VT-78	Property Damage Only	Rear End	Clear	23SW001544	Swanton PD.	11	7.161	None/Other	Day	Liberty Street	None	None	VT0060300	Four-way Intersection	None	85-95 1st St	Dry	44.920429953425725,-73.11678307336327
December 13, 2022 at 3:45 AM	Swanton	560-672 N River St	VT-78	Injury	Single Vehicle Crash	Clear	22A2007167	VSP - A2 St. Albans	10	2.863	None/Other	Night	Residence # 522	None	None	VTVSP0700	Not at a Junction	Shoulders (none, low, soft, high)	560-672 N River St	Dry	44.96063204167175,-73.1701751272261
December 18, 2023 at 3:47 PM	Swanton	2-10 VT-78	VT-78	Property Damage Only	Left Turn and Thru, Angle Broadside -->v--	Rain	23SW002627	Swanton PD.	11	6.526	None/Other	Day	North River Street	None	None	VT0060300	Four-way Intersection	Road Surface Condition(wet, icy, snow, slush, etc)	2-10 VT-78	Wet	44.92163254528801,-73.12848598194722
December 18, 2023 at 6:10 AM	Swanton	165-165 1st St	VT-78	Injury	Single Vehicle Crash	Rain	23A2007324	VSP - A2 St. Albans	10	7.517	None/Other	Day	HOMETOWN SUNOCO	None	Pedestrian	VTVSP0700	Not at a Junction	None	165-165 1st St	Wet	44.9218123753827,-73.10980559316212
December 20, 2023 at 5:19 PM	Swanton	103-103 1st St	VT-78	Property Damage Only	Left Turn and Thru, Broadside v<--	Clear	23SW002642	Swanton PD.	11	7.295	None/Other	Night	King Street	None	None	VT0060300	Not at a Junction	None	103-103 1st St	Dry	44.92093481388124,-73.11418151222378
December 22, 2022 at 11:57 AM	Swanton	163-165 1st St	VT-78	Property Damage Only	Same Direction Sideswipe	Clear	22MV010385	DMV	10	7.498	None/Other	Day	I 89	None	Heavy Truck	VTDMV0000	T - Intersection	None	163-165 1st St	Dry	44.92173741675452,-73.11018496934986
December 27, 2023 at 4:12 PM	Swanton	754-784 N River St	VT-78	Injury	Same Direction Sideswipe		23SW002724	Swanton PD.	10	0.786	None/Other	Day	Tabor Road	None	None	VT0060300	Not at a Junction	None	754-784 N River St	Wet	44.969554698219916,-73.20511755314821
December 30, 2022 at 10:40 AM	Swanton	First Street	VT-78	Injury	Rear End	Cloudy	22SW002347	Swanton PD.	11	7.238	None/Other	Day	Pine Street	None	None	VT0060300	Not at a Junction	None	First Street	Dry	44.92072509047546,-73.1152900737593
December 30, 2022 at 6:02 PM	Swanton	538-558 N River St	VT-78	Injury	Single Vehicle Crash	Clear	22SW002348	Swanton PD.	10	3.029	None/Other	Night	Macs Bend Road	None	None	VT0060300	Not at a Junction	None	538-558 N River St	Wet	44.959087751694064,-73.16770129688813
February 20, 2020 at 3:24 PM	Swanton	1 S River St	VT-78	Property Damage Only	Other - Explain in Narrative	Clear	20SW00430	Swanton PD.	11	6.517	None/Other	Day		None	None	VT0060300	Four-way Intersection	None	1 S River St	Dry	44.92174576176565,-73.12855457987268
February 20, 2020 at 3:24 PM	Swanton	1 S River St	VT-78	Property Damage Only	Other - Explain in Narrative	Clear	20SW00430	Swanton PD.	11	6.517	None/Other	Day		None	None	VT0060300	Four-way Intersection	None	1 S River St	Dry	44.92174576176565,-73.12855457987268

5-Year Crash History 2020 - 2024

Crash Date	Town	Address	AOT Route	Crash Type	Collision Direction	Weather	Report Numb	Reporting Agenc	Road Gr	AOT Acti	Animal	Time of I	Intersection With	Impairmer	Involving	Reporting Agency	Road Characteristics	Road Condition	Street Address	Surface Condition	Coordinates
February 22, 2021 at 9:42 PM	Swanton	First Street	VT-78	Injury	No Turns, Thru moves only, Broadside ^<	Freezing P	21SW00422	Swanton PD.	10	7.15	None/Other	Night	Liberty Street	None	None	VT0060300	Four-way Intersection	Road Surface Condition(wet, icy, snow, slush, etc)	First Street	Snow	44.92039055916175,-73.11699743119482
February 25, 2021 at 2:30 PM	Swanton	First Street	VT-78	Property Damage Only	Left Turn and Thru, Angle Broadside -->v--	Clear	21SW00444	Swanton PD.	10	6.83	None/Other	Day	York Street	None	None	VT0060300	Four-way Intersection	None	First Street	Dry	44.918705326775566,-73.12297393320682
February 25, 2022 at 12:04 PM	Swanton	Rt. 78	VT-78	Property Damage Only	Single Vehicle Crash	Freezing P	22A2000889	VSP - A2 St. Albans	10	1	None/Other	Day	Tabor Rd.	None	None	VTVSP0700	Not at a Junction	Road Surface Condition(wet, icy, snow, slush, etc)	Rt. 78	Snow	44.97004250818051,-73.19440373166626
February 3, 2021 at 5:44 AM	Swanton	VT-78	VT-78				21A200376	VSP - A2 St. Albans	10	3.12		Night	LOUIS LANDING			VTVSP0700			VT-78		44.95810148619235,-73.16654011111072
February 3, 2023 at 3:16 PM	Swanton	100-148 N River St	VT-78	Property Damage Only	Head On	Cloudy	23A2000575	VSP - A2 St. Albans	10		None/Other	Day	Babbie Blvd	None	None	VTVSP0700	Not at a Junction	None	100-148 N River St	Dry	44.93204415963497,-73.13022410035236
February 8, 2020 at 7:46 AM	Swanton	VT-78	VT-78	Property Damage Only	Single Vehicle Crash	Clear	20A200610	VSP - A2 St. Albans	10	3.681	None/Other	Day	N River St	None	None	VTVSP0700	Not at a Junction	Road Surface Condition(wet, icy, snow, slush, etc)	VT-78	Ice	44.95093061821308,-73.16184174111301
January 12, 2021 at 10:30 AM	Swanton	First Street	VT-78	Injury	Rear End	Clear	21SW00096	Swanton PD.	10	6.75	None/Other	Day	Grand Avenue	None	Heavy Truck	VT0060300	T - Intersection	None	First Street	Wet	44.91824753903048,-73.12447128544025
January 13, 2023 at 12:28 PM	Swanton	197 1st St	VT-78	Injury	Single Vehicle Crash		23A2000198	VSP - A2 St. Albans	10	7.8	None/Other	Day	Lafar St.	None	None	VTVSP0700	Not at a Junction	Road Surface Condition(wet, icy, snow, slush, etc)	197 1st St	Snow	44.92293479152886,-73.10427086228428
January 14, 2020 at 2:13 PM	Swanton	4 VT-78	VT-78	Property Damage Only	Other - Explain in Narrative	Clear	20A200189	VSP - A2 St. Albans	11	6.749	None/Other	Day	Grand Ave	None	None	VTVSP0700	T - Intersection	None	4 VT-78	Dry	44.91824753903048,-73.12447128544025
January 15, 2020 at 5:26 PM	Swanton	N River Street	VT-78	Property Damage Only	Single Vehicle Crash	Cloudy	20SW00134	Swanton PD.	10	1.966	None/Other	Night	Campbell Bay Rd	None	None	VT0060300	Not at a Junction	None	N River Street	Wet	44.970153098423836,-73.1814197677875
January 15, 2020 at 7:57 AM	Swanton	N RIVER ST & TABOR RD; WILDLIFE REFUGE	VT-78				20A200197	VSP - A2 St. Albans	10	1.092		Day				VTVSP0700			N RIVER ST & TABOR RD; WILDLIFE REFUGE		44.96984862819365,-73.1989989498285
January 2, 2023 at 7:50 AM	Swanton	736-752 N River St	VT-78	Property Damage Only			23MV000002	DMV	10	1.313	None/Other	Day	Church St	None	Heavy Truck	VTDMV0000	Not at a Junction		736-752 N River St		44.97006043548598,-73.19451190568277
January 23, 2023 at 2:24 PM	Swanton	VT RT 78	VT-78	Injury	Single Vehicle Crash		23A2000360	VSP - A2 St. Albans	10	7.645	None/Other	Day	Exit 21 Northbound Offra	None	None	VTVSP0700	T - Intersection	Other - Explain in Narrative	VT RT 78	Other - Explain in Narrative	44.92232779319103,-73.10725411255368
January 24, 2020 at 3:32 PM	Swanton	First Street	VT-78	Injury	Right Turn and Thru, Angle Broadside -->^--	Clear	20SW00213	Swanton PD.	11	6.831	None/Other	Day	York Street	None	None	VT0060300	Four-way Intersection	None	First Street	Wet	44.91871105442003,-73.1229554917817
January 26, 2022 at 4:54 PM	Swanton	527 North River Street	VT-78	Property Damage Only	Single Vehicle Crash	Clear	22SW000130	Swanton PD.	10	3.23	None/Other	Day	Campbell Bay Road	None	None	VT0060300	Other - Explain in Narrative	None	527 North River Street	Dry	44.9566760251276,-73.16568531254852
July 10, 2020 at 2:37 PM	Swanton	First Street	VT-78	Property Damage Only	Rear End	Clear	20SW01623	Swanton PD.	11	7.227	None/Other	Day	Pine Street	None	None	VT0060300	Four-way Intersection	None	First Street	Dry	44.920684457029,-73.11550399102572
July 15, 2021 at 4:17 PM	Swanton	VT-78	VT-78				21A202612	VSP - A2 St. Albans	10	1.09		Day	Church Rd			VTVSP0700			VT-78		44.96984694489566,-73.19903896176054
July 22, 2021 at 4:00 PM	Swanton	First Street	VT-78	Property Damage Only	Opp Direction Sideswipe	Clear	21SW01811	Swanton PD.	10	6.75	None/Other	Day	Grand Avenue	None	None	VT0060300	T - Intersection	None	First Street	Dry	44.91824753903048,-73.12447128544025
July 22, 2021 at 4:38 PM	Swanton	FIRST ST	VT-78				21A202720	VSP - A2 St. Albans	10	7.42		Day	ROBIN HOOD DR			VTVSP0700			FIRST ST		44.92142517649276,-73.11174056205694
July 23, 2021 at 3:30 PM	Swanton	219 N River St	VT-78	Injury	Opp Direction Sideswipe	Clear	21A202736	VSP - A2 St. Albans	10	5.18	None/Other	Day	Jonergin Dr	None	Heavy Truck	VTVSP0700	Not at a Junction	None	219 N River St	Dry	44.9385662308882,-73.13792641936064
July 25, 2020 at 12:14 PM	Swanton	First STreet	VT-78	Property Damage Only	Left Turn and Thru, Broadside v<--	Clear	20SW01777	Swanton PD.	10	7.522	None/Other	Day	Mapleffields	None	None	VT0060300	Not at a Junction	None	First STreet	Dry	44.921832101125375,-73.10970575778214
July 5, 2020 at 12:55 PM	Swanton	First Street	VT-78	Property Damage Only		Clear	20SW01574	Swanton PD.	11	7.166	None/Other	Day	Liberty Street	None	None	VT0060300	Not at a Junction	None	First Street	Dry	44.92045441652899,-73.116688209336
July 5, 2021 at 4:06 PM	Swanton	108 First Street	VT-78	Property Damage Only	Other - Explain in Narrative	Clear	21SW01653	Swanton PD.	10	7.29	None/Other	Day		None	None	VT0060300	Parking Lot	None	108 First Street	Dry	44.92091647868336,-73.11427879846063
July 6, 2020 at 5:04 PM	Swanton	First Street	VT-78	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	20SW01588	Swanton PD.	11	6.906	None/Other	Day	Broadway Street	None	None	VT0060300	Four-way Intersection	None	First Street	Dry	44.919143142972906,-73.12157628830545
July 6, 2023 at 5:31 PM	Swanton	77-99 N River St	VT-78	Property Damage Only	Single Vehicle Crash	Clear	23SW001276	Swanton PD.	10	6.037	None/Other	Day	Babbie Blvd	None	None	VT0060300	Not at a Junction	None	77-99 N River St	Dry	44.92873276179042,-73.12665128380375
June 1, 2020 at 4:45 PM	Swanton	First STreet	VT-78	Property Damage Only	Left Turn and Thru, Angle Broadside -->v--	Clear	20SW01311	Swanton PD.	11	7.295	None/Other	Day	King Street	None	None	VT0060300	T - Intersection	None	First STreet	Dry	44.92093550284763,-73.11417785240145
June 12, 2023 at 4:09 PM	Swanton	690-734 N River St	VT-78	Injury	Opp Direction Sideswipe	Clear	23A2003397	VSP - A2 St. Albans	10		None/Other	Day	RESIDENCE # 526	None	None	VTVSP0700	Not at a Junction	None	690-734 N River St	Dry	44.9707922371783,-73.18499389325866
June 14, 2022 at 2:07 PM	Swanton	39 1st St	VT-78	Injury	Single Vehicle Crash	Clear	22SW001030	Swanton PD.	10	6.92	None/Other	Day	Broadway St	None	Pedestrian	VT0060300	Not at a Junction	None	39 1st St	Dry	44.919224735918974,-73.12131672607123
June 16, 2023 at 8:37 PM	Swanton	1st St	VT-78	Injury	Left Turn and Thru, Angle Broadside -->v--	Cloudy	23SW001109	Swanton PD.	10	7.893	None/Other	Night	Waugh Farm Rd	None	None	VT0060300	T - Intersection	None	1st St	Dry	44.92351838543116,-73.10262483455192
June 19, 2021 at 10:05 AM	Swanton	166 First Street	VT-78	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	21SW01501	Swanton PD.	10	7.51	None/Other	Day		None	None	VT0060300	Not at a Junction	None	166 First Street	Dry	44.92178475919046,-73.10994536376525
June 21, 2021 at 5:30 PM	Swanton	96v First Street	VT-78	Property Damage Only	Single Vehicle Crash	Clear	21SW01518	Swanton PD.	10	7.21	None/Other	Day		None	None	VT0060300	Not at a Junction	None	96v First Street	Dry	44.92062158902179,-73.11583450057118
June 21, 2022 at 3:12 PM	Swanton	N. RIVER ST.	VT-78	Property Damage Only	Same Direction Sideswipe	Cloudy	22A2003270	VSP - A2 St. Albans	10	0.5	None/Other	Day	SANDY POINT PUBLIC BOA	None	None	VTVSP0700	Four-way Intersection	None	N. RIVER ST.	Dry	44.9700989511286,-73.21070999020897
June 4, 2021 at 1:13 PM	Swanton	98 N RIVER ST	VT-78				21A201928	VSP - A2 St. Albans	10	5.94		Day				VTVSP0700			98 N RIVER ST		44.930208317232236,-73.127353856119
June 6, 2022 at 2:50 PM	Swanton	VT RT 78	VT-78	Fatal	Rear End	Cloudy	22A2002926	VSP - A2 St. Albans	10	5.602	None/Other	Day	Jonergin Dr.	Drugs	Motorcycle	VTVSP0700	T - Intersection	None	VT RT 78	Dry	44.93369856455527,-73.13310001901566
June 6, 2022 at 5:00 PM	Swanton	First Street	VT-78	Property Damage Only	Other - Explain in Narrative	Clear	22SW000981	Swanton PD.	10	6.83	None/Other	Day	York Street	None	None	VT0060300	Four-way Intersection		First Street	Dry	44.91870532244968,-73.12297395294972
June 8, 2020 at 3:45 PM	Swanton	716 VT-78	VT-78	Property Damage Only	Rear End	Clear	20A202419	VSP - A2 St. Albans	10	0.683	None/Other	Day	Raven Dr	None	None	VTVSP0700	Not at a Junction	None	716 VT-78	Dry	44.96948172774404,-73.20717875613907
March 10, 2023 at 8:20 PM	Swanton	557-673 N River St	VT-78	Property Damage Only	Single Vehicle Crash	Clear	23SW000444	Swanton PD.	10	2.723	None/Other	Night	Louie's Landing	Alcohol	None	VT0060300	Not at a Junction	None	557-673 N River St	Dry	44.96216146555607,-73.17190245083047

