

I. INTRODUCTION

A. OVERVIEW

The Central Vermont Regional Planning Commission is managing a Conceptual Alignment Study for the City and Town of Barre that focuses on updating the potential alignment of a shared use path between the existing multi use paths in the City and the Town, providing a link between downtown Barre City and Barre Town. The project Study Area extends from Merchants Row in downtown Barre City south to the area around the Barre Town Elementary and Middle Schools. **Figure 1** shows the approximate extent of the Study Area.

This report summarizes the results of the analysis and records the recommendations of the most appropriate alignment. It is organized into six additional sections after this Introduction:

- Recommendations,
- Existing Conditions,
- Potential Alignments,
- Analysis,
- Initial Estimates of Probable Construction Costs, and
- Implementation.

The recommendations for the path alignment are presented first so that those just interested in the conclusions can find what information they need quickly and easily. Those that are interested in the more detailed aspects of the project can then continue reading. The report continues by describing the existing conditions, the various alternatives that were considered, the analysis of the alternatives, and the review of the potential impacts of the preferred alignment.

The remaining portions of this introduction are meant to provide an overview of the issues so that the recommendations can be more clearly understood. **Appendix I** includes a summary of the study process that resulted in this final report; **Appendix J** includes several photos of the various alternatives examined in this study.

B. PURPOSE & NEED

The purpose of the Barre City Barre Town Multi Use Path is to:

- Provide a secure, accessible means for bicyclists and pedestrians to travel primarily off road between the end of the Millstone Hill West Path in Barre Town and the southern end of the proposed multi use path in Merchants Row in Barre City;
- Assist in the reduction of vehicular traffic on roadways in Barre City and Barre Town;

- Provide easy non-motorized access to schools, parks and multiple other destinations in Barre City and Barre Town;
- Incorporate as much of the existing Barre City / Barre Town Paths as possible;
- Provide another link in the Central Vermont Regional Path; and
- Provide economic development, conservation, cultural and community enhancement, and recreation benefits to the City and the Town.

The need for the path can be seen in:

- The limited locations where it is easy and convenient for pedestrians and bicyclists to cross VT Route 14 between downtown Barre City and the intersection with VT Route 63;
- The lack of adequate bicycle or pedestrian facilities on much of VT Route 14 combined with high motor vehicle traffic volumes;
- The lack of bicycle or pedestrian facilities on other State and local roads in Barre Town north of VT Route 63 and Barre City south of Prospect Street or VT Route 302; and
- The number of current users on the existing shared use paths in the City and the Town that use the paths for transportation as well as recreational purposes.

As the purpose statement indicates, the City and Town see this path as much more than a transportation facility. They envision it as a vital enrichment of both communities. It can serve as a means of linking neighborhoods, providing outstanding recreational possibilities, attracting out of town users to the community and increasing economic activity, increasing the activity level and consequently the health of residents, and providing a means of highlighting the history of the community.

C. PROJECTED USERS

1. OVERVIEW

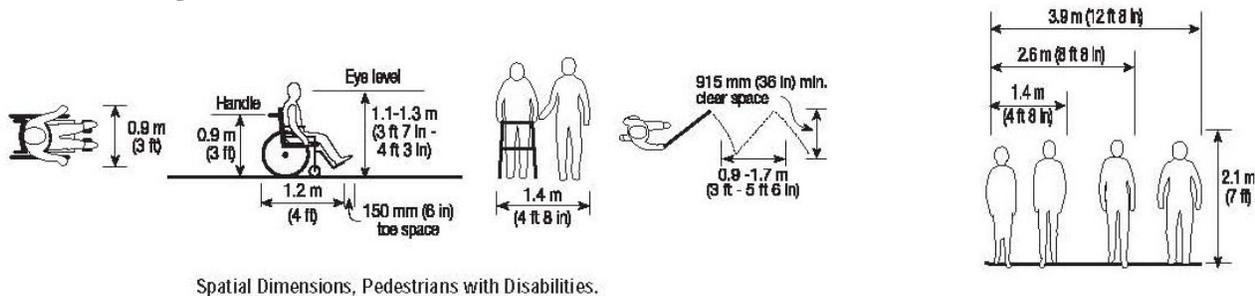
The Town and City path committees want the connecting multi use path to serve as many of the pedestrians and bicyclists of all ages and abilities as possible. This means that in general the path will need to minimize interactions with motor vehicles while at the same time provide a rather direct route between the two existing paths so that it will serve the needs of skilled bicyclists that could use the path for commuting or long distance riding.

If the analysis of potential alignments shows that it is difficult to both minimize motor vehicle contact and maximize the directness of the route, the minimizations of contact with motor vehicles is considered to be the more important criteria to address. This is because it is always possible for more experienced bicyclists to use existing roads, even if they have minimal bicycle facilities, while it is not now possible for less experienced bicyclists to find locations to bicycle between the two destinations that lack interactions with motor vehicles.

The following sections provide more information on the abilities and needs of the different types of pedestrians and bicyclists.

2. PEDESTRIANS

Pedestrians vary significantly in their skills, experience, and willingness to walk different distances. Strong determining factors for pedestrians are the time and mobility required to reach their destinations, particularly if they need to cross high-volume or high-speed roads. Time and mobility constraints also dictate the pedestrian's usable geographic space; few urban pedestrians will venture more than one mile from point to point; most actually will only undertake trips shorter than 1/2 mile, unless the trip is recreational.



