Champlain Path Feasibility Study

Charlotte to Burlington, Vermont

Prepared for:
Chittenden County Metropolitan Planning Organization

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In association with:
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Background

The Chittenden County Metropolitan Planning Organization (CCMPO) contracted with Alta Planning + Design to study the feasibility of constructing a shared use path for bicycles and pedestrians in the area west of Route 7 from Charlotte to Burlington, Vermont. The study area included a state-owned railroad leased to Vermont Railway. The railroad runs south to north with Charlotte in the south and Burlington in the north. Until recently, Vermont Railway operated both freight and commuter rail passenger service (Champlain Flyer) in the corridor. The commuter rail service was recently discontinued. Currently, there are approximately two freight trains that run north and two that run south per day on this railroad. There is also an excursion train called the Champlain Valley which runs two roundtrips on Friday, Saturday and Sunday, from July 4 through October 19. The excursion train runs between Burlington and Middlebury with intermediate stops in Shelburne and Charlotte.

Alta Planning + Design had two subcontractors who contributed to this study. Natural Resource Consulting Services (NRCS) of Grand Isle, Vermont performed an environmental analysis of environmental resources along the railroad corridor. The NRCS report is attached in Appendix C. The University of Vermont (UVM) Consulting Archeology Program prepared an Archaeology Resource Assessment (ARA) along the corridor in the towns of Charlotte, Shelburne, South Burlington and Burlington. The UVM report is included in Appendix D. Findings of these two reports were incorporated in the recommendations of the feasibility study.

Methodology

Alta Planning + Design staff with Vermont Railway investigated the rail corridor from Charlotte to Burlington on two occasions. On November 6, 2002 Alta and Vermont Railway rode in a truck mounted on the rails (high rail vehicle), stopping frequently to assess conditions. Video tape of the corridor was taken along with digital still pictures at bridges, grade crossings and other points of interest. On that same day, Alta staff rode the Champlain Flyer, taking pictures and video from the locomotive. An additional high-rail ride was taken on March 21, 2003 to further investigate pinch points and trail alternatives along the corridor. This second investigation occurred after meeting with the public and getting their input on trail placement along the corridor.

Also, Alta Planning + Design obtained the railroad valuation or 'val' plans from Chittenden County Metropolitan Planning Organization (CCMPO). These val plans are a map of the rail corridor prepared in 1914. Included in the val plans are the railroad centerline with stationing every 1000 feet, the railroad right of way or boundary lines, drainage structures, bridges and road crossings. The valuation plans were scanned and digitally reproduced in Computer Aided Design (CAD) software, showing existing bridges, rivers, streams, drainage features and grade crossings. Mileposts along the railroad were included as were the railroad centerline and stationing every 1000 feet.

This digitized file was overlaid onto orthophotos obtained from the CCMPO. This allowed for a concept layout of the path to be refined along the railroad corridor easily. The orthophotos also allowed constraints to be clearly identified. Constraints in the corridor were:

- Steep slopes
- Narrow right of way (ROW)
- Wetlands
- Water bodies (streams, rivers etc)

The steep slopes and ROW constraints are noted with an orange strip, indicating the approximate location and length of the constraint. The majority of the steep slopes were at the bridge crossings and the water crossings, especially at the La Platte River. The wetlands and water bodies were mapped by National Resource Consulting Services, Inc. (NRCS). These water constraints were obtained as Geographic Information System (GIS) layers from the Vermont Mapping Program and through field investigations by NRCS. The water data layers were then overlaid onto the orthophotos with the digitized valuation plans to create a working drawing set. Follow up field work allowed the areas of constraint to be revised further.

UVM used the video taken by Alta and with their extensive knowledge of the study area to prepare their report indicating potential areas of further investigation where the path may be located in archeologically sensitive areas.

This information, along with the video and pictures have been used to assess the feasibility of constructing a shared use path for bicycles and pedestrians in the railroad corridor.

Public and Agency Involvement

Under the direction of the Chittenden County MPO, a steering committee was created consisting of town officials from Charlotte, Shelburne, South Burlington and Burlington, the Chittenden County MPO, Vermont Agency of Transportation (VTrans), local bicycle and pedestrian advocates, the railroad operator, Vermont Railway and concerned citizens. There was an initial meeting with the CCMPO to gather data on November 5, 2002. Then the first committee meeting took place on December 10, 2002. The steering committee has advised the consultant and the CCMPO during the duration of this study.

A public meeting was held at the Shelburne Municipal building on March 20, 2003. The meeting presented preliminary options for the layout of a trail along the railroad corridor. Based on comments from this meeting, a preliminary findings report was prepared and distributed to the CCMPO, the steering committee and Vermont Railway.

A meeting was held at the VTrans office with the CCMPO, the State Bicycle Coordinator and officials from VTrans Railroad Division to clarify issues surrounding the path location and offset from the railroad on April 29, 2003 . The comments from the meeting were then incorporated into a complete draft report. The draft report was distributed to the CCMPO, VTrans and Vermont Railway.

A meeting was held with Vermont Railway in Burlington on June 23, 2003. David Wolfson, President of Vermont Railway, provided detailed comments on the design and location of the path. The concept plan for the path was modified and presented at a public meeting on August 27, 2003 in Shelburne. Comments received at that meeting have been incorporated in this report.

Context

This study was performed as part of the review of the regional transportation system. The Chittenden County Metropolitan Planning Organization wanted to know if a shared use path for bicycles and pedestrians was feasible along the railroad corridor from Charlotte to Burlington. The idea was to extend the current Burlington Bike south as an alternative to US Route 7. If a bicycle and pedestrian path were developed, it would be maintained by the municipalities, similar to the Burlington Bike Path.

Currently, Route 7 does not have adequate bicycle and pedestrian accommodations. The reconstruction of Route 7 from Webster Road to Imperial Drive will include bike lanes. This project is under construction. This on-road alternative is only for a portion of the project area for this study.

Trail Design

The shared use path for this study is assumed to be 10 feet wide with an asphalt wearing course and 8 to 10-inch gravel base. There are 2- foot shoulders consisting of grass or 'giving' material on either side of the path. The path offset is measured from the center of the railroad to the fence separating the railroad from the path. In this study the typical minimum offset as defined by VTrans is 25 feet. In Shelburne there is a short segment where the path offset is 18 feet. Two cross sections of the path showing the typical offset to the railroad are shown in Appendix E. The typical sections include a 6-foot high chain link fence between the path and the railroad. A fence is assumed for the entire length of the path for the purpose of the cost estimates. During design, the need for and location of fencing or other forms of separation between the railroad and the path will be evaluated for all segments.

Recommendations

The following section describes the corridor from south to north and divides the potential trail into eight segments. Major features within each segment are discussed. Photographs showing these features for each segment are provided in Appendix B . The trail segments, broken down in Table 1, include railroad stationing and distances for each segment in miles and feet. Included in Appendix A are concept plans (maps) of the study corridor at 400 scale. These maps are drawings that point out a preference for one side of the rail versus the other for a potential trail. This selection of east or west of the track for path placement is used to minimize impacts to features adjacent to the railroad and to provide access to attractions.

Table 1: Trail Segments

No.	From	To	Station from	Station to	Length in Feet	Length in Miles
1	Charlotte Station	Lake Road	5796+44	5879+50	8,666	1.64
2	Lake Road	Bostwick Road	5879+50	5985+74	10,624	2.01
3	Bostwick Road	Harbor Road	5985+74	6077+68	9,194	1.74
4	Harbor Road	1200 ft north of Harbor Road	6077+68	6090+00	1,232	0.23
5	1200 ft north of Harbor Road	Arrowhead Crossing	6090+00	6111+00	1,500	0.28
6	Arrowhead Cross-	Bay Road	6111+00	6151+13	4,013	0.76
7	Bay Road	Pine Haven	6151+13	6225+46	7,433	1.41
8	Pine Haven Shore Road	Queen City Park Road	6225+46	6324+05	9,859	1.87
				TOTAL	**52,521**	**9.95**

Segment 1: Charlotte Station to Lake Road (Charlotte)

This 1.64-mile long segment begins at the Charlotte Station and ends at Lake Road in Shelburne. The path is located on the west side of the railroad. At Greenbush Road the trail leaves the rail corridor and would be constructed on the west side of the road to Lake Road. Lake Road would be the designated route back to the railroad corridor. Vermont Railway has an easement to use this section of Lake Road.