5-Year Crash History 2020 - 2024

Crash Date	Town	Address	AOT Route	Crash Type	Collision Direction	Weather	Report Numb	Reporting Agenc	Road Gr	AOT Acti	Animal	Time of I	Intersection With	Impairmer	Involving	Reporting Agency	Road Characteristics	Road Condition	Street Address	Surface Condition	Coordinates
March 12, 2023 at 2:21 PM	Swanton	557-673 N River St	VT-78	Injury	Single Vehicle Crash	Clear	23A2001323	VSP - A2 St. Albans	10	2.81	None/Other	Day	Loui's Landing Boat Launc	None	None	VTVSP0700	Not at a Junction	None	557-673 N River St	Dry	44.96113282343494,-73.17095825736874
March 15, 2022 at 3:21 PM	Swanton	109 N River St	VT-78	Property Damage Only	Rear End	Clear	22A2001238	VSP - A2 St. Albans	10	5.91	None/Other	Day	N River St	None	Heavy Truck	VTVSP0700	T - Intersection	None	109 N River St	Dry	44.93062874053079,-73.12768625895994
March 18, 2023 at 7:19 PM	Swanton	VT-78	VT-78	Property Damage Only	Same Direction Sideswipe	Clear	23SW000491	Swanton PD.	10	0.472	None/Other	Night	LAKEWOOD DR	None	None	VT0060300	T - Intersection	None	VT-78	Dry	44.97025467640723,-73.21122649490562
March 3, 2020 at 2:07 PM	Swanton	FIRST ST & WAUGH FARM RD	VT-78				20A201024	VSP - A2 St. Albans	10	7.884		Day				VTVSP0700			FIRST ST & WAUGH FARM RD		44.92344739922957,-73.10276443825015
March 31, 2020 at 4:14 PM	Swanton	First STreet	VT-78	Injury	Rear End	Clear	20SW00769	Swanton PD.	10	7.429	None/Other	Day	Missisquoi Street	Alcohol	None	VT0060300	Four-way Intersection	None	First STreet	Dry	44.92146329676504,-73.11156192706243
May 13, 2020 at 10:20 AM	Swanton	Fist Street	VT-78	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	20SW01145	Swanton PD.	11	7.062	None/Other	Day	New Street	None	None	VT0060300	Four-way Intersection	None	Fist Street	Dry	44.920028949691584,-73.11869882814146
May 14, 2022 at 11:24 AM	Swanton	First Streret	VT-78	Property Damage Only	Rear End		22SW000826	Swanton PD.	10	7.41	None/Other	Day	Missisquio Street	None	None	VT0060300	Four-way Intersection	None	First Streret	Dry	44.92138322542086,-73.11193921784417
May 20, 2022 at 2:53 PM	Swanton	N River St	VT-78	Property Damage Only	Rear End	Clear	22SW000873	Swanton PD.	10	6.32	None/Other	Day	Brooklyn St	None	None	VT0060300	T - Intersection	None	N River St	Dry	44.924275366829654,-73.12661583994763
May 27, 2021 at 1:20 PM	Swanton	First Street	VT-78	Property Damage Only		Clear	21SW01244	Swanton PD.	10	7.06	None/Other	Day	New Street	None	None	VT0060300	Four-way Intersection	None	First Street	Dry	44.920020639877144,-73.11873230889549
May 29, 2022 at 8:11 AM	Swanton	254 N River St	VT-78	Injury	Opp Direction Sideswipe		22A2002737	VSP - A2 St. Albans	10	4.85	None/Other	Day		None	None	VTVSP0700	Not at a Junction	None	254 N River St	Dry	44.94155212201348,-73.1429131481903
May 31, 2022 at 7:23 AM	Swanton	165 First Street	VT-78	Property Damage Only	Same Direction Sideswipe	Cloudy	22SW000950	Swanton PD.	10	7.5	None/Other	Day	Interstate 89 / Exit 21	None	Heavy Truck	VT0060300			165 First Street		44.92174530719002,-73.11014503610292
May 5, 2021 at 6:36 PM	Swanton	First Street	VT-78	Property Damage Only	Other - Explain in Narrative	Cloudy	21SW01003	Swanton PD.	10	6.77	None/Other	Day	Grand Avenue	None	Heavy Truck	VT0060300	T - Intersection	Other - Explain in Narrative	First Street	Wet	44.91836233280423,-73.12408077344621
May 7, 2022 at 3:57 PM	Swanton	197 1st St	VT-78	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	22A2002302	VSP - A2 St. Albans	10	7.78	None/Other	Day		None	None	VTVSP0700	Not at a Junction	None	197 1st St	Dry	44.922846249810526,-73.10464744866213
May 9, 2022 at 9:45 AM	Swanton	493 N. River St, Swanton, VT, 05488, 054	VT-78	Injury	Single Vehicle Crash	Clear	22A2002329	VSP - A2 St. Albans	10	3.48	None/Other	Day	Campbell	None	Heavy Truck	VTVSP0700	Not at a Junction	Shoulders (none, low, soft, high)	493 N. River St, Swanton, VT, 05488, 054	Dry	44.9534209077619,-73.16375395946577
November 11, 2021 at 3:42 PM	Swanton	165 1st St	VT-78	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	21A204523	VSP - A2 St. Albans	10	7.51	None/Other	Day	Missisquoi St	None	None	VTVSP0700	Parking Lot	None	165 1st St	Dry	44.92178475919046,-73.10994536376525
November 14, 2022 at 4:41 PM	Swanton	166 First Street	VT-78	Property Damage Only	Left and Right Turns, Simultaneous Turn Crash --vv--	Clear	22SW002080	Swanton PD.	10	7.789	None/Other	Day	I89 South Bound	None	None	VT0060300	Other - Explain in Narrative	None	166 First Street	Dry	44.922885585560294,-73.10447775102061
November 21, 2020 at 4:14 AM	Swanton	103 1st St	VT-78	Property Damage Only	Rear End	Clear	20SW02868	Swanton PD.	11	7.287	None/Other	Night	King St	None	None	VT0060300	Not at a Junction	None	103 1st St	Dry	44.92090548012174 6,-73.11433715793027
November 22, 2020 at 6:07 PM	Swanton	First Street	VT-78	Property Damage Only	Left Turn and Thru, Broadside v<--	Freezing P	20SW02880	Swanton PD.	11	7.423	None/Other	Night	Robinhood Dr	None	None	VT0060300	Four-way Intersection	None	First Street	Wet	44.921436331079875,-73.11168773864789
November 6, 2022 at 2:57 PM	Swanton	RT 78	VT-78	Injury	Single Vehicle Crash		22A2006376	VSP - A2 St. Albans	10	2.844	None/Other	Day	Approximately 1200 Feet	None	None	VTVSP0700	Not at a Junction	Other - Explain in Narrative	RT 78	Other - Explain in Narrative	44.960802043956356,-73.17046812582652
November 6, 2022 at 5:27 PM	Swanton	1st St	VT-78	Property Damage Only	Single Vehicle Crash	Rain	22SW002029	Swanton PD.	10	7.72	None/Other	Night	Frontage Road	None	None	VT0060300	Not at a Junction	Road Surface Condition(wet, icy, snow, slush, etc)	1st St	Wet	44.92261511681236,-73.10579220669786
November 9, 2022 at 11:51 PM	Swanton	42-74 N River St	VT-78	Property Damage Only	Single Vehicle Crash	Clear	22SW002045	Swanton PD.	10	6.169	None/Other	Night	Box 56	None	None	VT0060300	Not at a Junction	None	42-74 N River St		44.926634647482125,-73.12620340596557
October 10, 2020 at 4:55 PM	Swanton	First Street	VT-78	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Rain	20SW02524	Swanton PD.	11	6.828	None/Other	Day	York Street	None	None	VT0060300	Four-way Intersection	None	First Street	Wet	44.91869206103944,-73.12301664036147
October 14, 2022 at 9:55 AM	Swanton	538-558 N River St	VT-78	Property Damage Only	Single Vehicle Crash	Cloudy	22MV008511	DMV	10	3.052	None/Other	Day	Missisquoi Wild Life Refug	None	Heavy Truck	VTDMV0000	Not at a Junction	None	538-558 N River St	Wet	44.958840468529736,-73.16740374379307
October 19, 2020 at 5:14 PM	Swanton	First Street	VT-78	Injury	No Turns, Thru moves only, Broadside ^<	Rain	20SW02598	Swanton PD.	11	6.983	None/Other	Day	Greenwich Street	None	None	VT0060300	T - Intersection	Road Surface Condition(wet, icy, snow, slush, etc)	First Street		44.919589239145076,-73.12015716003152
October 19, 2021 at 11:52 AM	Swanton	First Street	VT-78	Property Damage Only	Rear End	Clear	21SW02525	Swanton PD.	10	7.42	None/Other	Day	Missisquoi Street	None	Heavy Truck	VT0060300	Four-way Intersection	None	First Street	Dry	44.92142517649276,-73.11174056205694
October 2, 2021 at 12:36 PM	Swanton	94 1st St	VT-78	Property Damage Only	Other - Explain in Narrative		21SA006921	St. Albans PD.	10	7.21	None/Other	Day	State Rte 78	None	None	VT0060100	Not at a Junction		94 1st St		44.92062158902179,-73.11583450057118
October 2, 2021 at 7:48 AM	Swanton	VT Rt 78	VT-78				21A203870	VSP - A2 St. Albans	10	999.99		Day				VTVSP0700			VT Rt 78		
October 22, 2022 at 4:06 PM	Swanton	1-23 Babbie Blvd	VT-78	Property Damage Only	Rear End	Clear	22A2006006	VSP - A2 St. Albans	10	5.938	None/Other	Day	Babbie Blvd	None	None	VTVSP0700	T - Intersection	None	1-23 Babbie Blvd	Dry	44.93023696759666,-73.1273744841749
October 23, 2023 at 3:45 PM	Swanton	2-16 Pine St	VT-78	Property Damage Only	Rear End	Clear	23SW002233	Swanton PD.	11	7.229	None/Other	Day	Pine Street	None	None	VT0060300	Not at a Junction	None	2-16 Pine St	Dry	44.92069154729762,-73.11546494719369
October 27, 2021 at 8:50 AM	Swanton	First Street	VT-78	Property Damage Only	Rear End	Clear	21SW02543	Swanton PD.	10	7.42	None/Other	Day	Robin Hood Drive	None	Heavy Truck	VT0060300	Four-way Intersection	None	First Street	Dry	44.92142517649276,-73.11174056205694
October 27, 2023 at 4:47 PM	Swanton	156-158 1st St	VT-78	Property Damage Only	Rear End	Clear	23SW002265	Swanton PD.	10	7.49	None/Other	Day		None	None	VT0060300	Not at a Junction	None	156-158 1st St	Dry	44.92170585485226,-73.11034470618483
October 29, 2022 at 1:20 PM	Swanton	538-558 N River St	VT-78	Property Damage Only			22A2006175	VSP - A2 St. Albans	10	3.118	None/Other	Day	Macs Bend Rd	None	None	VTVSP0700	Y - Intersection		538-558 N River St		44.95812529166589,-73.16656160980487
October 29, 2022 at 9:57 AM	Swanton	VT Route 78, Swanton, VT	VT-78				22A2006170	VSP - A2 St. Albans	10	999.99		Day				VTVSP0700			VT Route 78, Swanton, VT		
October 9, 2021 at 4:34 PM	Swanton	166 FIRST ST	VT-78				21A203983	VSP - A2 St. Albans	10	7.51		Day				VTVSP0700			166 FIRST ST		44.92178475919046,-73.10994536376525
September 10, 2022 at 10:54 AM	Swanton	Rt 78 / Campbell Bay Rd, Swanton, VT	VT-78				22A2005058	VSP - A2 St. Albans	10	1.98		Day				VTVSP0700			Rt 78 / Campbell Bay Rd, Swanton, VT		44.9700651987525,-73.18116322269805
September 12, 2023 at 8:04 AM	Swanton	112-120 1st St	VT-78	Property Damage Only	Rear End	Clear	23SW001899	Swanton PD.	11	7.362	None/Other	Day	Brown Avenue	None	None	VT0060300	Not at a Junction	None	112-120 1st St		44.92119528373559,-73.11288383196151