Spatial Dimensions, Pedestrians with Disabilities.

There are three basic pedestrian user groups:

- Active pedestrians,
- Basic pedestrians, and
- Circumscribed pedestrians.

Active pedestrians use the road system regularly for transportation, as well as for fitness. They know and generally follow the rules of the road. Basic pedestrians include the majority of older children and healthy adult pedestrians. Circumscribed pedestrians are those whose speed and mobility are extremely limited. The physical requirements of pedestrians are shown in these figures which are from the Vermont Agency of Transportation's (VTTrans) *Pedestrian and Bicycle Facility Planning and Design Manual*.

Despite the many different categories of pedestrians, a few design considerations appear to greatly enhance the transportation options for all. For the study area of this project, the most important design consideration consists of well-maintained, attractive, ADA-compliant sidewalks.

3. BICYCLISTS

Among bicyclists, there are three typical user groups that can be expected to use the multi use path:

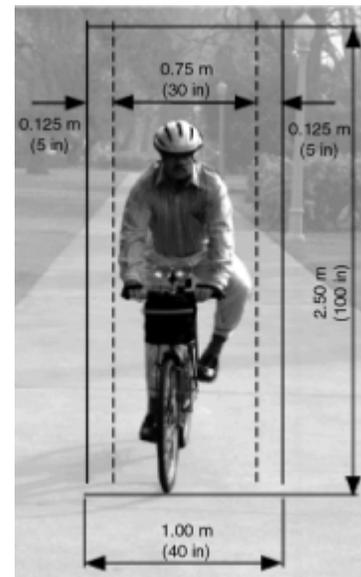
- Advanced bicyclists,
- Basic bicyclists, and
- Beginner bicyclists or children.

Advanced bicyclists are highly experienced bicycle riders who feel comfortable riding their bikes in heavy traffic and typically prefer to ride on roadways. Because of the difficulty of using the existing roads in the study area, it is likely that advanced bicyclists will use the proposed path if it is convenient to do so.

Basic bicyclists comprise the largest category of bicycle riders, including older children, inexperienced adult riders, occasional bicycle commuters, recreational adult bicyclists, and experienced riders who still fear or dislike riding in urban traffic conditions. Basic bicyclists are reasonably competent in handling their bicycles and they generally understand the rules of the road, but they ride at more moderate speeds and are generally uncomfortable on busy streets unless a wide, striped, obstacle-free shoulder is provided and traffic volumes are low. Basic bicyclists can be expected to use the proposed trail extensively.

Beginner bicyclists have the weakest bicycling skills. Beginner bicyclists ride more slowly, don't always understand the rules of the road, and are typically uncomfortable riding with motor vehicles. They are best accommodated on low-speed local roads and multi user paths, or even sidewalks for the very young where there are few, if any driveway crossings.

The basic physical dimensions and characteristics of a bicyclist help explain what minimal design considerations are appropriate for on-road bicycle facilities. The illustration of these characteristics is taken from the American Association of State Highway and Transportation Officials (AASHTO) 1999 *Guide to the Development of Bicycle Facilities*.



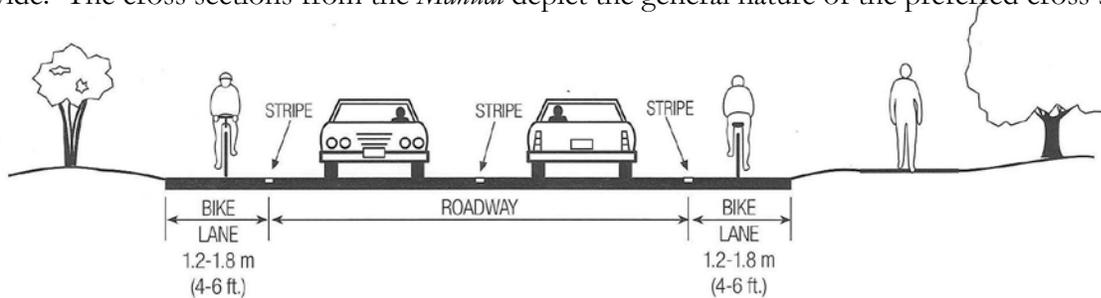
D. RECOMMENDED CROSS SECTION

The preferred cross section for this path is a twelve-foot wide asphalt shared use path with an adequate sub-base and two-foot gravel or grass shoulders on each side. The wider twelve foot path is recommended to more readily accommodate multiple uses on the path throughout the year. It may be constructed to lie partially or completely above grade, so as not to disturb archeological resources where necessary or cut off groundwater flow leading to wetland areas. If installed above grade, the sides need to be stabilized with soil, vegetation, or some other means that will hold the edge firm and eliminate an abrupt change in elevation at the edges of the path, unless a boardwalk is used.