Heading north from Charlotte Station, a double track reduces the space to place a path in the right of way. A 1000 foot section of the path is within the right of way, but soon the trail moves outside and abutting the railroad right of way . This is done to maintain the preferred 25 foot offset from the center of the track. Even though the double track reduces the right of way width on the west side, there is still more room on the west side of the track than the east side. There is a utility corridor that runs parallel to the tracks on the west side.

After the double track ends, the path turns back into the right of way for a short distance and then swings back outside the railroad corridor dropping to the road grade to avoid constructing a bridge crossing over Greenbush Road. A low retaining wall would be needed to bring the path down to the road grade. The Greenbush Road bridge is the first of two bridges in this segment with steep slopes that rise approximately 20 feet above road grade. Greenbush Road curves under the railroad bridge. When the path is at grade, the sight distance is minimal, so the path would parallel Greenbush Road to the intersection of Greenbush and Lake Road. The path would cross at this intersection and use the existing private road and then enter the railroad right of way when it intersects Lake Road. The path would not cross the tracks.

Segment 2: Lake Road (Charlotte) to Bostwick Road (Shelburne)

This 2.01-mile long segment begins at Lake Road and continues to Bostwick Road. The path is located on the west side of the railroad. There are two wetland areas on the west side that would potentially be affected by the trail. These wetlands could be spanned with a timber platform (boardwalk) to minimize impacts. At the Bostwick Road bridge the railroad goes under the roadway. Here the slopes rise up to accommodate the road crossing. A path could rise up on a retaining wall and meet the road at grade. From there the path would use the Bostwick Road bridge to cross over the railroad. Currently, the Bostwick Road bridge is under emergency repair with a permanent structure scheduled to be built soon. The new structure, which is scheduled to be built in the summer of 2004, will have 5-foot shoulders on each side.

The trail is shown on the west side in part because of right-of-way constraints on the east side. Given the expense of constructing 1,900 feet of timber platform over wetlands on the

west side, an alternative using abutting land on the east side may be considered.

Segment 3: Bostwick Road to Harbor Road (Shelburne)

This segment is 1.74 miles long. The path would cross Bostwick Road and enter the right of way on the east side of the tracks where it would continue to Harbor Road. Locating the path on the east side of the railroad would allow users easy access to the Shelburne Museum.

Aside from the natural constraints, there is a man-made constraint near station 6018+00±, before Milepost 114. On the east side of the tracks there is a structure close to the railroad right of way. Also in this 800 foot stretch, the right of way narrows so that the path offset varies from 23 feet to 18 feet. The structure (a house) near Station 6018+00 is about eight feet from the back edge of the path. The fenced area near the structure is 3 feet from the back edge of the path. The path as defined in this section is within the railroad right of way. The house is six feet from the right of way line to the closest point of the structure. The path width here could be reduced to 8 feet for a limited distance.

An alternative alignment was evaluated starting where Limerick and Bostwick roads move close to the railroad. The alternative alignment , which is shown on the concept plans, would follow Limerick Road to an off-road path to the end of School Street where an on-road route would connect to Harbor Road and the Ti Haul path just west of School Street. A dirt road could be used to connect to the Shelburne Museum via an existing grade crossing near Station 6040+00. This path alternative would traverse significant wetlands and for that reason is not recommended.

The path is shown on the concept plan as being routed through the Shelburne Station. The railroad is double tracked in the station area. Actual routing of bicycles and pedestrians through the Shelburne Station property is subject to refinement during design.

Segment 4: From Harbor Road east for 1200 feet (Shelburne)

The path would continue on the east side of the railroad for about 1200 feet eastward from Harbor Road. The path would be within the railroad right of way which is wider on the east side.

Continuing in the rail corridor any further is not recommended because of potential impacts on wetlands and other natural resources in the vicinity of the La Platte River. This segment is challenging because of the La Platte River crossing and the wetlands associated with the river. The wetlands around the La Platte River extend far beyond the river bed creating a major obstacle to trail development. A long boardwalk or timber platform of over 1400± feet would need to be constructed for a path to cross this area.

Segment 5: 1200 feet east of Harbor Road to Arrowhead Crossing (Shelburne)

This 0.28-mile long segment of the Champlain Path would leave the rail corridor to minimize negative impacts on the La Platte River and its environs. The Champlain Path would connect to Route 7 and then parallel the highway on its west side. The path would then go underneath the Route 7 bridge on the south side of the La Platte River.

The Route 7/La Platte River bridge was recently reconstructed and during the reconstruction a temporary bridge was installed on the west side of the bridge. The bridge abutments from the temporary bridge were left in place with the intention of possibly using them for a bicycle/pedestrian bridge later. After going under the new Route 7 bridge, the path would use the old bridge abutments to cross the river on a new bicycle/pedestrian bridge structure. Shelburne recently completed a Conceptual Alignment Analysis for the Longmeadow—Webster Road shared use path. This path would also use the new bicycle/pedestrian bridge constructed on the abutments of the temporary bridge and then continue on new Webster Road. This study recommends that the Champlain Path then cross back under the Route 7 bridge and use the pump house maintenance road to get to the intersection of Industrial Road and Route 7. There the path goes up Industrial Road and re-enters the railroad corridor at Arrow Head Crossing. This alignment eliminates the 1400± feet of boardwalk, crosses the La Platte River in an efficient manner and does not require crossing Route 7 at-grade.

Segment 6: Arrowhead Crossing to Bay Road (Shelburne)

This trail segment is 0.76 miles long. The initial section of path would be designed so as not to interfere with potential rail sidings at Industrial Road. The path would continue on the east side of the railroad in the right of way to station 6120+00±. There the path would go outside the right of way for most of the distance to Bay Road. Then the path uses a retaining wall to descend to the road level and cross Bay Road where there is sufficient sight distance. A project has been proposed to replace the Railroad Bridge over Bay Road. The existing bridge has an abutment to abutment opening of only 20 feet, 8 inches, while the new bridge would have an opening of 29 feet. This improvement would increase safety for vehicles and bikes/pedestrians traveling through the bridge. The project also includes minor realignment of Bay Road to decrease the curve and improve sight distances going through the bridge.

Segment 7: Bay Road to Pine Haven Shore Road (Shelburne)

This 1.41 mile long segment has numerous railroad/roadway grade crossings and 'ditch' wetlands. The 'ditch' wetlands were created when the railroad was built. Because the railroad was raised above the existing land, it created ditches on either side of the track that filled with water. The proposed trail alignment would avoid the majority of the ditch wetlands along the railroad.

After crossing to the north side of Bay Road, the path would run parallel to the road and rejoin the railroad corridor near Station 6160+00. The path would be placed within the parallel utility corridors (overhead electric wires) on the east side. The path would continue in this utility corridor to Pine Haven Shore Road.

Segment 8: Pine Haven Shore Road (Shelburne) to Queen City Park Road

This 1.87-mile long path would be located on the west side of the railroad outside the railroad ROW. One of the main reasons for moving the path to the west side at Pine Haven Shore Road is to avoid crossing a series of railroad spur lines including Rice Lumber (inactive), Georgia Pacific, Fassetts and Farrell Distributing.

The path would follow the existing utility corridor from just south of Holmes Road to Queen City Park Road. Keeping the path in the utility corridor would avoid the steep slopes and make the crossing of the Potash Brook easier. Crossing Potash Brook in the railroad right of way would require a long and costly retaining wall structure to traverse the steep slopes caused by the 32 foot elevation difference from Potash Brook to the top of the railroad berm. The recommended alignment over Potash Brook in the utility corridor would use a short timber bridge. The path would follow the existing utility lines up to the top of the slope at Queen City Park Road.

The 9.95-mile long Champlain Path as described in this study would connect to existing and planned facilities being developed in the City of Burlington. The concept plans provided in this report connect the Champlain Path to the existing I- 189 bike path via Queen City Park Road. This bike path is being continued as part of the I-189 extension project (Champlain Parkway), which is now under design. This new section of roadway begins at Home Avenue and heads north to Lakeside Avenue. Bike lanes are being developed on Lakeside Avenue and Pine Street, where connections to the existing Burlington Waterfront Bikeway will be provided.