5-Year Crash History 2020 - 2024

Crash Date	Town	Address	AOT Route	Crash Type	Collision Direction	Weather	Report Numb	Reporting Agenc	Road Gr	AOT Acti	Animal	Time of I	Intersection With	Impairmer	Involving	Reporting Agency	Road Characteristics	Road Condition	Street Address	Surface Condition	Coordinates
September 14, 2021 at 11:33 AM	Swanton	75 First Street	VT-78	Property Damage Only	Rear End	Clear	21SW05019	Swanton PD.	10	7.14	None/Other	Day	Liberty Street	None	None	VT0060300	Not at a Junction	None	75 First Street	Dry	44.920349928837766,-73.11719040603252
September 21, 2022 at 10:45 AM	Swanton	560-672 N River St	VT-78	Property Damage Only	Single Vehicle Crash	Clear	22MV007798	DMV	10	2.961	None/Other	Day		None	Heavy Truck	VTDMV0000	Not at a Junction	None	560-672 N River St	Dry	44.9597871424154 2,-73.16862970944466
September 22, 2021 at 4:56 PM	Swanton	34 First Street	VT-78	Property Damage Only	Rear End	Clear	21SW02380	Swanton PD.	10	6.83	None/Other	Day	York Street	None	None	VT0060300	Four-way Intersection	None	34 First Street	Dry	44.918705326775566,-73.12297393320682
September 26, 2020 at 11:49 AM	Swanton	752 N RIVER ST	VT-78				20A204232	VSP - A1 Williston	10	999.99		Day				VTVSP0100			752 N RIVER ST		44.97056278676124,-73.19731707297217
September 26, 2021 at 4:42 AM	Swanton		VT-78				21A203785	VSP - A2 St. Albans	10	7.71		Night				VTVSP0700					44.92257709328033,-73.1059831956967
September 27, 2023 at 11:43 AM	Swanton	139-153 1st St	VT-78	Injury	Other - Explain in Narrative	Clear	23SW002029	Swanton PD.	10	7.428	None/Other	Day	Robin Hood Drive	None	Pedestrian	VT0060300	Four-way Intersection	None	139-153 1st St	Dry	44.92145904403941,-73.11158176950768
September 28, 2020 at 8:00 AM	Swanton	1056 VT-78	VT-78	Property Damage Only	Single Vehicle Crash	Clear	20A204267	VSP - A2 St. Albans	10	0.999	None/Other	Day	Raven Dr	None	Heavy Truck	VTVSP0700	Not at a Junction	None	1056 VT-78	Dry	44.93354324154663,-73.08089529059443
September 3, 2022 at 5:09 PM	Swanton	Exit 21	VT-78	Property Damage Only	Left Turn and Thru, Same Direction Sideswipe/Angle Crash vv--	Clear	22SW001636	Swanton PD.	10	0.147	None/Other	Day	Exit 21 NB Off Ramp	None	None	VT0060300	Off Ramp		Exit 21	Dry	44.97204946712063,-73.21722933383559
September 30, 2022 at 5:42 PM	Swanton	First Street	VT-78	Property Damage Only	No Turns, Thru moves only, Broadside ^<	Clear	22SW001802	Swanton PD.	11	6.826	None/Other	Day	York Street	None	Motorcycle	VT0060300	Other - Explain in Narrative	None	First Street	Dry	44.91868233338818,-73.12304766631232

Appendix M: Level of Service Analysis

Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Lane Configurations						
Traffic Volume (vph)	0	484	616	0	0	0
Future Volume (vph)	0	484	616	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt						
Flt Protected						
Satd. Flow (prot)	0	1863	1863	0	0	0
Flt Permitted						
Satd. Flow (perm)	0	1863	1863	0	0	0
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)						
Link Speed (mph)		25	25		30	
Link Distance (ft)		268	518		118	
Travel Time (s)		7.3	14.1		2.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	526	670	0	0	0
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	526	670	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		0	0		0	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15			9	15	9
Number of Detectors		2	2			
Detector Template		Thru	Thru			
Leading Detector (ft)		100	100			
Trailing Detector (ft)		0	0			
Detector 1 Position(ft)		0	0			
Detector 1 Size(ft)		6	6			
Detector 1 Type		Cl+Ex	Cl+Ex			
Detector 1 Channel						
Detector 1 Extend (s)		0.0	0.0			
Detector 1 Queue (s)		0.0	0.0			
Detector 1 Delay (s)		0.0	0.0			
Detector 2 Position(ft)		94	94			
Detector 2 Size(ft)		6	6			
Detector 2 Type		Cl+Ex	Cl+Ex			
Detector 2 Channel						
Detector 2 Extend (s)		0.0	0.0			
Turn Type		NA	NA			
Protected Phases		6	2			
Permitted Phases						
Detector Phase		6	2			
Switch Phase						
Minimum Initial (s)		10.0	10.0			

Lane Group	SEL	SET	NWT	NWR	SWL	SWR
Minimum Split (s)		32.0	32.0			
Total Split (s)		55.0	65.0			
Total Split (%)		45.8%	54.2%			
Maximum Green (s)		33.0	43.0			
Yellow Time (s)		4.0	4.0			
All-Red Time (s)		18.0	18.0			
Lost Time Adjust (s)		0.0	0.0			
Total Lost Time (s)		22.0	22.0			
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)		3.0	3.0			
Recall Mode		Min	Min			
Act Effct Green (s)		33.0	43.0			
Actuated g/C Ratio		0.28	0.36			
v/c Ratio		1.03	1.00			
Control Delay (s/veh)		90.0	74.8			
Queue Delay		30.6	0.0			
Total Delay (s/veh)		120.7	74.8			
LOS		F	E			
Approach Delay (s/veh)		120.7	74.8			
Approach LOS		F	E			
90th %ile Green (s)		33.0	43.0			
90th %ile Term Code		Max	Max			
70th %ile Green (s)		33.0	43.0			
70th %ile Term Code		Max	Max			
50th %ile Green (s)		33.0	43.0			
50th %ile Term Code		Max	Max			
30th %ile Green (s)		33.0	43.0			
30th %ile Term Code		Max	Max			
10th %ile Green (s)		33.0	43.0			
10th %ile Term Code		Max	Max			
Queue Length 50th (ft)		~435	~519			
Queue Length 95th (ft)		#651	#772			
Internal Link Dist (ft)		188	438		38	
Turn Bay Length (ft)						
Base Capacity (vph)		512	667			
Starvation Cap Reductn		208	0			
Spillback Cap Reductn		0	0			
Storage Cap Reductn		0	0			
Reduced v/c Ratio		1.73	1.00			