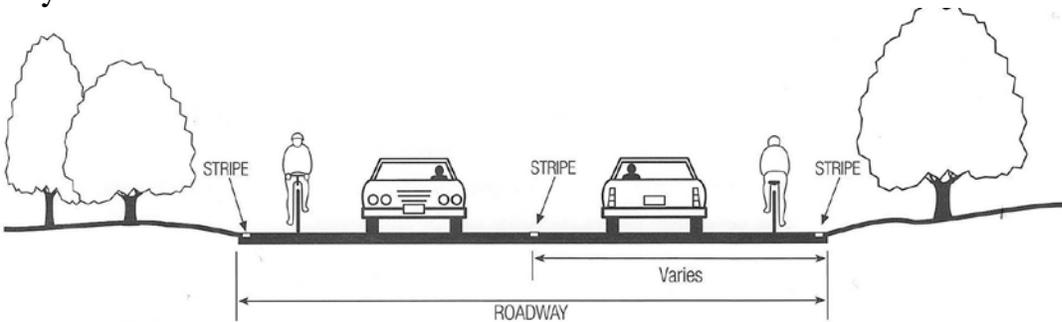
The BRPD team recommends that the cross section be consistent with the recommendation in the *Vermont Pedestrian and Bicycle Facility Planning & Design Manual (The Manual)*. This will make the path eligible for State or federal funding, if the Town and City decide to pursue it. Access to these funding sources creates more options for funding, if they should become necessary.

The preferred cross section would keep grades at or below five percent to meet the Americans with Disabilities Act (ADA) regulations. When grades need to exceed five percent, they will only do so for short distances in accordance with the provided exceptions in the ADA regulations, or when adjacent to an existing roadway that exceeds five percent. In locations adjacent to or through wetland areas, crossing steep slopes or at other tight locations, the width of the path may be narrowed to eight feet to minimize intrusion into the adjacent areas.

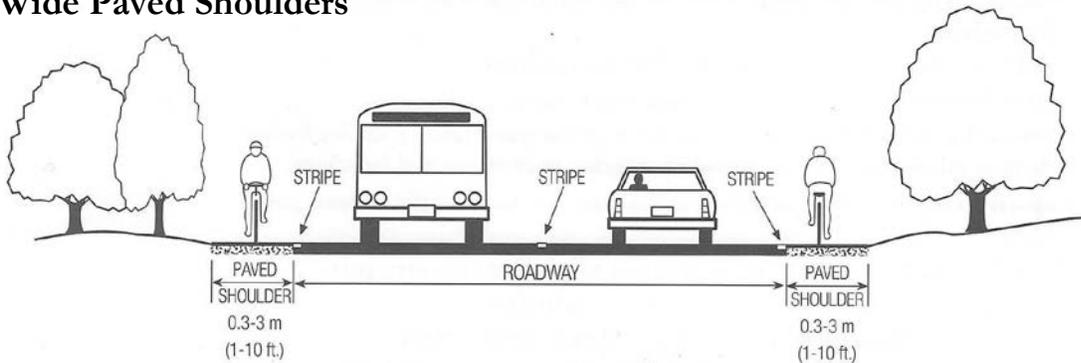
When the facility is on a roadway, the preferred cross section would be two bike lanes, one on either side of the road, each at least four feet wide. The travel lanes would range from ten to twelve feet wide. If bike lanes are not possible, wide paved shoulders would be the second choice, where the shoulders are preferably at least three feet wide. On roadways with very low traffic volumes, it may also be possible to use a shared lane, where the travel lanes in each direction are at least eleven feet wide. The cross sections from the *Manual* depict the general nature of the preferred cross sections.



Bicycle Lanes



Wide Paved Shoulders



Shared Roadway

II. PREFERRED ALIGNMENT RECOMMENDATIONS

Figure 2 shows the preferred alignment of the path. The following route description takes the path from the south to the north.

Starting at the northern end of the existing Mill Hill West path in Barre Town, the new path turns west and follows the south edge of the school parking lot, crosses the access drive to the Town Recreation Area and turns to the north along the west side of the parking lot. The path crosses the parking lot access drive via a crosswalk at its southern end just before it meets the parking lot. From here it heads north on the east side of the parking lot access drive to Websterville Road.

At Websterville Road, the multi use path ends. The route continues as on-road bicycle lanes and a sidewalk on the south side of Websterville Road. A bicycle crossing at the end of the school parking lot access drive carries bicyclists heading west over to the north side of Websterville Road so they can ride with traffic. The sidewalk will follow the alignment recommended in the Barre Town Sidewalk study, prepared by Lamoureux & Dickinson (L&D), dated November 2009, with the exception that Websterville Road itself will be wider than shown on the cross sections in the L&D study to accommodate the bicycle lanes. The recommended cross section would be two 10-foot travel lanes with four-foot wide paved shoulders on the outside of both travel lanes. This will place the sidewalk closer to the edge of the Websterville Road right-of-way than identified in the L&D report, unless modifications to the location of the roadway within the right-of-way are made. (See **Section VI.A.**)

Bicyclists heading east and all pedestrians will cross Graniteville Road via a crosswalk on the south side of the intersection; bicyclists heading west will cross Graniteville Road via a signed bicycle crossing. The sidewalk will continue west along the south side of Sterling Hill Road to a point on the south side of the road just to the west of the access drive to the commercial building (currently McAuley Meats) located on the north side of the road. Bicyclists will be accommodated on Sterling Hill Road by wide paved shoulders on both sides of the pavement to at least the east side of the commercial building access drive. A bicycle crossing at this point will bring bicyclists generally heading south on the path to the south side of Sterling Hill Road.