Buildings in close proximity to the railroad together with a double track section make it infeasible to continue the shared use path within or adjacent to the railroad north of Home Avenue.

Summary of Trail Segments Outside the Railroad Right of way

In response to concerns expressed by Vermont Railway and VTrans, a significant amount of the Champlain Path alignment is outside the railroad right-of-way. Many of these trail segments are proposed within parallel utility easements as described in Table 2. Vermont Electric Power Company (VELCO) transmits electricity on overhead wires supported on metal, wood or concrete poles 30± feet high. The locations where the alignment is recommended in the utility corridors are generally flat with little or no wetland impacts. The corridors are generally free of brush and trees.

Table 2: Trail Segments Outside Railroad Right of Way

Trail Location	Town or City	Offset from Railroad Centerline (ft)	Station		Length	
			from	to	feet	miles
Outside railroad ROW in parallel utility easement	Charlotte	>25	5810+00	5845+00	3,500	0.7
Outside railroad ROW in utility easement or along Greenbush Rd	Charlotte	>25	5863+00	5880+00	1,700	0.3
Outside railroad ROW approaching Bostwick Rd from west	Shelburne	>25	5983+00	5986+00	300	0.1
Outside and adjacent to ROW at Shelburne Museum	Shelburne	>25	6020+00	6050+00	3,000	0.6
Outside railroad ROW and adjacent to Route 7 at La Platte River	Shelburne	>25	6090+00	6110+00	2,000	0.4
Outside and adjacent to railroad ROW	Shelburne	>25	6120+00	6151+00	3,100	0.6
Adjacent to Bay Road	Shelburne	>25	6151+00	6158+00	700	0.1
Outside railroad ROW in parallel utility easement	Shelburne	>25	6158+00	6225+00	6,700	1.3
Outside and adjacent to railroad ROW	Shelburne/South Burlington	>25	6225+00	6267+00	4,200	0.8
Outside railroad ROW in parallel utility easement	South Burlington	>25	6267+00	6324+00	5,700	1.1
TOTAL					30,900	5.9

Note: station references are approximate and rounded

Trail Cost

Unit costs were developed using a typical cross section, which includes a 10-foot wide bike path with 2- foot wide shoulders and a chain link fence as shown in Appendix F. This section is a representation of the majority of the potential trail segments. Descriptions of other types of construction (timber platform and low retaining wall) are provided in the following paragraphs.

Order of magnitude construction cost estimates for the various trail segments were calculated and are based on unit costs for labor and materials provided in the Average Bid Prices for the Vermont Agency of Transportation (January 1995 to December 2002).

Trail on Level Terrain

Building a trail on level terrain requires preparation of the site by clearing and grubbing. The clearing would be approximately two feet deep and 16 feet wide. The clearing would remove trees, shrubs, roots and other debris. This would also smooth out any irregularities in the topography and create a good base for the granular substructure. An asphalt surface would go on top of the gravel sub-base. This type of treatment is applicable to areas where there is sufficient right-of-way and the topography is relatively flat. The cost for this trail type is $67 per linear foot with an asphalt surface course and chain link fence.

Trail with Low Retaining Wall

This type of trail is needed when the railroad is on a high berm and the portion of land at the bottom of the slope is too narrow to build a trail within the right-of-way. In this case, the trail would be constructed near the bottom of the slope. The placement of the trail at that location will allow for a shorter retaining wall with some minor grading. Portions of the rail embankment would be cut and create a steeper slope of 1.5:1 compared to the current 2:1. Material would be brought in to raise the bottom of the slope. The construction of the wall could be cast-in-place concrete, treated timber retaining wall, a system of gabions or a block wall system commonly called 'T-wall'. The cast-in-place wall is the costliest of all the retaining wall types listed. The cost for a cast-in place concrete retaining wall is $218 per linear foot. The gabion wall, which is a system of stones placed in a wire cage placed on top of one another, is $142.18 per cubic yard or $31.27 per linear foot, while the timber retaining wall is $70.94 per linear foot. Another alternative for a retaining wall is the T-wall or block wall at $45 per linear foot. These retaining wall costs must be added to the typical path cost of $67 per linear foot. For example, the cast-in place concrete wall would be $285 per linear foot for the wall and path construction combined.

The order of magnitude cost estimate for this feasibility study will use the block wall or 'T-wall' system at $45 per linear foot. That means if a low retaining wall is recommended in a segment, it would cost $45 per linear foot to build the wall plus $67 to build the path on top of the wall. Therefore, the cost for a low retaining wall with a path would be $112 per linear foot.

Timber Platform

Timber platforms would be constructed where there is active cross-flow beneath the railroad tracks or adjacent water. A timber platform is essentially a boardwalk that is raised over water or wetlands on wooden piles. The timber platform would have railings on both sides and have sufficient width to carry bikes and pedestrians in both directions. These platforms would allow bridging wet areas with minimal impacts on existing water flows. The timber platform would also be used at the Potash Brook crossing. The platform would cross the brook in the same area where the utility corridor passes parallel to the railroad corridor. The spanning of the brook would be approximately 30 feet. Also, the timber platform would be used on either side of Potash Brook where wetlands would need to be crossed. The cost for construction of a timber platform would be $653 per linear foot.

Summary

Unit costs were applied to the potential trail segments. The total estimated cost for each major trail segment is listed in Table 3. More detailed cost data are provided in Appendix F. These are order-of-magnitude estimates of construction costs. Actual "engineer's cost estimates" would be developed as part of the design of specific trail segments.

It is likely that individual segments would be designed and constructed based on their utility and local interest. The trail from Harbor Road in Shelburne to Queen City Park Road in Burlington would be 4.55 miles long and cost about $1.8 million. This portion of the trail would connect to the existing and programmed bikeway system in Burlington. The segments from Charlotte Station to Harbor Road comprise 5.39 miles with a cost of $3 million. This latter cost may go down if an alternative to segment 2 is developed that avoids the need for over 1,900 linear feet of timber platform over wetlands.

Table 3: Estimated Trail Construction Cost

Segment.	From	To	Length in Miles	Estimated Construction Cost ($)
1	Charlotte Station	Lake Road	1.64	529,122
2	Lake Road	Bostwick Road	2.01	1,838,708
3	Bostwick Road	Harbor Road	1.74	615,998
4	Harbor Road	1200 ft north of Harbor Rd	0.23	82,544
5	1200 ft north of Harbor Rd	Arrowhead Crossing	0.28	90,000
6	Arrowhead Crossing	Bay Road	0.76	282,371
7	Bay Road	Pine Haven Shore Road	1.41	498,011
8	Pine Haven Shore Road	Queen City Park Road	1.87	841,063
TOTAL			9.95	4,777,817

When the bikeway project in designed, special attention will be required at trail/roadway intersections including locations where an off-road path transitions to an on-road route. The design of these intersections and transitions should be consistent with state and federal design practices. Connections to attractions along the Champlain Path route will also be developed during the design phase of the project.

Appendix A

Appendix B
Selected Photographs

Selected Photographs: Charlotte Station to Harbor Road (Charlotte to Shelburne)

Looking north from Charlotte Station. There is more room on the west (left) side of the track.

Looking north on Greenbush Road approaching the railroad bridge.

Looking north at bottom of slope on west side of the railroad right of way, just south of Greenbush Road.

Looking west at Lake Road crossing of railroad.

Cattle pass at milepost 112.

Looking north in railroad right of way north of Bostwick Road.

Looking south from Shelburne Museum grade crossing. Trail would be located on the east side (left) of the rail.

Looking north approaching Shelburne Station.

Selected Photographs: Harbor Road to Bay Road (Shelburne)

Looking north at railroad crossing of Harbor Road.

Looking north on Route 7 approaching the La Platte River. Path would be on west (left) side of road.

Path would go under the Route 7 bridge over the La Platte River.

Route 7 Detour Bridge abutments (looking south). Route 7 is in the background.

Railroad bridge over the La Platte River.

Looking north at Harbor Industrial Park from Industrial Road at Arrow Head crossing.

Railroad bridge over Bay Road, east side, looking north..

Bay Road under railroad, looking west.