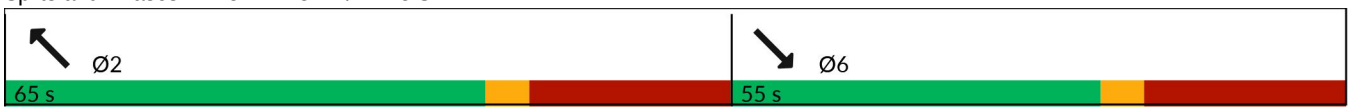
Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 120			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.03			
Intersection Signal Delay (s/veh): 95.0		Intersection LOS: F	

Intersection Capacity Utilization 50.8%	ICU Level of Service A
Analysis Period (min) 15	
90th %ile Actuated Cycle: 120	
70th %ile Actuated Cycle: 120	
50th %ile Actuated Cycle: 120	
30th %ile Actuated Cycle: 120	
10th %ile Actuated Cycle: 120	

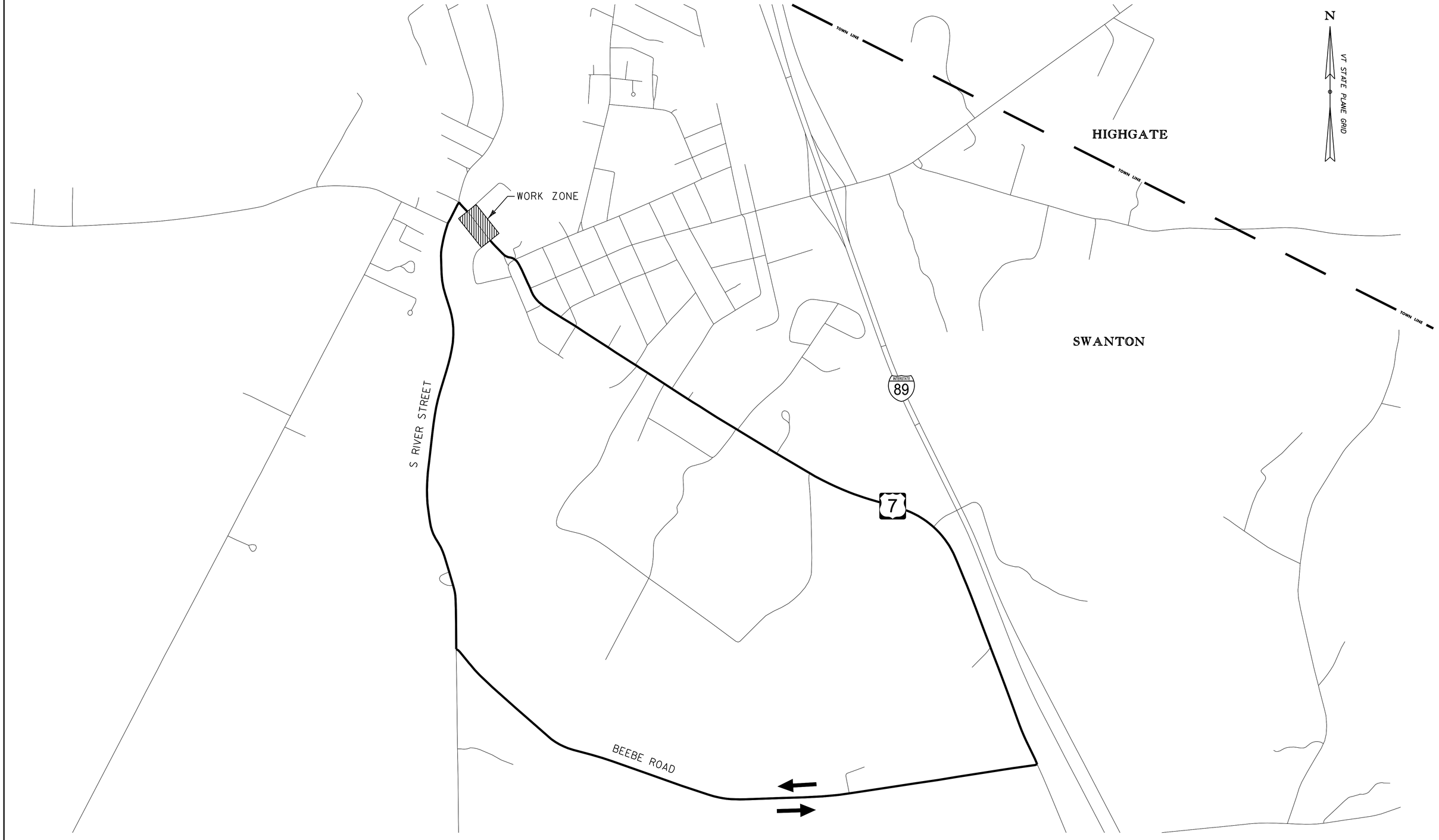
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 13: VT 78 NB/VT 78 SB



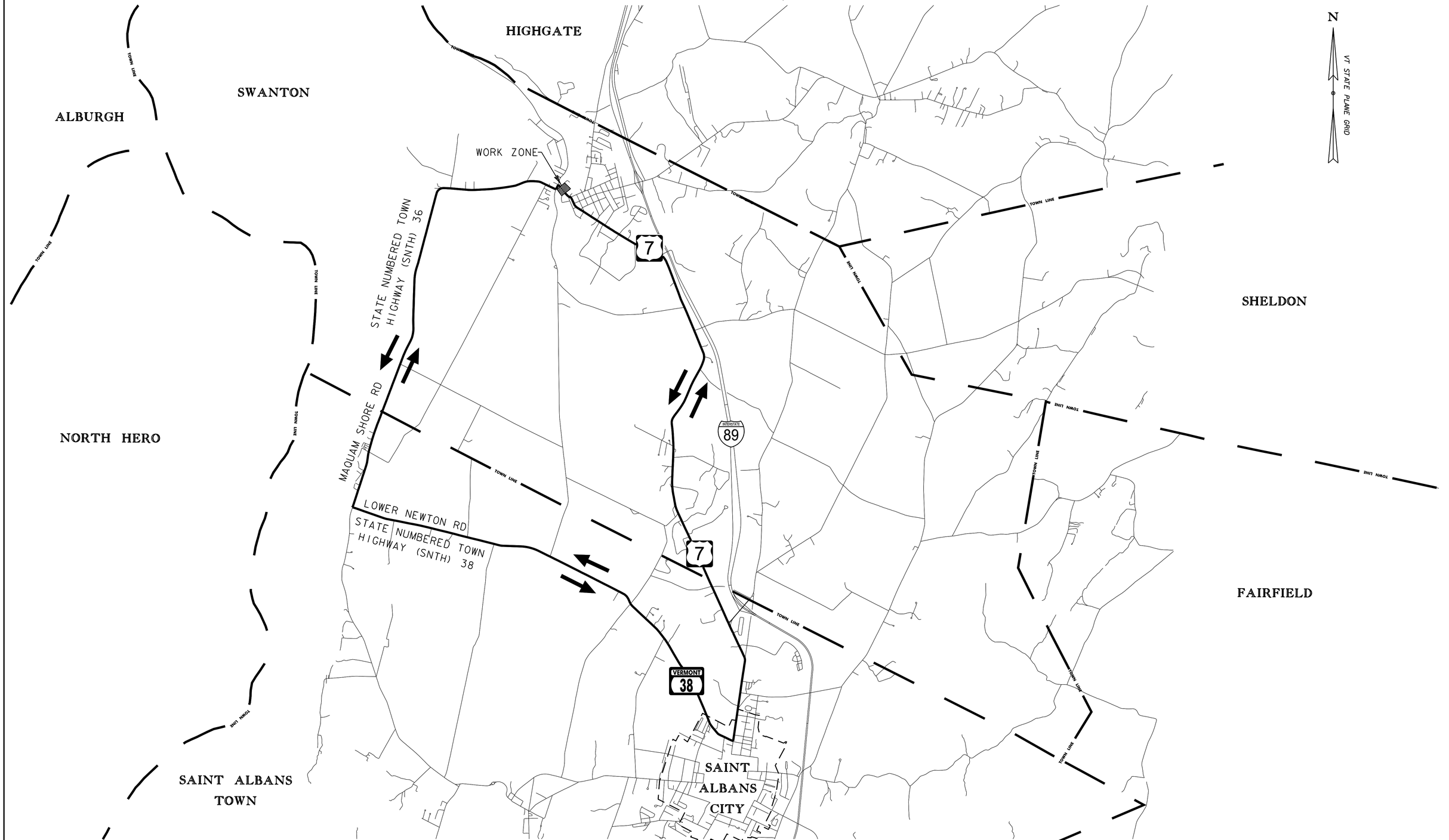
Appendix N: Detour Routes



LOCAL DETOUR ROUTE
NOT TO SCALE

PROJECT NAME:	SWANTON
PROJECT NUMBER:	BF 036-1(116)
FILE NAME: z22j402_detour.dgn	PLOT DATE: 2/14/2025
PROJECT LEADER: T. CARD	DRAWN BY: F. EISINGER
DESIGNED BY: H. GAO	CHECKED BY: A. VAZQUEZ
LOCAL DETOUR PLAN SHEET	SHEET 12 OF 13

GREEN



REGIONAL DETOUR ROUTE
NOT TO SCALE

PROJECT NAME: SWANTON	
PROJECT NUMBER: BF 036-1(16)	
FILE NAME: z22j402_detour.dgn	PLOT DATE: 2/14/2025
PROJECT LEADER: T. CARD	DRAWN BY: F. EISINGER
DESIGNED BY: H. GAO	CHECKED BY: A. VAZQUEZ
REGIONAL DETOUR PLAN SHEET	SHEET 13 OF 13

GREEN

SCALE 1"=50'

GREEN
A Lochner Company

Turning Movement
WB-67
Lower Newton Street to North Main Street
Swanton, VT

SCALE 1"=50'

GREEN
A Lochner Company

Turning Movement
WB-67
North Main Street to Lower Newton Street
Swanton, VT

SCALE 1"=50'

GREEN
A Lochner Company

Turning Movement
WB-67
Lower Newton Street to Maquam Shore Road
Swanton, VT

SCALE 1"=50'

GREEN
A Lochner Company

Turning Movement
WB-67
Maquam Shore Road to Lower Newton Road
Swanton, VT

SCALE 1"=50'

GREEN
A Lochner Company

Turning Movement
WB-67
Lake Street to South River Street
Swanton, VT

SCALE 1"=50'