The path turns south away from the roadway at or close to the location of the VAST trail, which is just to the west of the commercial building access drive. It soon turns west to southwest again and generally follows the northern property line of the two parcels it crosses until it intersects the Green Mountain Power (GMP) transmission line. After crossing the GMP right-of-way, the path turns west and skirts the rear of the lots on the south side of Silver Circle. The path turns north on the west side of the lots on the west side of Platinum Plain and begins to descend the steep hillside. The path continues generally north while descending the hillside at approximately a five percent slope. There may be the need to have short sections of trail at more than a five percent grade to complete the descent by the time the path returns to Sterling Hill Road at a lower elevation.

When the path meets Sterling Hill Road, it again converts to a sidewalk on the south side of the street in conjunction with paved shoulders on the roadway itself. The road would either be striped to have two nine-foot travel lanes and two-foot shoulders or marked as a shared roadway and bicycle route. Due to the narrow right-of-way, the sidewalk may need to be next to the edge of the roadway which will require curbing. The sidewalk and bicycle facilities continue west to the intersection with Henry Street where the sidewalk will switch to the north side of the street. At the South Main Street intersection, pedestrians and bicyclists will cross South Main Street via the new pedestrian signals and crosswalks to be added with the new traffic signals already planned for the intersection.

West of the South Main Street intersection, the sidewalk continues west on the north side of Bridge Street to the intersection with the south end of the existing Town/City path. Three or four-foot wide paved shoulders on both sides of Bridge Street will be provided for bicyclists. Because of the closeness of at least one residential structure to the north side of Bridge Street, the sidewalk could be installed close to the existing north edge of the Bridge Street pavement, with the road widening occurring all on the south side of the street. The four-foot widening creates a 28-foot wide paved area; the roadway could either consist of two eleven-foot travel lanes with three-foot paved shoulders, or two ten-foot wide travel lanes with four-foot wide paved shoulders. Although the three foot-wide paved shoulders would meet State Standards, the BRPD Team recommends the wider paved shoulders to make the path as accommodating to younger and older bicyclists as possible.

A bicycle crossing on Bridge Street brings south/east bound bicyclists to the south side of Bridge Street. The path continues north on the existing path to the intersection with Parkside Terrace. At this point, the new path shifts to Parkside Terrace heading east to the entrance to Rotary Park; no changes other than striping of bicycle lanes are needed on Parkside Terrace. A bicycle crossing brings bicyclists from the west side of Parkside Terrace to the entrance of the park.

The path continues through Rotary Park as a multi use path to Mill Street. At the north end of Rotary Park, the path heads up the right-of-way for Blodgett Avenue for a very short distance before it heads north again paralleling Mill Street on higher ground to the west side of the road. The path heads north across country to Brooklyn Street, but avoids the steep hill at the southern end of Brooklyn Street by heading east closer to the banks of Stevens Branch. It follows the western bank of Stevens Branch north to rejoin Brooklyn Street at its low point south of the last structures on the east side of the street.

The path changes to on-road wide shoulders and adjacent sidewalk with a bicycle crossing bringing southbound bicyclists on the west side of Brooklyn Street to the path. At the intersection with Prospect Street, the sidewalk and wide shoulders join to cross a new bridge to the south of the existing Prospect Street Bridge. **Figure 3** shows a detail of this area. The path width narrows to eight feet to fit between the new electrical panel and the end of the bridge on the east side of the bridge. Alternately, the panel may be moved more to the edge of the space to allow a wider path. A bicycle crossing brings southbound bicyclists from the bridge to the west side wide shoulder on

Brooklyn Street. On the east side of the bridge, the path crosses Prospect Street, turns to the east and crosses the railroad tracks on the north side and adjacent to Prospect Street.

There are several additional connections of path, sidewalks, or on-road improvements that are also considered to be important in maximizing both the integration of the new path into the community and the ease of pedestrians and bicyclists in using the path to access neighborhoods or important destinations. **Figure 2** also shows these additional portions of the preferred alignment.

The first provides a connection to the high school. It heads from Alignment C-3 and crosses Stevens Branch via a new bicycle/pedestrian prefabricated or recycled historic bridge. On the east side of the river, the path follows the northern edge of the transmission station property east towards Main Street. At the rear of the existing structure east of the transmission station, the path crosses the access road and follows the southern edge of the transmission station property to Main Street. There, the path turns north along the west side of Main Street the short distance to the intersection with Ayers Street. At the intersection, the path converts to bicycle lanes and sidewalks on Ayers Street, heading east to the front of the high school or to Crimson Tide Way which it could follow into the high school campus.

The second addition converts the existing grass path that starts at the eastern end of the Blodgett Avenue right-of-way and heads north and uphill to join with the existing City/Town path into a paved multi use path.

The third addition extends a connection to the residential area on the east side of Route 14 along Parkside Terrace. The bicycle lanes would be continued past the entrance to Rotary Park all the way to the signalized intersection with Route 14. The link continues as wide paved shoulders on East Parkside Terrace with a sidewalk on the north side of the roadway to the intersection with Pouliot Avenue. East Parkside Terrace could also be widened by approximately two feet to allow the creation of two ten-foot wide travel lanes and two four-foot wide bike lanes.

The last additional link revitalizes the existing wide paved shoulders on Route 14 between the Bridge Street and VT Route 63 intersections.