Selected Photographs: Bay Road, Shelburne to Burlington

Looking south from Mariners Way. Trail would be on the east (left) side in power line easement.

Looking north from Pine Haven Shores Lane. Trail would be located on west (left) side.

Looking north at Bartlett Bay Road. The South Burlington Station is in the background.

Looking north from Holmes Road. Trail would be on the west (left) side in power line easement partly to avoid the rail spur to the Budweiser Beer distributer on the right.

Potash Brook, looking west from elevated railroad section.

Queen City Park Road looking west at bridge over railroad.

Existing bike path along I-189.

The rail corridor between Home Avenue and Flynn Avenue in Burlington is a double track with structures near the track, precluding path development.

Appendix C
Environmental Analysis

Champlain Path-Natural Areas Investigation Report
Natural Resource Consulting Services

Introduction

The Chittenden County Metropolitan Organization (CCMPO) contracted a feasibility study for a shared use path, running approximately 10.8 miles from Charlotte, VT, north to Burlington, VT. The feasibility study focuses on the existing railroad corridor owned by the State of Vermont, and long-term leased to Vermont Railway, that operates and maintains the track.

Natural Resource Consulting Services (NRCS) performed an environmental analysis of the flora, fauna, and wetlands along the railroad corridor. NRCS found seven areas of potential wetland impacts and one area of significant wildlife/habitat impacts.

Methods

NRCS contacted the Chittenden County Regional Planning Commission as well as the Town Planning Commissions of the involved townships and requested a GIS database of all environmental information that they had mapped. The data they provided is seen in Table 1.

Table 1: GIS data provided by Town Planning Commissions in the project area

100 year Flood	Rare Threatened and Endangered Species
Conserved Public Land	Recreational Trails
Federal and State Conserved Areas	Road Centerline
Hazardous Sites	Surface Waters
Natural Heritage 300m Buffer	Town Boundaries
Natural Communities within Chittenden County	VT Fish and Wildlife Natural Heritage Areas
Digitized Town Wetlands	Well Head Protection Areas
NWI Wetlands	White Tail Deer Wintering Areas
Rail Road Centerline	

NRCS analyzed these layers by overlapping them with orthophotos (provided by Alta Planning and Design). Wetlands were identified using several of the data layers listed in Table 1, along with the orthophotos, and municipal wetland maps from Shelburne and South Burlington. Numerous field visits were made to verify the accuracy of wetland locations taken from the various GIS data sources.

Results

The railroad corridor travels through a variety of landscapes as it moves northward from Charlotte Station to Burlington Station. The proposed trail passes through small communities, city streets, open farm country, and wetlands, among other landscape types. The existing corridor crosses wetlands or has abutting wetlands in several areas. To widen, regrade, or otherwise impact these wetlands will require, at a minimum, a State of VT Conditional Use Determination (with possible Army Corps of Engineers and/or Act 250 involvement), as well as other town permits.

Specifically, NRCS found seven potential wetland impact areas and one significant wildlife/habitat impact area. These are detailed as follows:

- Holmes Creek along Greenbush Road faces potential impacts from the proposed pathway.
- A large wetland complex south of the Charlotte-Shelburne town line appears to be impacted by the project.
- A large wetland south of Bostwick Road will possibly be impacted.
- The alternative route west of the RR corridor at Bostwick Road leads past Limerick Road, heading north, and crosses a significant wetland near the Shelburne Museum.
- The wetlands and their associated buffers along the La Platte River will be impacted using either path alternative. This one section of the corridor also includes conserved public lands, the 100 year floodplain, and several different wetland types, as well as the only significant wildlife/habitat impacted by the proposed pathway.
- There are potential minor wetland buffer impacts to the ditches along the corridor from Mariners Way and periodically northward to Holmes Road for both trail alternatives.
- East of Queen City Park at the Potash Brook crossing there will be wetland impacts for both alternative trails. These impacts are primarily in the buffer, pre-exist, and are minor and quite manageable.

Possible wildlife/habitat impacts**:**

- Located along the La Platte River (same area as wetland area), there is a large section of deer wintering area, as well as at least five natural heritage 300m buffers.

Recommendations

NRCS recommends using timber platforms in order to cross wetland areas wherever possible. These platforms would decrease the direct impacts to the wetland and allow the trail users to view the wetlands in their more natural setting without fill and re-grading.

The recommended trail alternative at the La Platte River along Route 7 poses significantly less wetland and wildlife impacts than the alternative on the west side of the railroad. Crossing the La Platte River along the railroad was eliminated as an option earlier in the study because of significant environmental impacts.

The La Platte River wetland complex and wildlife area is a very important natural area. As the proposed trail nears this area there is great opportunity to make an educational/informational spot. A placard could discuss the wildlife that uses the area, the importance of maintaining a floodplain, wetlands, and other important habitats.

In the area where Bay Road crosses the railroad corridor and to the north the trail, rail and utility corridors are close to Lake Champlain. Deer and other animals will want to access the lake for various reasons. If a fence is installed in this area, provision should be made for wildlife crossing.

Hazardous waste sites along the railroad corridor will require further investigation during the design phase of the project.

Conclusion:

The Project Team has attempted to avoid and minimize wetland and other natural resource impacts to the maximum extent possible. We believe the rail with trail project as shown on the final concept plan is permitable from a State and Federal environmental perspective.

Appendix D

Archaeological Resource Assessment

University of Vermont Report No. 366

January 14, 2003

Archaeological Resources Assessment for the Champlain Path Bicycle and Pedestrian Planning and Feasibility Study, Towns of Charlotte, Shelburne, South Burlington, and Burlington, Chittenden County, Vermont

Project Description
The Chittenden County Metropolitan Planning Organization (CCMPO) proposes the Champlain Path Bicycle and Pedestrian Planning and Feasibility Study, Towns of Charlotte, Shelburne, South Burlington and Burlington, Chittenden County, Vermont. The proposed bicycle path area encompasses a distance of approximately 12 miles west of VT Route 7, extending southward from the Burlington Bike Path to the Charlotte Railroad Station, staying within the railroad right-of-way of the existing railroad tracks as much as possible. Possible alternative, non-railroad alignments also will be considered.

The University of Vermont Consulting Archaeology Program (UVM CAP) conducted an Archaeological Resources Assessment (ARA) of the Area of Potential Effects (APE) for the proposed project. Five areas sensitive for prehistoric Native American sites were identified. These sensitive areas cover numerous sensitive loci that are often bisected by the existing railroad. A Phase I site identification survey is recommended for these areas if they cannot be completely avoided.

Study Goal
The goal of an ARA (or "review") is to identify portions of a specific project's APE that have the potential for containing prehistoric and/or historic sites. An ARA is to be accomplished through a "background search" and a "field inspection" of the project area. For this study, reference materials were reviewed following established guidelines. Resources examined included the National Register of Historic Places (NRHP) files; the Historic Sites and Structures Survey; and the USGS master archaeological maps that accompany the Vermont Archaeological Inventory. Relevant town histories and nineteenth-century maps also were consulted. Based on the background research, general contexts were derived for prehistoric and historic resources in the vicinity of the study area.

Prehistoric Archaeological Site Potential
In total, 12 Native American prehistoric sites exist within 250 m (820 ft) of the existing railroad tracks (see Figure 1). Of these, sites VT-CH-080, 286, 322, 328, 366, 659, 660, 679, and FS-CH-101 represent small encampments, where tool manufacturing activities occurred, as is suggested by the artifacts recovered from these sites, these being primarily lithic flakes, cores, and some tools, such as bifaces. No temporally diagnostic artifacts were recovered from these sites. Two of these sites, sites VT-CH-322 and 366 are located on the northern bank of the La Platte, within the VDHP's high sensitivity area. Chert, quartzite flakes, and FCR were recovered from these sites. Both the northern and southern banks are still highly sensitive for prehistoric Native American sites. Site VT-CH-322 is a historic cellar hole and undisturbed grounds.