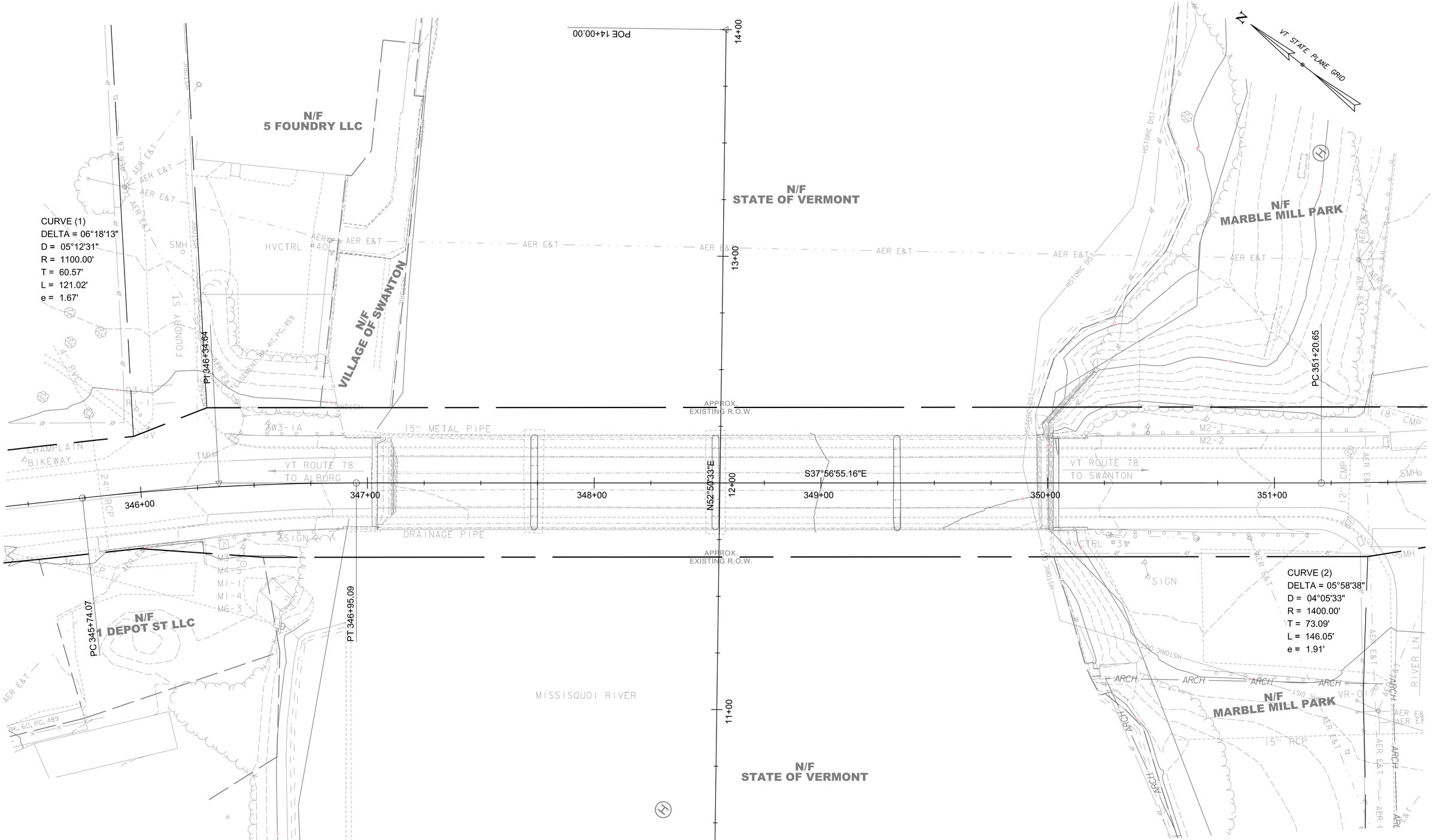
GREEN
A Lochner Company

Turning Movement
WB-67
South River Street to Lake Street
Swanton, VT

Appendix O: Plans

INDEX OF SHEETS

SHEET NO.	SHEET DESCRIPTION
1	Existing Conditions Layout
2-3	Existing Conditions Profile
4-5	Typical Sections
6-7	Alternative 1 Phase 1 & 2
8-9	Alternative 2 Phase 1 & 2
10	Temporary Bridge Layout



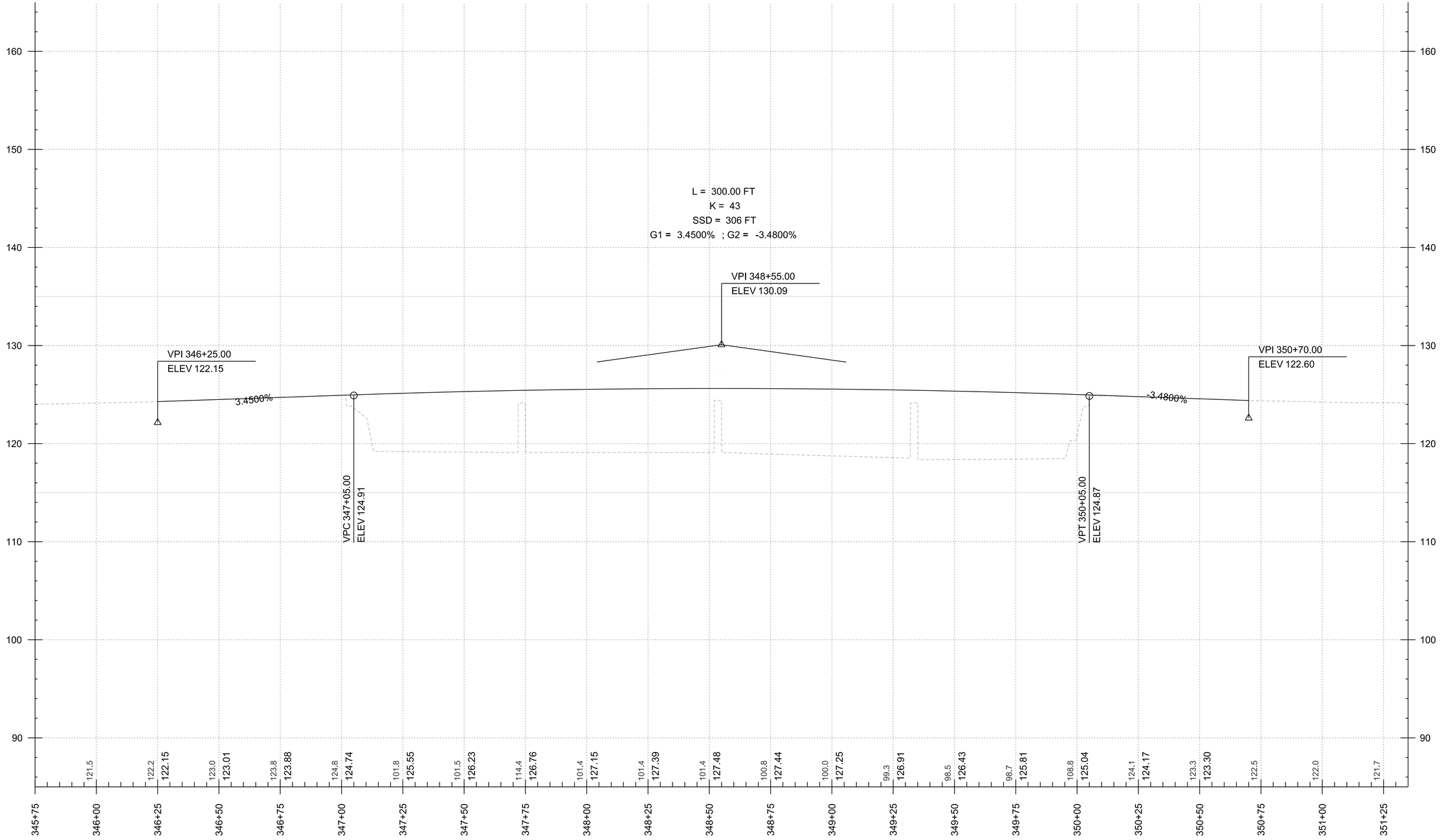
EXISTING BRIDGE INFO
BUILT 1966
STRINGER/MULTI-BEAM OR GIRDER
CIP CONCRETE DECK
MAX SPAN 80', TOTAL LENGTH 302'

RESOURCE SITE PLAN

0 20 40
SCALE IN FEET

GREEN

PROJECT NAME:	SWANTON
PROJECT NUMBER:	BF 036-1(116)
FILE NAME: z22j402_border.dgn	PLOT DATE: 2/17/2025
PROJECT LEADER: T. CARD	DRAWN BY: F. EISINGER
DESIGNED BY: F. EISINGER	CHECKED BY: S. SACCO
EXISTING CONDITIONS LAYOUT SHEET	SHEET 1 OF 13



THE GRADES SHOWN TO THE NEAREST TENTH ARE THE ORIGINAL GROUND APPROXIMATE ELEVATIONS ALONG THE PROPOSED ALIGNMENT. THE GRADES SHOWN TO THE NEAREST HUNDREDTH ARE THE PROPOSED PROFILE GRADES FOR THE NEW ALIGNMENT.

HORIZONTAL SCALE: 20 SCALE
VERTICAL SCALE: 10 SCALE

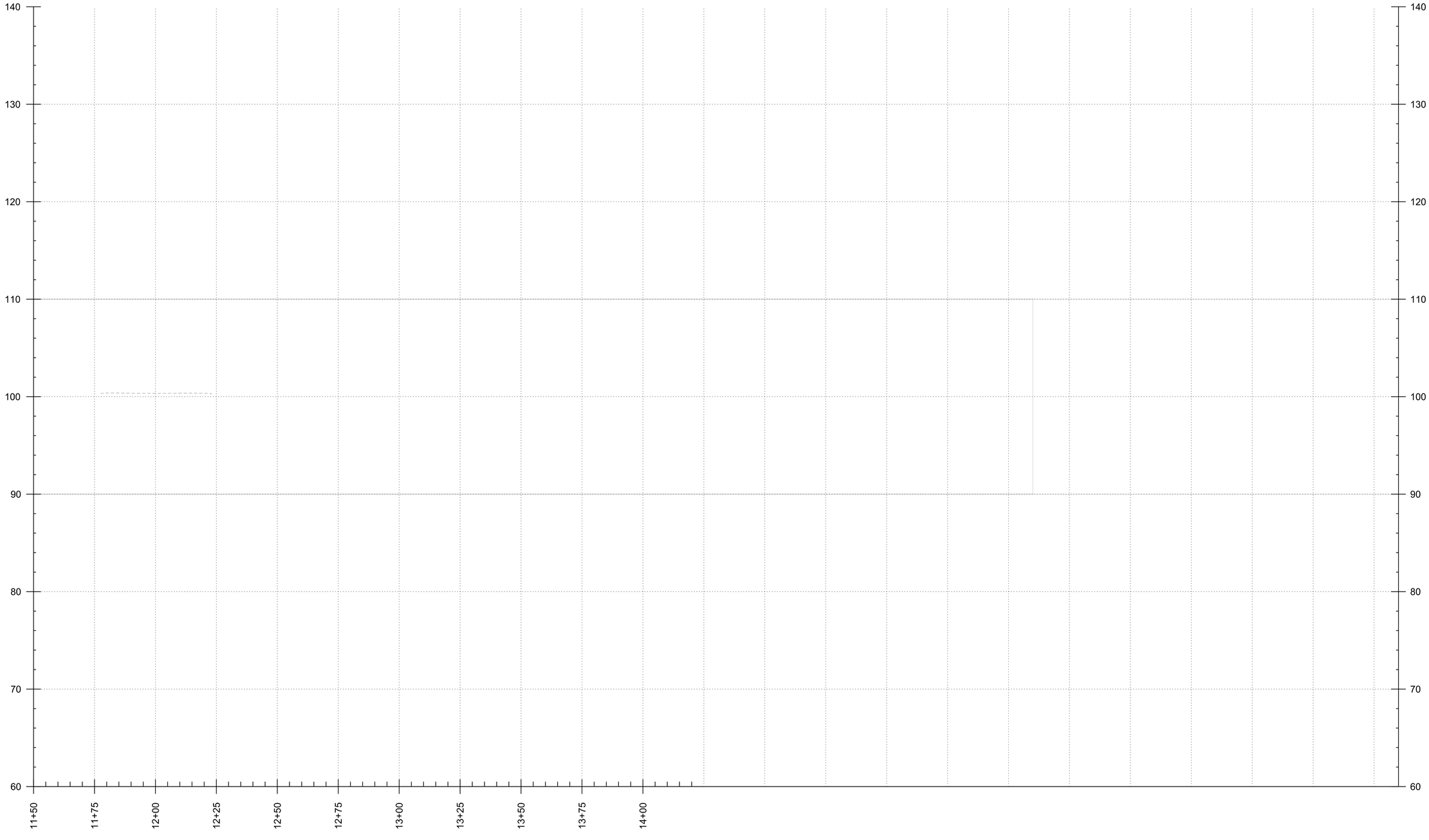
NOTE:
1. ALL STATIONS AND ELEVATIONS ARE SHOWN IN FEET.