III. EXISTING CONDITIONS

A. OVERVIEW

To better understand how a shared use path between the existing multi use paths in the City and the Town could fit into the land, the Study Team looked closely at the existing conditions in the study area. The following text, with matching figures, describes the various aspects that they examined.

- **Figure 4** shows the existing transportation facilities;
- **Figure 5** shows existing utilities;

- **Figure 6** shows the natural resources;
- **Figure 7** shows the topography; and
- **Figure 8** shows the cultural resources.

B. TRANSPORTATION FACILITIES

1. OVERVIEW

The following section provides basic information on the busier roadways in the study area, as well as additional roads that could be considered for use as part of the path. It also briefly describes other transportation facilities within the study area. **Appendix A** provides more detailed statistics on selected roadways. **Figure 4** shows the location of these transportation facilities.

2. VT ROUTE 14 (SOUTH MAIN STREET)

Vermont Route 14 (South Main Street) is a Class 1 Town Highway with a three-rod (49.5 feet) wide right-of-way in the project area. The width of this paved roadway varies from 32' – 38.5' as it intersects with the various streets in the project area. Pavement markings on South Main Street include centerlines in all locations and white edge lines in some locations. There are various grade changes along this roadway throughout the project area. There are 4-5' wide concrete sidewalks along one or both sides of South Main Street in the project area.

3. QUARRY STREET/QUARRY HILL ROAD

Quarry Hill Road in the Town has recently been upgraded and although the right-of-way is not uniform, it is for the most part approximately four rods (66 feet) wide. The roadway is newly paved with painted center lines and white edge lines. South of its intersection with Patch Road the roadway is relatively open with gradual grade changes. However north of the Patch Road intersection to the city line it is a steep hill with two lanes of downhill traffic and one lane of uphill traffic and guardrails on the west/uphill shoulder of the road. There are currently no sidewalks along Quarry Hill Road.

Quarry Street in the City is a continuation of Quarry Hill Road; however, it is much narrower with a three-rod (49.5 feet) wide right-of-way. The pavement on this street is in poor condition and there is only a painted center line. The grades on this portion are gradual from the Town/City line to the intersection with VT Route 14 (South Main Street). The intersection of Quarry Street and South Main Street has limited sight distance from Quarry Street looking south due to a vertical crest on South Main Street.

4. PROSPECT STREET

Leading from the heart of downtown Barre and heading west, Prospect Street is a paved roadway with a three-rod (49.5 feet) wide right-of-way. Heading west from Main Street, the first 300 feet of

Prospect Street to Brooklyn Street has a slight downhill grade. This section of the roadway has only centerline markings and has five-foot wide concrete sidewalks along both sides of the road. The next section starts with a bridge on a bend over the Stevens Branch where the roadway has a striped centerline with sidewalks on the bridge and edge lines delineating 10' wide paved shoulders after the bridge up to Brooklyn Street. From Brooklyn Street, the road begins to climb steeply uphill to the west with a sidewalk continuing along the south side of the road.

5. BROOKLYN STREET

The northern 1,300 feet of Brooklyn Street consists of a 24-foot wide paved roadway with a five-foot wide concrete sidewalk along the west side. The southern 750 feet of the street is paved 20-foot wide and has no sidewalks. There are no curbs and no pavement markings on Brooklyn Street, even in the section with a sidewalk. Branch Street ties into Brooklyn Street at the northern end where they both intersect with Prospect Street, at the west side of the bridge over the Stevens Branch. The sidewalk on the west side of Brooklyn Street ends at the point where Branch Street intersects Brooklyn Street. There is a segment of guardrail and retaining wall located between the streets due to a grade difference. The bridge abutment and bridge railing extend south approximately 120 feet along the east side of Brooklyn Street starting at the southern side of the bridge deck. In this area, the pavement on Brooklyn Street ranges from 26 to 29 feet wide between the guardrail/retaining wall on the west side and the bridge abutment/railing on the east side.

6. PARKSIDE TERRACE / EAST PARKSIDE TERRACE

Parkside Terrace is a 32-foot wide paved street with a two-rod (33 feet) wide right-of-way. This street dips downward to a bridge over the Stevens Branch. On the west side of the river, it continues towards Rotary Park, turns to the north to climb a hill towards the Barre City Elementary and Middle Schools, and switches back to the south to rise a bit more towards the school parking lot and the school itself. The Barre City/Barre Town multi use path intersects Parkside Terrace at the curve of the switchback. There is a five-foot wide concrete sidewalk along the northeast side of Parkside Terrace from South Main Street to the school.

East Parkside Terrace is a 24-foot wide, paved street with a three-rod (49.5-foot) wide right-of-way. The first 80 feet of the street is curbed on both sides with a concrete sidewalk on the north side up to this point. The remaining 420 feet to the Pouliot Avenue / North Parkside Terrace intersection is uncurbed and has no sidewalks. There are no pavement markings on East Parkside Terrace. There is a slight rise in grade from South Main Street east to Pouliot Avenue.