Three of the 12 sites have produced artifacts that can be dated. At site VT-CH-525 a fluted Paleoindian projectile point, and several chert flakes were found, dating the site to the Paleoindian period (ca. 9500-7000) (Frink 1991). Site VT-CH-221 is known from the recovery of a quartzite, Meadowood type projectile point recovered from a house garden, dating the site to the Early Woodland period (900 -100 B.C.). Finally, site VT-CH-827 was identified on the basis of two artifacts, one being a stemmed projectile point that does not fit into any known typology for the area, but appears similar in shape to points from the general Archaic period (7000-900 B.C.), and a basalt biface (Thomas et al., 1999).

In general, the relatively high density of dateable, significant and potentially significant sites in this area, coupled with the proximity of the proposed project area to several rivers, creeks, and brooks makes it archaeologically sensitive, as it would have been an attractive location for at least semi-permanent settlement by prehistoric Native American groups. As a result, more sites most likely exist in the area.

Historic Archaeological Site Potential
A review of the National Register found no sites listed within the proposed project's APE. No structures are recorded within the proposed project's APE on the 1869 Beer's Atlas (Figure 2), or on the 1895/1906 USGS map (Figure 3). Based on this review of historic maps, town histories, and Vermont Division of Historic Places (VDHP) site files, however, historic archaeological sites are unlikely to exist within the proposed project's APE, and proposed project elements will have no effect on historic cultural resources. Any historic structures located on the 1869 Beers' Atlas, appear to still be in use today.

Field Inspection
Since UVM CAP personnel were not allowed within the existing railroad's right-of-way, a field inspection of the project area could not be undertaken. However, Alta Planning and Design provided the UVM CAP with a video of the entire project's APE, taken from the locomotive of the Champlain Flyer. As a result, all areas of potential impact were illustrated in the video, and coupled with background research, an ARA of the proposed project's APE was possible. The overall project area received a high sensitivity score of 40 based on the variables in the "Environmental Predictive Model for Locating Precontact Archaeological Sites," since proposed project elements will impact landforms bordering the La Platte River, McCabes Brook, Holmes Creek, and other unnamed permanent and intermittent streams, and border wetlands and pass through a head of draw. Five areas (Areas 1-5) sensitive for prehistoric archaeological sites were identified during the background research and video inspection (Figure 4).

Area 1 is centered on the railroad crossing of the La Platte River, in the general location of sites VT-CH-332 and VT-CH-366 (see figure 4). The sensitive area consists of three 15 m (49 ft) linear loci on the northwest, southwest, and southeast banks of the La Platte River, extending bank from the river banks, parallel to the railroad tracks (Figure 5). The linear loci on the northwest bank extends back 85 m (279 ft), the southwest linear loci extends 195 m (640 ft), and the linear loci on the southeast bank extends 185 m (607 ft). Since this area is wooded, subsurface test pits will be required in Area 1.

Area 2 is located just southwest of the Shelburne Museum grounds in Shelburne, Vermont, at the point where the railroad tracks cross the McCabe Brook, just north of Bostwick Road (see Figure 4). Two 15 m (49 ft) wide linear loci of sensitivity are located in this sensitive area, one on each side of the railroad tracks, parallel to them, extending for 270 m (886 ft) on the northwest side and 180 m (591 ft) on the southeast side of the tracks (Figure 6). Since Area 2 is wooded, subsurface test pits will be required to test this area for prehistoric Native American sites.

Area 3 is located just south of the Charlotte town line, just east of CR 22K, at a point where the rail road tracks cross an intermittent stream channel (see Figure 4). Two 15 m (49 ft) wide linear loci of sensitivity are located in this sensitive area, one on each side of the railroad tracks, parallel to them, extending for 210 m (689 ft) on the west side of the tracks, and 250 m (820 ft) on the east side of the tracks (Figure 7). Since this area is in pasture, subsurface test pits will be required to test Area 3.

Area 4 is located just northeast of the intersection of Lake Road and CR 22K, at a point where the railroad tracks cross Holmes Creek (see Figure 4). It is bounded to the south by a farm road. Two 15 m (49 ft) wide linear loci of sensitivity are located in this sensitive area, one on each side of the railroad tracks, parallel to them, extending for 330 m (1083 ft) on the west side of the tracks, and 510 m (1673 ft) on the east side of the tracks (Figure 8). Since this area is in pasture, subsurface test pits will be required to test Area 4.

Area 5 is located just south and east of the intersection of Lake Road and CR 22K, at a point where the railroad tracks cross another channel of Holmes Creek, and just south of the point where the railroad tracks cross CR 22K (see Figure 4). Three 15 m (49 ft) linear loci of sensitivity are located in this sensitive area, one on each side of the railroad tracks north of where the tracks cross CR 22K, and one on the west side of the tracks immediately south of this crossing (Figure 9). The linear loci to the northwest of the railroad and CR 22K crossing is 106 m (348 ft) long, while the linear loci to the east of the tracks is 190 m (623 ft) long. The linear loci to the southwest of this crossing, is 210 m (689 ft) in length (see Figure 9). Since these areas are either wooded or in pasture, subsurface test pits will be required to test Area 5. Therefore a Phase I site identification survey is recommended for those portions of the proposed project that will impact archaeologically sensitive areas. Subsurface testing in all sensitive areas is recommended.

Conclusions
The Chittenden County Metropolitan Planning Organization (CCMPO) proposes the Champlain Path Bicycle and Pedestrian Planning and Feasibility Study, Towns of Charlotte, Shelburne, South Burlington and Burlington, Chittenden County, Vermont. The proposed bicycle path area encompasses a distance of approximately 12 miles west of VT Route 7, extending southward from the Burlington Bike Path to the Charlotte Railroad Station, staying within the railroad right-of-way of the existing railroad tracks as much as possible. Possible alternative, non-railroad alignments also will be considered.

The UVM CAP conducted an ARA of the proposed project area, as part of the Section 106 permitting process and identified five archaeologically sensitive areas. The overall project area received a high sensitivity score of 40 based on the variables in the "Environmental Predictive Model for Locating Precontact Archaeological Sites," since proposed project elements will impact landform that border the La Platte River, McCabes Brook, Holmes Creek,

and other unnamed permanent and intermittent streams, and border wetlands and pass through a head of draw.

We recommend that before any construction occurs within these sensitive areas a Phase I site identification is carried out in all five areas to determine the presence/absence of pre-historic Native American sites, unless these areas can be avoided.

Charles Knight, Ph.D.
Assistant Director

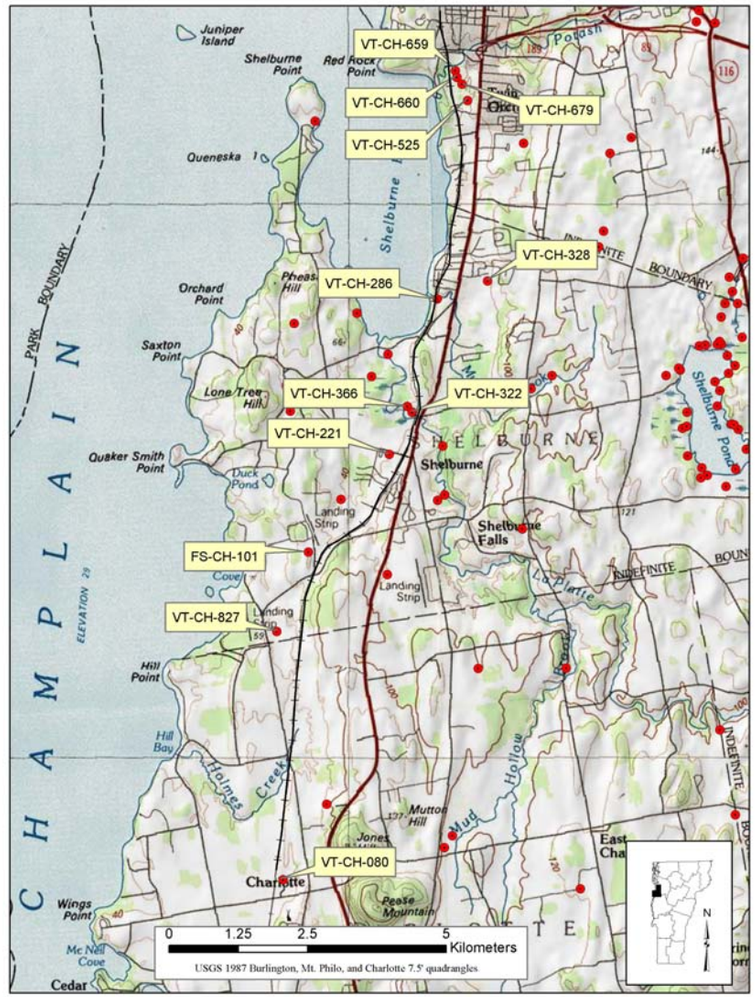

Figure 1. Map showing the route of the Champlain Flyer Rail Line, and nearby archaeological sites, that are near the proposed Champlain Bike Path's APE, Burlington, South Burlington, Shelburne and Charlotte, Vermont.