GREEN

PROJECT NAME: SWANTON
PROJECT NUMBER: BF 036-1(116)

FILE NAME: z22j402prof.dgn
PROJECT LEADER: T. CARD
DESIGNED BY: F. EISINGER
ROADWAY PROFILE SHEET

PLOT DATE: 2/17/2025
DRAWN BY: F. EISINGER
CHECKED BY: S. SACCO
SHEET 2 OF 13



THE GRADES SHOWN TO THE NEAREST TENTH ARE THE ORIGINAL GROUND APPROXIMATE ELEVATIONS ALONG THE PROPOSED ALIGNMENT. THE GRADES SHOWN TO THE NEAREST HUNDREDTH ARE THE PROPOSED PROFILE GRADES FOR THE NEW ALIGNMENT.

HORIZONTAL SCALE: 20 SCALE
VERTICAL SCALE: 10 SCALE

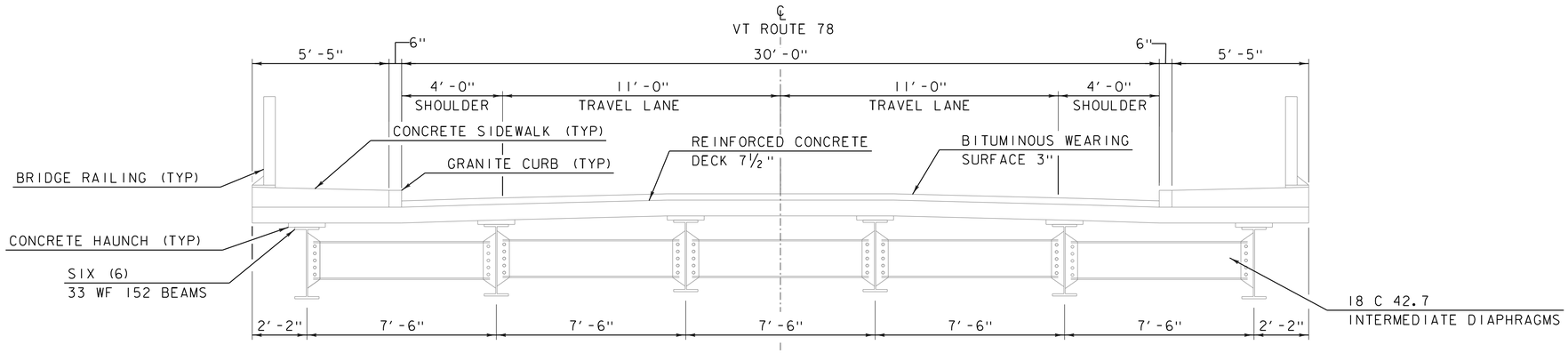
NOTE:
1. ALL STATIONS AND ELEVATIONS ARE SHOWN IN FEET.

GREEN

PROJECT NAME: SWANTON
PROJECT NUMBER: BF 036-1(116)

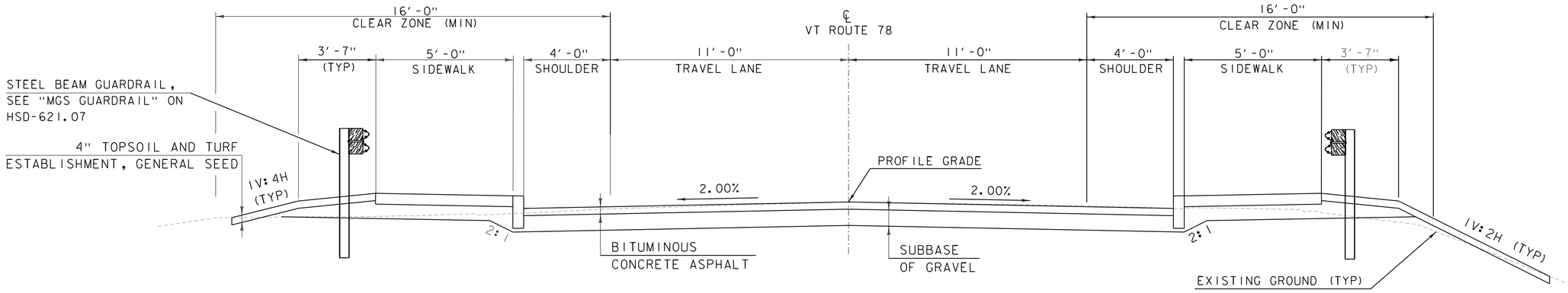
FILE NAME: z22j402prof.dgn
PROJECT LEADER: T. CARD
DESIGNED BY: F. EISINGER
CHANNEL PROFILE SHEET

PLOT DATE: 2/17/2025
DRAWN BY: F. EISINGER
CHECKED BY: S. SACCO
SHEET 3 OF 13



EXISTING TYPICAL SECTION

SCALE ⅜″ = 1′-0″

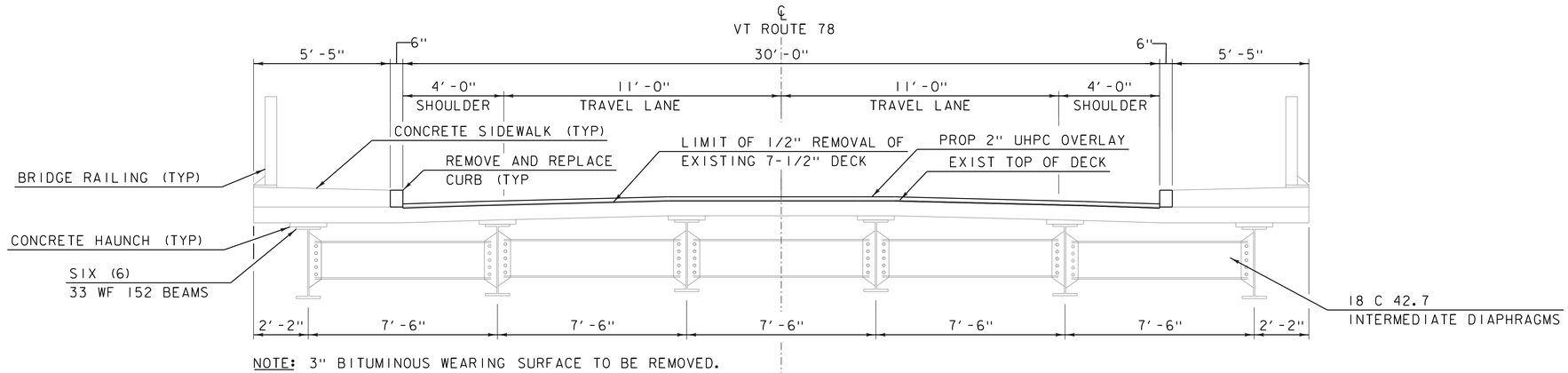


PROPOSED TYPICAL SECTION - ROADWAY

SCALE ⅜″ = 1′-0″

PROJECT NAME:	SWANTON
PROJECT NUMBER:	BF 036-1(16)
FILE NAME: Swanton Typical Section.dgn	PLOT DATE: 4/4/2025
PROJECT LEADER: T. CARD	DRAWN BY: J. TZANETOS
DESIGNED BY: S. BIBINSKI	CHECKED BY: S. BIBINSKI
TYPICAL SECTIONS SHEET 1	SHEET 4 OF 13

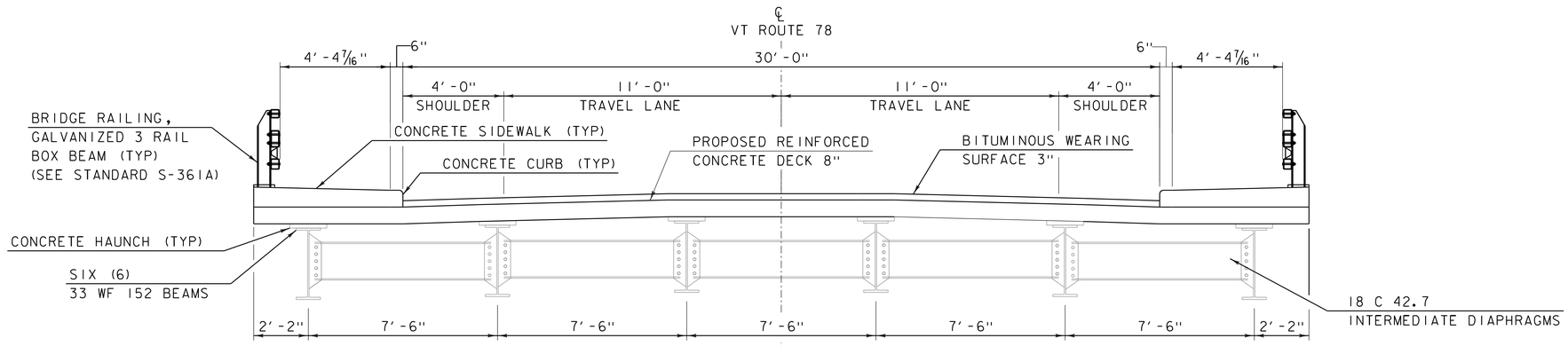
GREEN



NOTE: 3" BITUMINOUS WEARING SURFACE TO BE REMOVED.