7. MILL STREET

Approximately the first 600 feet of Mill Street up to the bridge, consists of a 21-foot wide paved roadway in poor condition with no painted lines and a three-rod (49.5 feet) wide right-of-way. After a short descent from Main Street, the road is generally flat. There is a sidewalk on one side of the bridge but no other sidewalks along the roadway. Just after the bridge, Mill Street narrows slightly to 19-feet in width and has a right-of-way width of approximately 20 feet. After the bridge, the

roadway goes up a hill and terminates at Rotary Park. Blodgett Avenue is a side street off Mill Street that continues a short distance uphill but does not connect to the multi-use path.

8. STERLING HILL ROAD

The east end of Sterling Hill Road has a large culvert with guard rails on both sides of the road crossing over a stream. The first 300 feet west of the Sterling Hill Road/Quarry Hill Road/Graniteville Road intersection is a 26/28-foot wide paved roadway with a three-rod (49.5 feet) wide right-of-way. The roadway in this segment rises slightly uphill. However, after this segment, Sterling Hill Road starts to drop significantly in elevation to the west. West of the intersection with Silver Circle, the roadway becomes very steep and winding; supporting only one-way downhill traffic. The road condition in this section is a mix of pavement grindings with a width of 14/16 feet. A stream runs along the road on the south. The west end of Sterling Hill Road, formerly called School Street, is a 22-foot wide paved roadway with a two-rod (33 feet) wide right-of-way. The west 1000 feet of Sterling Hill Road is at a slight down slope to South Main Street and is lined on both sides with houses. There are currently no sidewalks along Sterling Hill Road.

9. WEBSTERVILLE ROAD

Websterville Road has an overall roadway width of 26 feet and is striped with eleven-foot wide travel lanes and two-foot wide shoulders. The existing right-of-way width for Websterville Road is three-rods (49.5 feet) wide. One section of Websterville Road, starting at the intersection of Graniteville Road and ending at the entrance to St. Sylvester's Cemetery parcel has an approximately 10% uphill grade traveling eastbound.

10. BRIDGE STREET

Bridge Street is a newly paved, 24' wide roadway with painted center lines and white edge lines within a three-rod (49.5 feet) wide right-of-way. From South Main Street, Bridge Street gradually slopes downward about 600 feet to a bridge on a bend in the road. From the bridge westward the road has a steady uphill incline. The terminus of the existing multi use path is located on the west side of the bridge.

11. WILSON STREET

Wilson Street is a 17/18-foot wide paved roadway with pavement in average to poor condition. This dead end roadway rises slightly in grade to the east where there is a crest in the roadway approximately 300 feet from the intersection with South Main Street. There are a few commercial and residential buildings along this street.

12. RAILROAD

The State of Vermont owns the railroad right-of-way that runs through the study area from Barre City southeast and uphill to the granite quarries. **Figure 1** shows the location of the railroad. The

right-of-way varies in width from approximately 20 feet to approximately 100 feet wide. The single railroad track is generally in the middle of the right-of-way. Washington County Railroad leases the right-of-way from the State and currently runs approximately 1 round trip train a day over the Class 1 (maximum speed for freight: 10 MPH and passenger: 15 MPH) track. The number of trains could increase in the future as delivery conditions for granite and other materials change.

13. BARRE CITY/BARRE TOWN MULTI USE PATH

The Barre City/Barre Town Multi Use Path runs between Fairview Street, at the north end, and Bridge Street in Barre Town at the south end. The path lies within a former railroad right-of-way. It is generally level. In addition to the two end access points, the path also crosses Parkside Terrace providing access to the Barre City Elementary and Middle Schools and Rotary Park. **Figure 4** shows the location of this path.

14. MILLSTONE HILL WEST MULTI USE PATH

The Millstone Hill West Path runs between the Barre Town Elementary and Middle Schools on the north end and Dodge Avenue in Upper Graniteville on the south end. This path includes several long gradients of approximately five percent, although in general it is also relatively level. **Figure 4** shows a portion of the Millstone Hill West path.

15. TRAFFIC AND CRASH DATA

Appendix A provides additional existing conditions information including length, classification, speed limit, sight distance measurements, crash history, and traffic data for the roadways in the study area.

16. UPCOMING IMPROVEMENT PROJECTS

Bridge Street Bridge (BRF 6100 (7)) – Preliminary plans have been developed by VTrans to replace the Bridge Street Bridge and approaches. Work on the project will extend from 75 feet west of the bridge to 150 feet east of the bridge. The new bridge structure will consist of eleven-foot wide paved travel lanes with three-foot wide paved shoulders and a five-foot wide concrete sidewalk on the north side. The sidewalk will extend from the existing bike path to the Bridge Street trailer park road located 150 feet east of the bridge. This project will be in the right-of-way phase during 2011 and is planned for construction in 2012.

Bridge Street/VT Route 14/Sterling Hill Road Intersection (STPG 6100 (6)) – VTrans is developing design plans to install a traffic signal at the Bridge Street / VT Route 14 / Sterling Hill Road intersection. The project involves a re-alignment of the north approach on VT Route 14. The signal will include pedestrian activated signals for a crosswalk across the southern approach of VT Route 14. Five-foot wide concrete sidewalks along the east and west sides of VT Route 14 coming from the south will end at the crosswalk. VT 14 will be constructed with 11-foot wide travel lanes

and 5-foot wide paved shoulders. The Bridge Street approach will consist of 11-foot wide paved lanes with no paved shoulders. This project is planned for construction to begin in 2013.