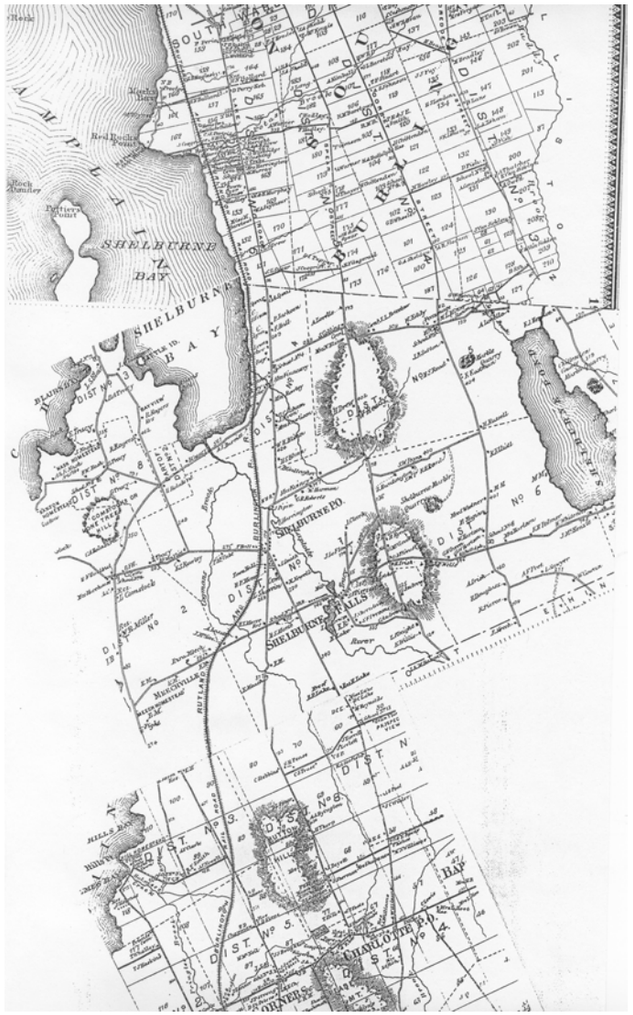

Figure 2. Historic 1869 Beers Map showing the Railroad tracks, which border the proposed Champlain Bike Path's APE, Burlington, South Burlington, Shelburne and Charlotte, Vermont.

Figure 3. Historic 1895 Willsboro and 1906 Burlington quadrangles showing the Railroad tracks, which border the proposed Champlain Bike Path's APE, Burlington, South Burlington, Shelburne and Charlotte, Vermont.

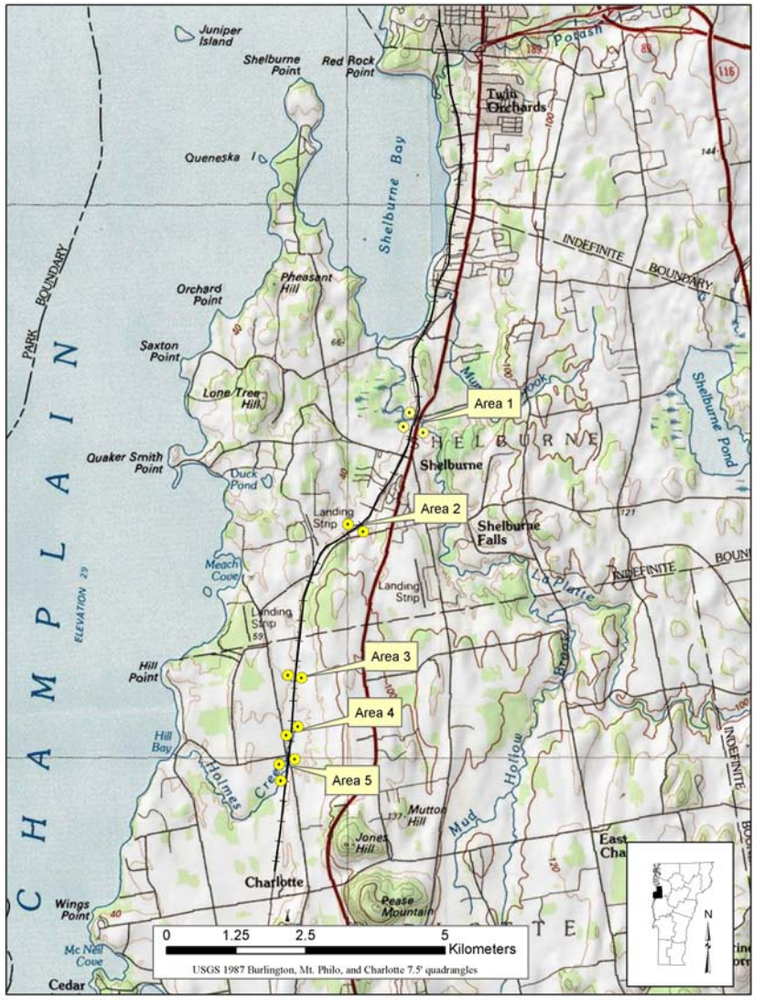

Figure 4. Map showing the five archaeologically sensitive areas identified within the proposed Champlain Bike Path's APE, Burlington, South Burlington, Shelburne and Charlotte, Vermont.

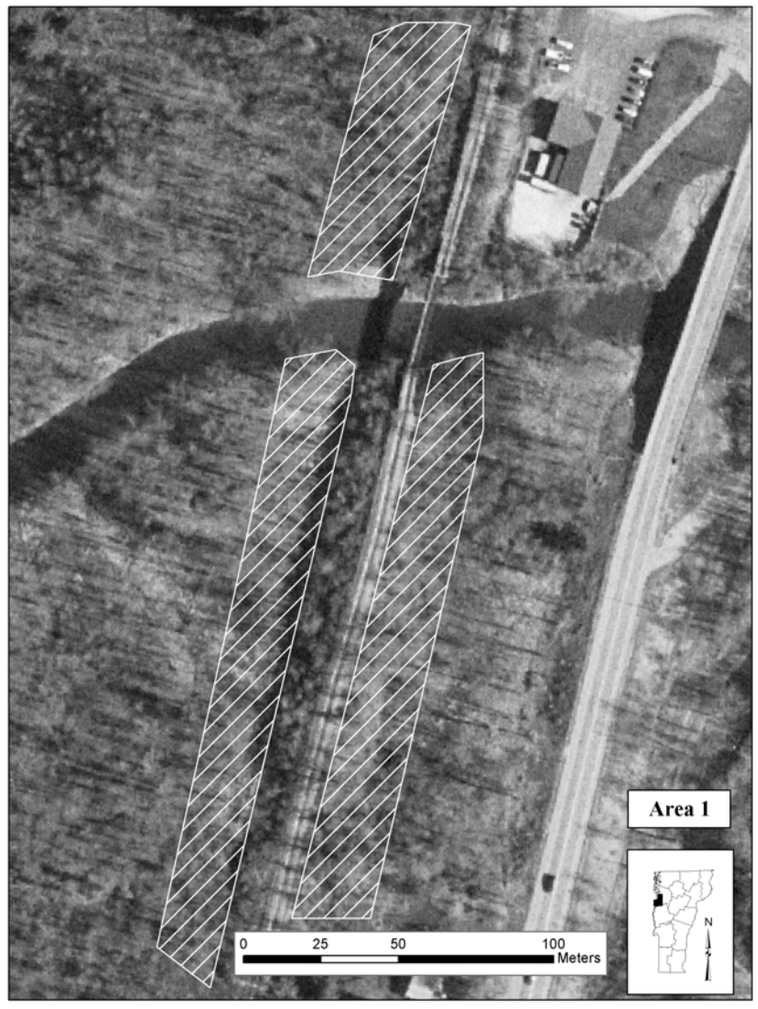

Figure 5. Map showing archaeologically sensitive Area 1 and the three sensitive loci bordering the La Platte River identified within the proposed Champlain Bike Path's APE, Burlington, South Burlington, Shelburne and Charlotte, Vermont.