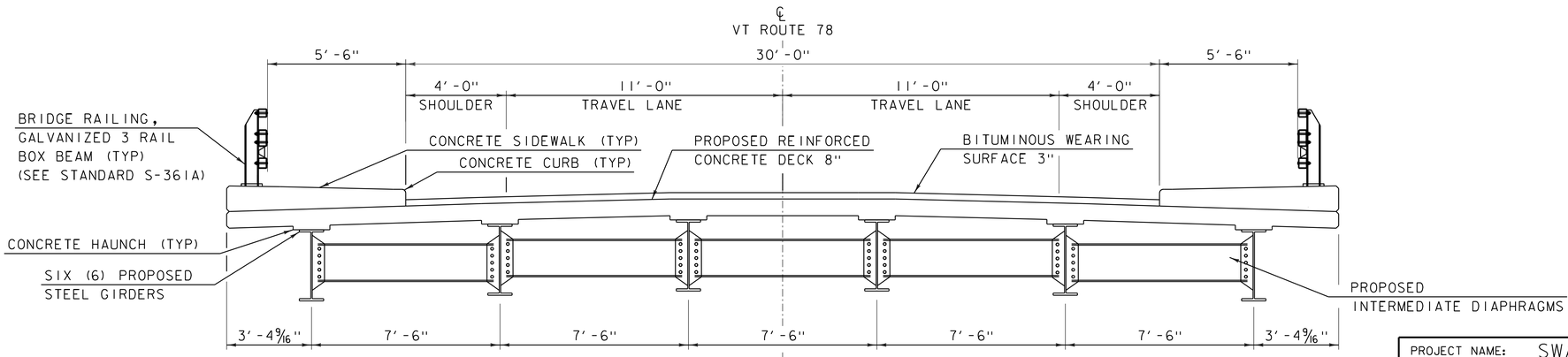
ALTERNATIVE 1 TYPICAL SECTION - UHPC DECK OVERLAY

SCALE 3/8" = 1′-0"



ALTERNATIVE 2 TYPICAL SECTION - PROPOSED DECK REPLACEMENT

SCALE 3/8" = 1′-0"



ALTERNATIVE 3 TYPICAL SECTION - PROPOSED SUPERSTRUCTURE REPLACEMENT

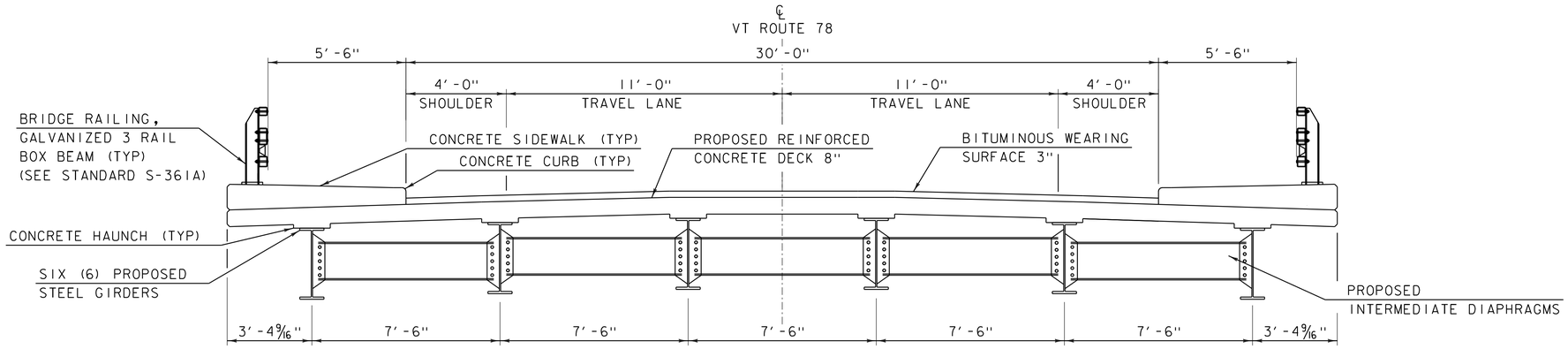
SCALE 3/8" = 1′-0"

GREEN

PROJECT NAME: SWANTON
PROJECT NUMBER: BF 036-1(16)

FILE NAME: Swanton Typical Section.dgn
PROJECT LEADER: T. CARD
DESIGNED BY: S. BIBINSKI
TYPICAL SECTIONS SHEET 2

PLOT DATE: 4/4/2025
DRAWN BY: J. TZANETOS
CHECKED BY: S. BIBINSKI
SHEET 5 OF 13

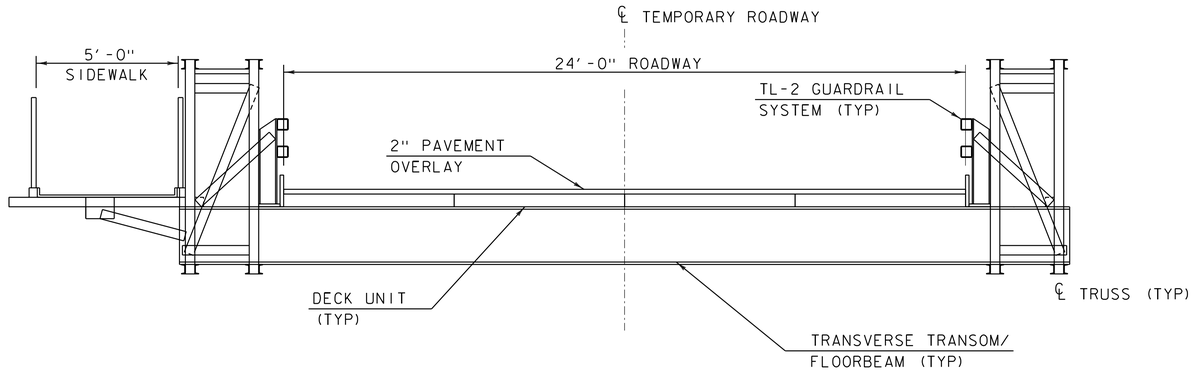


ALTERNATIVE 4 TYPICAL SECTION - FULL REPLACEMENT

SCALE 3/8″ = 1′-0″

NUMBER OF SPANS	APPROXIMATE PROPOSED GIRDER DEPTH (IN)
2	50″
3	39″

NOTE: FOR ALTERNATIVE 3 WHICH IS A FULL BRIDGE REPLACEMENT, TWO SPAN AND THREE SPAN OPTIONS WERE CONSIDERED AND PRELIMINARY GIRDER DEPTHS WERE CALCULATED.



TEMPORARY BRIDGE TYPICAL SECTION

SCALE 3/8″ = 1′-0″

PROJECT NAME:	SWANTON
PROJECT NUMBER:	BF 036-1(16)
FILE NAME: Swanton Typical Section.dgn	PLOT DATE: 4/4/2025
PROJECT LEADER: T. CARD	DRAWN BY: J. TZANETOS
DESIGNED BY: S. BIBINSKI	CHECKED BY: S. BIBINSKI
TYPICAL SECTIONS SHEET 3	SHEET 6 OF 13

GREEN


VT STATE PLANE GRID
N
N/F
5 FOUNDRY LLC
N/F
STATE OF VERMONT
N/F
MARBLE MILL PARK
N/F
VILLAGE OF SWANTON
FOUNDRY ST
HVCTRL #40
AER E&T
SIDE STREET CONTROLLED
BY TEMPORARY SIGNAL
APPROX.
EXISTING R.O.W.
15" METAL PIPE
CHAMPLAIN BIKEWAY
100'-0"
50'-0"
11'-0"
1'-0" BUFFER
VT ROUTE 78
TO ALBURG
VT ROUTE 78
TO SWANTON
30'-0"
M2-2 100'-0"
N52°50'53"E
S37°56'55.16"E
346+00
347+00
348+00
12+00
349+00
350+00
351+00
14+00
13+00
11+00
DRAINAGE PIPE
HVCTRL #3
SIGN
N/F
1 DEPOT ST LLC
TEMPORARY STOP BAR TO BE PLACED
40' FROM THE END OF THE BARRIER
TEMPORARY STOP BAR TO BE PLACED
40' FROM THE END OF THE BARRIER
MISSISQUOI RIVER
N/F
MARBLE MILL PARK
N/F
STATE OF VERMONT
N/F
RICE, GARY B. & TERRANCE K.
RIVER LN
15" RCP
36" RCP
ARCH

EXISTING BRIDGE INFO
BUILT 1966
STRINGER/MULTI-BEAM OR GIRDER
CIP CONCRETE DECK
MAX SPAN 80', TOTAL LENGTH 302'

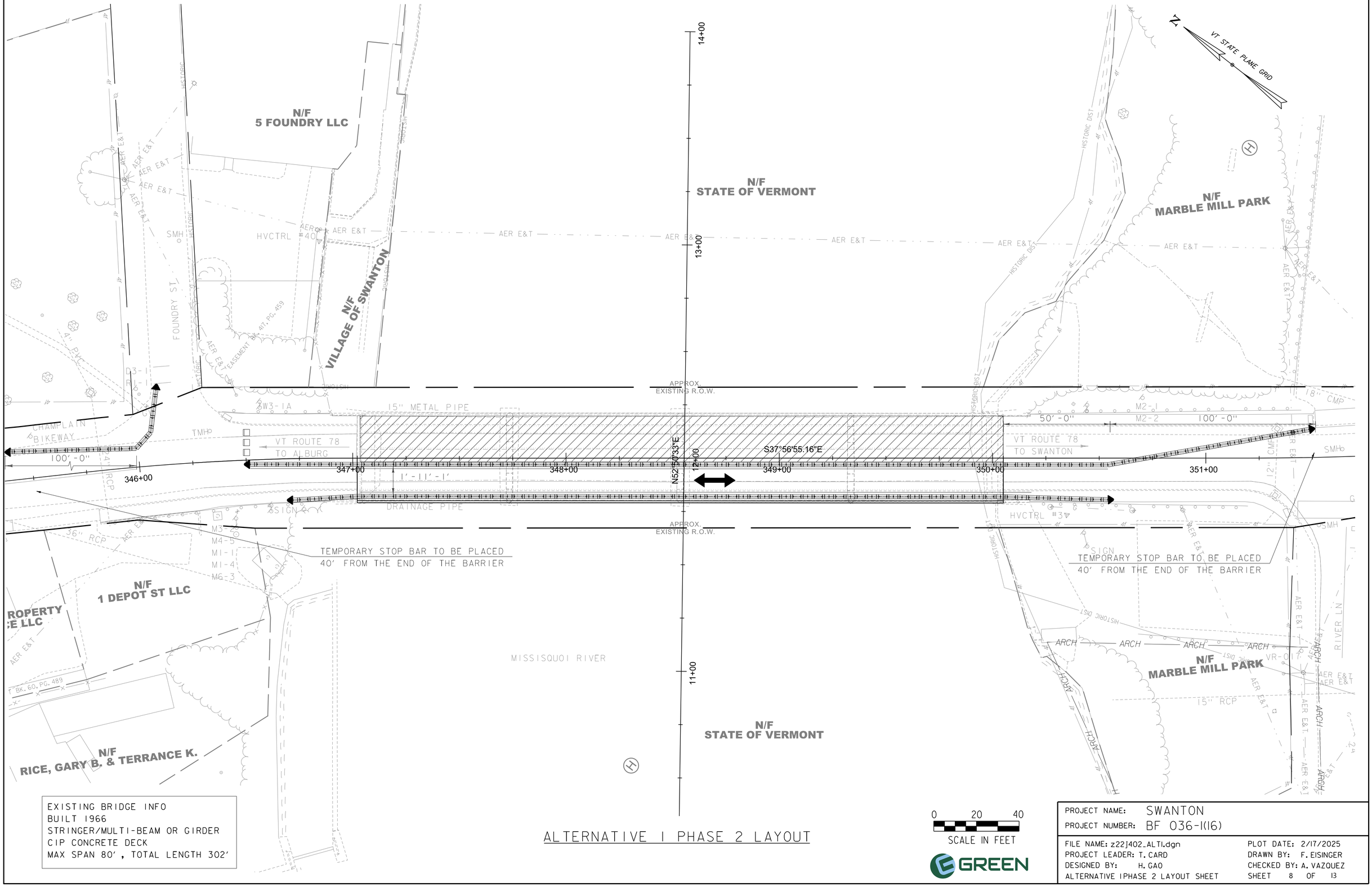
ALTERNATIVE I PHASE I LAYOUT

0 20 40
SCALE IN FEET

GREEN

PROJECT NAME:	SWANTON
PROJECT NUMBER:	BF 036-1(16)

FILE NAME: z22j402_ALT1.dgn	PLOT DATE: 2/17/2025
PROJECT LEADER: T. CARD	DRAWN BY: F. EISINGER
DESIGNED BY: H. GAO	CHECKED BY: A. VAZQUEZ
ALTERNATIVE 1 PHASE 1 LAYOUT SHEET	SHEET 7 OF 13



EXISTING BRIDGE INFO
BUILT 1966
STRINGER/MULTI-BEAM OR GIRDER
CIP CONCRETE DECK
MAX SPAN 80', TOTAL LENGTH 302'