Quarry Street/Route 14 Intersection (MEGC M 6000(11)) – VTrans is developing design plans to reconstruct the VT Route 14 / Quarry Road intersection including a relocation of Quarry Street and Quarry Hill Road. This project will be in the right-of-way phase during 2011 and is planned for construction in 2013.

C. UTILITIES

All of the roadways in the project area have utility poles with overhead lines located along them. In many cases the utility poles switch from one side of the road to the other. **Figure 5** shows the location of a portion of the utilities in the study area. The electric transmission lines on the poles are operated by Green Mountain Power, the telephone lines are provided by Fair Point and the cable lines belong to Charter Communications.

Barre Town and Barre City have municipal water and sewer lines along most of the roadways in the project area. Some of the waterlines in Barre Town are owned and operated by the Town and others are operated by various Fire Districts. There are also some waterlines in Barre Town that are on the City of Barre's water system. There is a cross-country waterline that runs from the town park at the end of Wilson Street up to the Silver Circle development and a cross-country sewer line in Barre Town that runs from the Wilson Industrial Park down to Quarry Hill Road. All municipal sewer lines in the project area, including those in Barre Town, run to the wastewater treatment plant in Barre City.

D. NATURAL RESOURCES

1. WATERCOURSES

The Stevens Branch of the Winooski River runs through the study area from south to north. It flows year round and varies from 10 to approximately 25 feet in width within the study area. **Figure 6** shows the alignment of the Stevens Branch as well as other water courses in the study area.

The Jail Branch joins the Stevens Branch near the southern limits of the City, flowing in from the east. It flows on the south side of the Spaulding High School Campus in Barre City. The Jail Branch also flows year round. An unnamed stream joins the Stevens Branch from the west, joining the main river almost opposite the Jail Branch.

Another stream flows into the Stevens Branch from the west further upstream.

2. TOPOGRAPHY

The study area covers both sides of the Stevens Branch valley from the center of Barre City south to approximately the intersection of Route 63 and Route 14 in South Barre. The existing Barre City

Multi Use Path lies on the west side of the valley, while the Barre Town Multi Use Path lies on the east side. There is an approximate rise of 100 feet from the valley floor to the City path and an approximate rise of over 400 feet to the Town path. **Figure 7** shows the existing topography with 20 foot contour lines.

There is also a side valley centered on the Jail Branch that runs east from the Steven Branch within the City, near the southern municipal boundary between the City and the Town.

3. WETLANDS

There are few wetlands mapped in the study area, which is consistent with the information in the original alignment analysis. The steep nature of the topography, as well as the previously developed nature of the study area, contribute to the lack of extensive wetland areas. **Figure 6** shows the location of the mapped wetlands in the study area. The largest wetland areas lie to the south and west of the Barre Town Elementary and Middle School's campus.

4. WATERBODIES

The only large waterbodies in the Study area are located within the quarries that lie at its edges, none of which are in areas that will most likely be considered for alternative alignments for the linking trail.

5. FLOODPLAINS.

The floodplain for the Stevens Branch lies on either side of the river as it runs south to north through the Study Area. **Figure 6** shows the extent of the floodplain in the study area. The Merchants Row portion of the study area in particular lies within the Stevens Branch floodplain.

6. FLORA.

The study area has been mostly developed over the last 150 years. There are only a few large, forested areas remaining within the Study Area. The photographic base of **Figure 6** shows the location of these forested areas. The developed areas include a wide variety of vegetation, most of it planted at one point in time as a component of the development process.

As reported in the previous studies, there are no important vegetative habitat areas identified within the study area.

7. FAUNA.

The Study Area contains a collection of suburban/rural Vermont fauna, including deer, smaller mammals, turkeys, song birds, hawks, owls, ducks, geese, coyote, fox, frogs, toads, and snakes. The minimal extent of the forests within the study area makes it unlikely that animal species that require large undisturbed tracts of forest land habitat could be found within the Study Area. It appears that

the Stevens Branch corridor, which lies to the west of Route 14, is used by some of these animals as a means of traveling through the study area.

There is an identified deer wintering area South of Route 63 and west of Route 14. This area will most likely not be considered for possible alignment alternatives for the linking path. There is also a smaller deer wintering area identified by property owners between VT Route 14, Quarry Hill Road and Sterling Hill Road.

As reported in the previous studies, there are no important wildlife habitat areas identified by the State within the Study Area.

8. ENDANGERED SPECIES

The previous studies indicated that the Vermont Nongame and Natural Heritage Program had not identified rare, threatened or endangered species within the study area. No new listings have been added since the previous study. **Appendix B** contains a copy of the correspondence from the Natural Heritage Program.

E. CULTURAL RESOURCES

1. HISTORIC RESOURCES

There are several historic properties within the study area as well as the Downtown Barre Historic District. This historic district includes Merchants Row but not the adjacent railroad. There are several other potential historic areas and structures within the study area, most notably on:

- Brooklyn Street,
- Branch Street,
- Fairview Street,
- Prospect Street,
- Main Street,
- Sterling Hill Road,
- Mill Street, and
- Bridge Street.

Appendix C and **Figure 8** provide more detailed information on the historic resources in the study area.