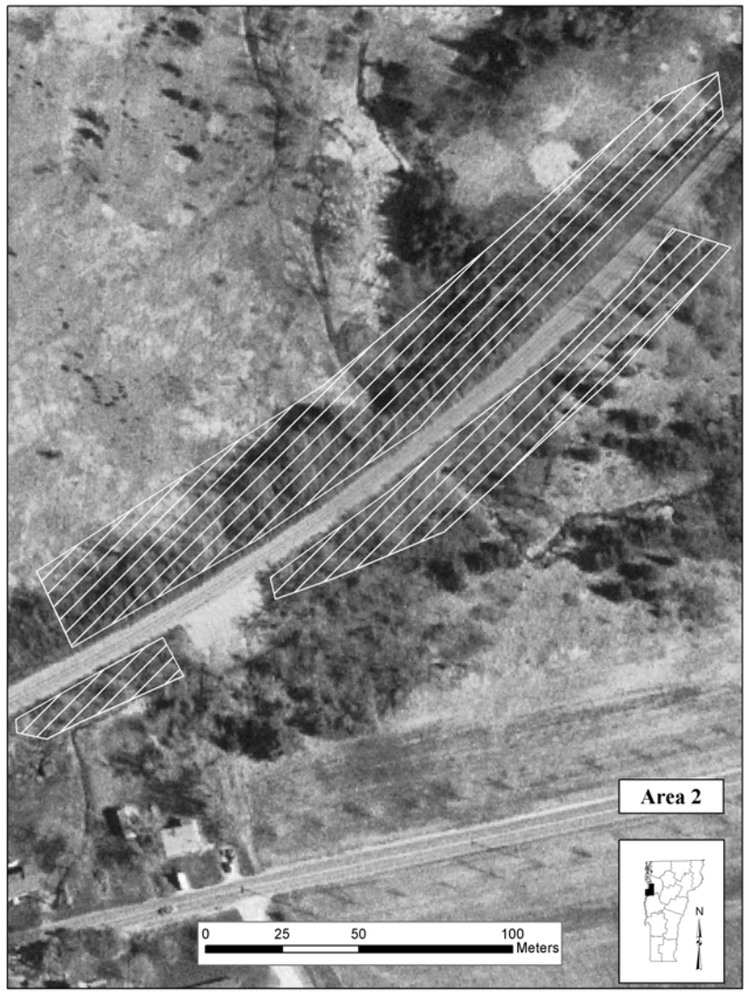

Figure 6. Map showing archaeologically sensitive Area 2 and the two sensitive loci, bordering the rail road tracks, identified within the proposed Champlain Bike Path's APE, Burlington, South Burlington, Shelburne and Charlotte, Vermont.

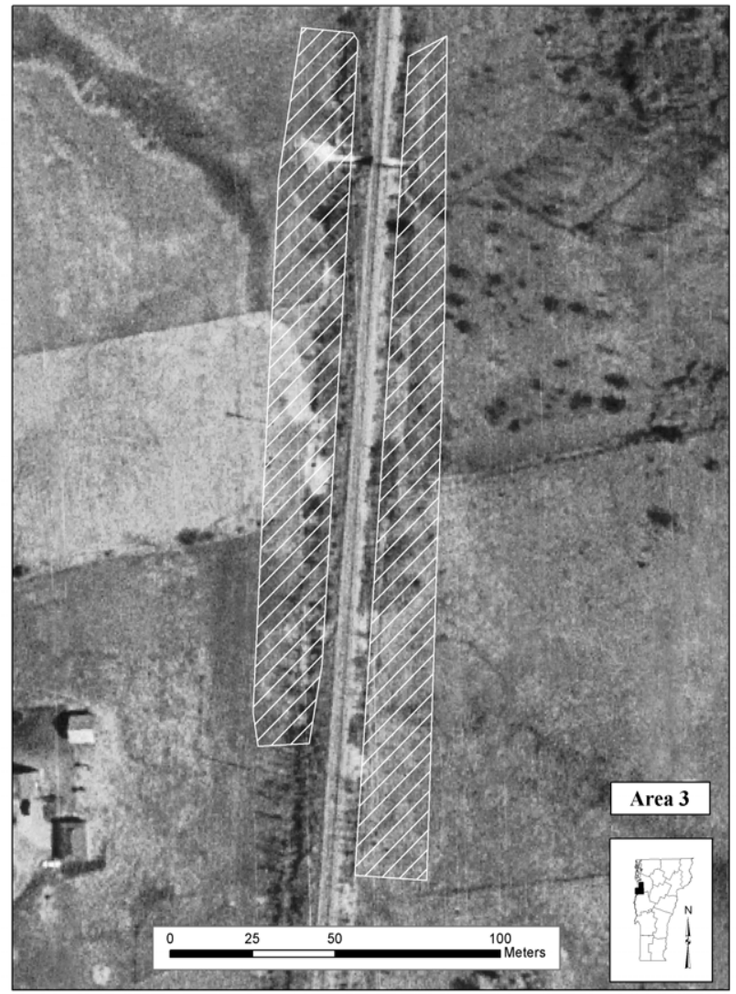

Figure 7. Map showing archaeologically sensitive Area 3 and the two sensitive loci, bordering the rail road tracks, identified within the proposed Champlain Bike Path's APE, Burlington, South Burlington, Shelburne and Charlotte, Vermont.

Figure 8. Map showing archaeologically sensitive Area 5 and the three sensitive loci, bordering the rail road tracks, identified within the proposed Champlain Bike Path's APE, Burlington, South Burlington, Shelburne and Charlotte, Vermont.

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1869 *Atlas of Chittenden Co. Vermont.* F.W. Beers and Co., New York.

Frink, Douglas S.
1991 *L & M Mark Project, South Burlington, VT. Phase I Archaeological Study.* Archaeology Consulting Team, Essex Junction, VT. July.

Thomas, Peter A., Prudence Doherty, Robert Florentin, and Kate Kenny
1999 *Phase 1 Site Identification Survey for Field of Dreams, Meach Cove Trust property, Shelburne, Chittenden County, Vermont.* University of Vermont Consulting Archaeology Program. Report No. 223

United States Geological Survey

1987 Burlington 7.5" quadrangle. United States Geological Survey, Washington D.C.

1987 Charlotte 7.5" quadrangle. United States Geological Survey, Washington D.C.

1987 Mt. Philo 7.5" quadrangle. United States Geological Survey, Washington D.C.

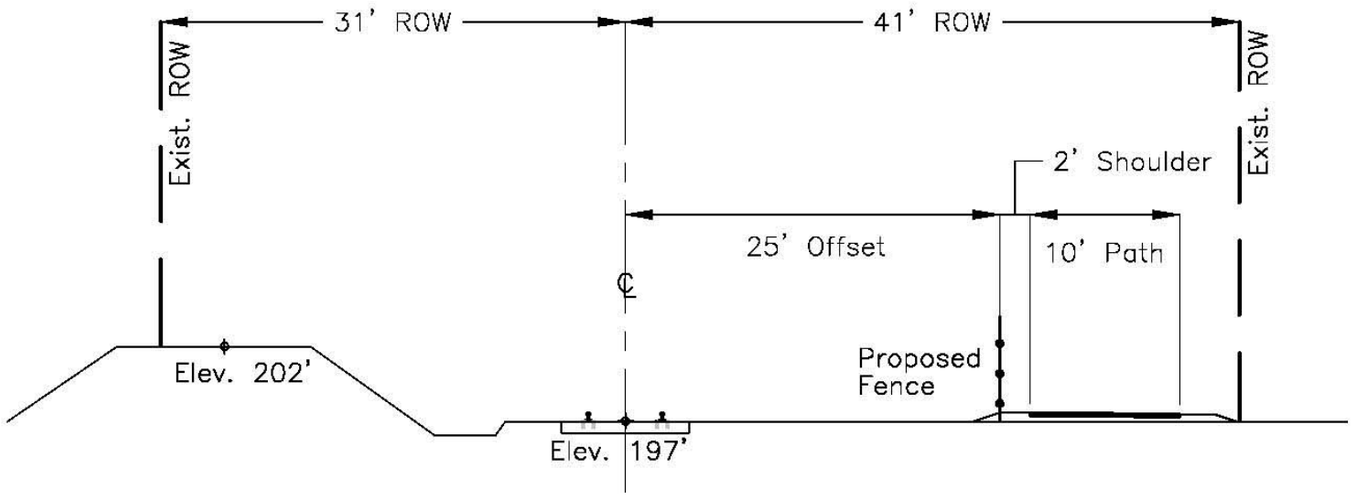
1906 SW ¼ Burlington quadrangle. United States Geological Survey, Washington D.C.