ALTERNATIVE 1 PHASE 2 LAYOUT

0 20 40
SCALE IN FEET

GREEN

PROJECT NAME:	SWANTON
PROJECT NUMBER:	BF 036-1(16)
FILE NAME: z22j402_ALT1.dgn	PLOT DATE: 2/17/2025
PROJECT LEADER: T. CARD	DRAWN BY: F. EISINGER
DESIGNED BY: H. GAO	CHECKED BY: A. VAZQUEZ
ALTERNATIVE 1PHASE 2 LAYOUT SHEET	SHEET 8 OF 13


N/F
5 FOUNDRY LLC
N/F
STATE OF VERMONT
N/F
MARBLE MILL PARK
VT STATE PLANE GRID
N/F
VILLAGE OF SWANTON
FOUNDRY ST
SIDE STREET CONTROLLED
BY TEMPORARY SIGNAL
APPROX.
EXISTING R.O.W.
15" METAL PIPE
100'-0"
50'-0"
11'-0"
1'-0" BUFFER
VT ROUTE 78
CHAMPLAIN BIKEWAY
S37°56'55.16"E
N52°50'33"E
30'-0"
M2-2 100'-0"
VT ROUTE 78
TO SWANTON
346+00
347+00
348+00
349+00
350+00
351+00
14+00
13+00
12+00
11+00
DRAINAGE PIPE
HVCTRL #3
SIGN
N/F
1 DEPOT ST LLC
TEMPORARY STOP BAR TO BE PLACED
40' FROM THE END OF THE BARRIER
TEMPORARY STOP BAR TO BE PLACED
40' FROM THE END OF THE BARRIER
MISSISQUOI RIVER
N/F
MARBLE MILL PARK
15" RCP
N/F
STATE OF VERMONT
N/F
RICE, GARY B. & TERRANCE K.
RIVER LN

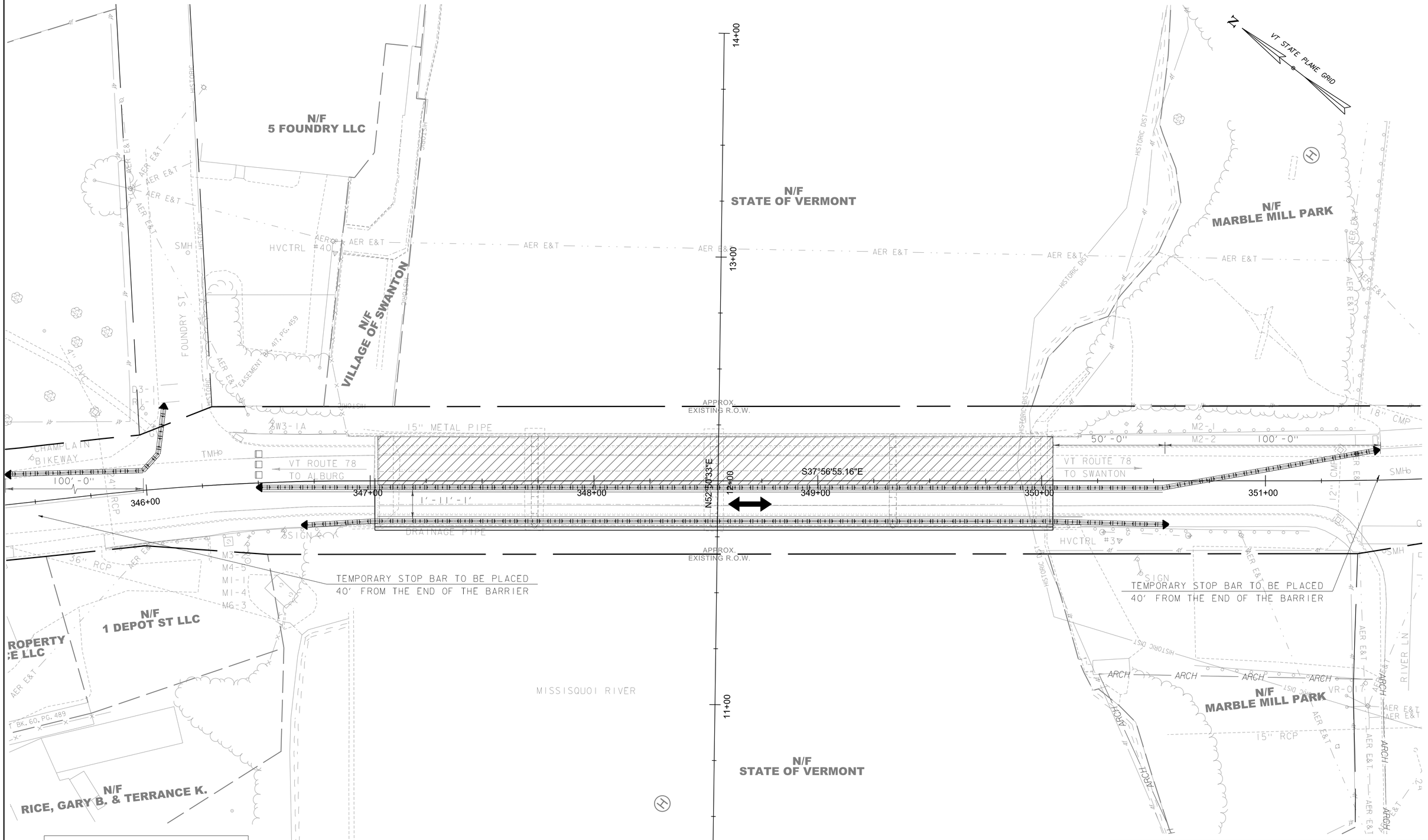
EXISTING BRIDGE INFO
BUILT 1966
STRINGER/MULTI-BEAM OR GIRDER
CIP CONCRETE DECK
MAX SPAN 80', TOTAL LENGTH 302'

ALTERNATIVE 2/3 PHASE 1 LAYOUT

0 20 40
SCALE IN FEET

GREEN

PROJECT NAME:	SWANTON
PROJECT NUMBER:	BF 036-1(16)
FILE NAME: z22j402_ALT2.dgn	PLOT DATE: 2/17/2025
PROJECT LEADER: T. CARD	DRAWN BY: F. EISINGER
DESIGNED BY: H. GAO	CHECKED BY: A. VAZQUEZ
ALTERNATIVE 2 PHASE 1 LAYOUT SHEET	SHEET 9 OF 13



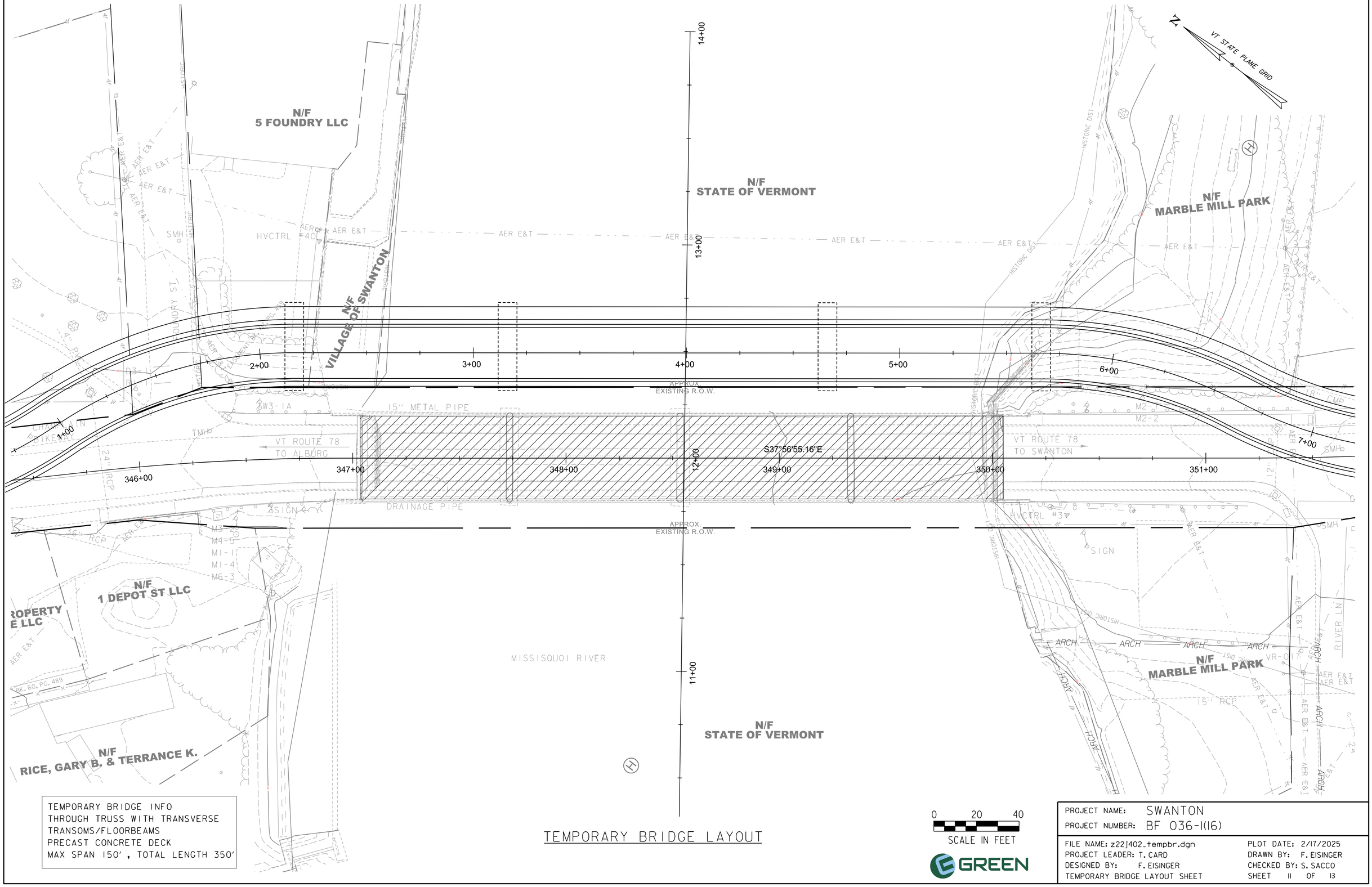
EXISTING BRIDGE INFO
BUILT 1966
STRINGER/MULTI-BEAM OR GIRDER
CIP CONCRETE DECK
MAX SPAN 80', TOTAL LENGTH 302'

ALTERNATIVE 2/3 PHASE 2 LAYOUT

0 20 40
SCALE IN FEET

GREEN

PROJECT NAME:	SWANTON
PROJECT NUMBER:	BF 036-1(16)
FILE NAME: z22j402_ALT2.dgn	PLOT DATE: 2/17/2025
PROJECT LEADER: T. CARD	DRAWN BY: F. EISINGER
DESIGNED BY: H. GAO	CHECKED BY: A. VAZQUEZ
ALTERNATIVE 2 PHASE 2 LAYOUT SHEET	SHEET 10 OF 13



TEMPORARY BRIDGE INFO
THROUGH TRUSS WITH TRANSVERSE TRANSOMS/FLOORBEAMS
PRECAST CONCRETE DECK
MAX SPAN 150', TOTAL LENGTH 350'

TEMPORARY BRIDGE LAYOUT

0 20 40
SCALE IN FEET

GREEN

PROJECT NAME: SWANTON
PROJECT NUMBER: BF 036-1(16)

FILE NAME: z22j402_tempbr.dgn
PROJECT LEADER: T. CARD
DESIGNED BY: F. EISINGER
TEMPORARY BRIDGE LAYOUT SHEET

PLOT DATE: 2/17/2025
DRAWN BY: F. EISINGER
CHECKED BY: S. SACCO
SHEET 11 OF 13