1895 Wilsboro quadrangle. United States Geological Survey, Washington D.C.

Appendix E

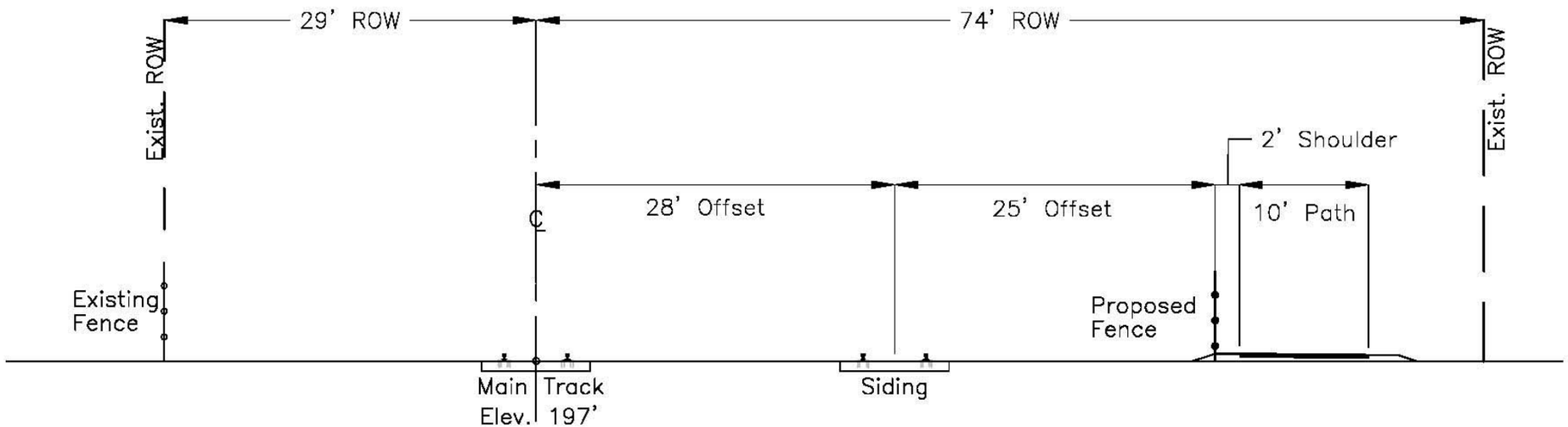
Typical Cross Sections

Section - Looking north



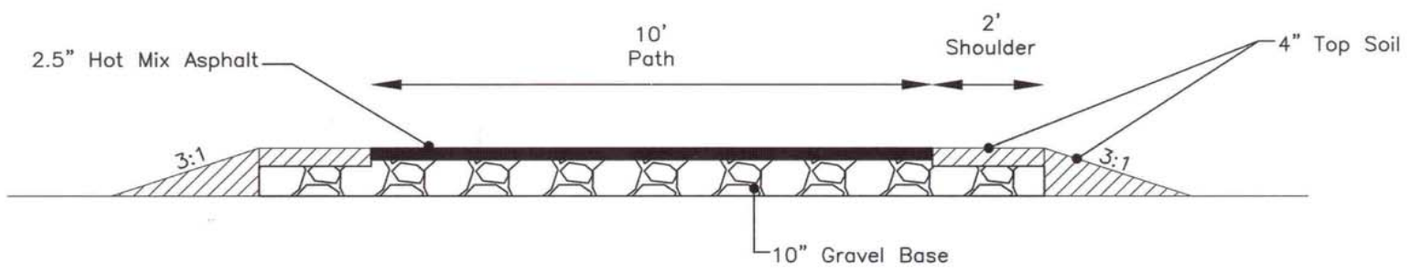
Before Shelburne Station, Sta 6068+00±
Shelburne, VT
Scale 1"=10'

Section - Looking north



Shelburne Station, Sta 6072+00±
Shelburne, VT
Scale 1"=10'

Appendix F
Cost Analysis



Summary of Items by VTRANS
Average Bid Prices, 01-1998 to 12-2002:

Item 201.11 - Clearing & Grubbing - $3828.32/Acre
Item 203.16 - Rock Excavation - $6.97/CY
Item 203.32 - Granular Backfill - $10.81/CY
Item 301.15 - 10" Subbase of Gravel - $18.06/CY
Item 303.25 - 2.5" Hot Mix Asphalt - $32.00/Ton
Item 620.12 - 6' High Chain Link Fence - $15.21/LF
Item 651.35 - Topsoil - $15.78/CY

Summary of Trail Cost by Linear Feet:

Clearing & Grubbing (201.11):	$ 1.40
Excavation (203.16):	$ 8.26
Backfill (203.32):	$12.75
Hot Mix Asphalt (301.15 & 303.25):	$ 9.43
Chain Link Fence (620.12):	$15.21
Topsoil (651.35):	$ 2.73
Sub-Total:	$49.78
Contingency (35%):	$17.42
Total:	$67.20
SAY:	**$67.00**

E02-12XS01.dwg

alta PLANNING + DESIGN

Champlain Path Feasibility Study

Rail with Trail Typical Section
Cost Estimate by Linear Foot

Figure 1

Champlain Path: Construction Cost by Segment

Segment		Description	Unit cost	Cost
1	587110	Greenbush Rd		
	579644	Charlotte Station		
	7266	rail trail w fence	67	$486,822
	200	ret wall	112	$22,400
	900	trail along Greenbush Rd	47	$42,300
	8366	trail length		$529,122
	300	Lake Rd		
	8666	total segment length		
	1.64	mi		
2	598574	Bostwick Rd		
	587950	Lake Rd		
	8424	rail trail w fence	67	$564,408
	300	ret wall	112	$33,600
	1900	timber platform	653	$1,240,700
	10624	total segment length		$1,838,708
	2.01	mi		
3	607768	Harbor Rd		
	598574	Bostwick Rd		
	9194	rail trail w fence	67	$615,998
	9194	total segment length		
	1.74	mi		

Champlain Path: Construction Cost by Segment (cont)

Segment		Description	Unit cost	Cost
4	609000	1200 ft +/- north of Harbor Rd		
	607768	Harbor Rd		
	1232	rail trail w fence	67	$82,544
	1232	total segment length		
	0.23	mi		
5	611100	Arrowhead Crossing		
	609000	1200 ft +/- north of Harbor Rd		
	1200	Trail from railroad and along Rt 7	47	$56,400
	300	ret wall	112	$33,600
		Trail bridge by others		
	1500	total segment length		$90,000
	0.28	mi		
6	615113	Bay Rd		
	611100	Arrowhead Crossing		
	3713	rail trail w fence	67	$248,771
	300	ret wall	112	$33,600
	4013	total segment length		$282,371
	0.76	mi		

Champlain Path: Construction Cost by Segment (cont)

Segment		Description	Unit cost	Cost
7	622546	Pine Haven Shore Rd		
	615113	Bay Rd		
	7433	rail trail w fence	67	$498,011
	7433	total segment length		
	1.41	mi		
8	632405	Queen City Park Rd		
	622546	Pine Haven Shore Rd		
	9274	rail trail w fence	67	$621,358
	300	ret wall	112	$33,600
	285	timber platform	653	$186,105
	9859	total segment length		$841,063
	1.87	mi		
Total	52521	ft		$4,777,817
	9.95	mi		