2. ARCHEOLOGICAL RESOURCES

The study area contains numerous areas that are sensitive for archeological resources. However, the previous study suggests that the prior disturbance of much of the area indicates that remaining undisturbed archeological resources in these areas may be well below grade. Archeological reviews

and field inspections completed as part of this project determined that the areas around the potential alignments contain seven small areas of archaeological sensitivity. The seven areas of archaeological sensitivity identified contain intact soils and are located next to major drainages or drainage valleys. **Appendix D** and **Figure 8** provide more detailed information on the archeological resources in the study area.

3. OPEN SPACE AND PUBLIC LANDS

The largest public open spaces within the study area are the campuses associated with the three schools, Rotary Park, and the cemeteries. There are also several smaller parks within the study area, as **Figure 8** shows.

4. AGRICULTURAL LANDS

There are few significant parcels with agricultural land in active use within the Study Area. Smaller agricultural uses do, however, occur on a parcel to the east of the Barre Town Elementary and Middle Schools and a land at the very eastern edge of the Study area northwest of Lower Websterville.

5. LAND USE

Only the industrial land uses within the Study Area are not considered compatible with a multi use path. This is due to the higher than normal number of large trucks that are typically associated with the roadways in and around industrial areas. Even so, industrial areas are considered destinations or attractions, since it is desirable to provide pedestrian and bicycle transportation access to these areas so that there is the potential to reduce vehicular commuter traffic to and from these areas.

F. PLANNING DOCUMENTS

1. TOWN OF BARRE DOCUMENTS

Municipal Plan – The Town of Barre 2008 Municipal Plan lists bike paths as recreational facilities, but discusses them in detail in the transportation section of the Plan. The Plan is generally supportive of the development of multi use paths to promote both bicycle and pedestrian circulation in the Town. In particular, several points and recommendations are relevant to this study.

In the discussion on “Accommodation of bicycles:” the Plan states, “The planning and design of bicycle facilities whether they are improvements to existing highways, provision included in new highways, or separate exclusive routes for bicycles need to accommodate a broad range of bicyclists.”

Two Recommendations for Future (bicycle) Improvements include:

4. ... Costs of long-term maintenance and overall safety of all path users should be

considered during the review process of any proposed path, as well as community benefits.

6. Any new bike path should be planned with consideration for additional width, signing, and striping in order to facilitate sharing the facility with pedestrians, joggers and horseback riders.

Zoning – The Town of Barre Zoning Bylaw does not appear to consider, either positively or negatively, multi use paths. They are not included in the definition section under any of the potential land use types. They do not appear to be discussed or mentioned anywhere in the text.

2. CITY OF BARRE DOCUMENTS

Municipal Plan – The City of Barre 2005 Municipal Plan does not mention multi use paths in the discussion of recreational infrastructure. The Plan does discuss bicycle and pedestrian mobility in the transportation section. The pedestrian discussion focuses solely on the development and maintenance of sidewalks. In the discussion of the Central Vermont Regional Path, the Plan states, “The (Central Vermont) bike way is considered a desirable project that will serve not only the city, but also the complete region.” The Plan also states that the latest statistics used to develop the Plan show that 6.5% of the City’s workers walk or bicycle to work. There are no bicycle related elements that are part of the proposed transportation strategies.

Zoning – The City of Barre Zoning Regulations define a recreation path and includes them as conditional uses in all zoning districts except the Conservation Area District, in which it is a permitted use. There does not seem to be other considerations of recreation paths in the Zoning Regulations.

3. STATE PLANS

The 2008 VTrans Pedestrian and Bicycle Policy Plan includes goals and objectives that directly support the completion of this path, including:

Goals:

- Cultural Environment: Enhance the human scale and livability of Vermont’s communities by improving opportunities for pedestrian and bicycle mobility and access in and between towns, downtowns, villages and rural landscapes.
- Health: Improve the health of Vermonters and reduce health care costs by making it easier, safer and more convenient for citizens to be more physically active by walking and bicycling on a regular basis.

- Transportation Choice: Enhance pedestrian and bicycle transportation options in Vermont so that citizens, regardless of location, socioeconomic status, or health can choose a seamless, convenient and comfortable mode that meets their needs. Promote a transportation network, including roadways, shared use paths, rail trails, rails with trails, and accessible pedestrian facilities, which allow pedestrians and bicyclists to reach their destinations throughout the State or to connect to other modes of travel.

Objectives:

- Objective 8: Work with citizens, municipalities, regional planning organizations, and other State agencies to develop, plan, and implement pedestrian and bicycle plans, projects, and programs.
- Objective 12: Provide a seamless transportation network for pedestrians and bicyclists by improving linkages between walking, bicycling and other modes of transportation.

4. SPECIAL REPORTS

Conceptual Alignment Analysis CVRP Barre City, 1996 – The Conceptual Alignment Analysis for the Barre City Segment of the Central Vermont Regional Transportation Path recommended an alignment for the path that primarily followed the State of Vermont railroad right-of-way (leased by Washington County Railroad). The report showed alternate layouts for short segments of the path, but provided little discussion of the benefits or drawbacks of either the primary route or the alternatives. **Figure 4** shows the previously recommended alignment and alternatives for the Barre City Segment within the study area of this update. The path was planned to be approximately 13 feet away from the center of the railroad tracks within the railroad right-of way.

The report indicates that several stream alteration permits, including both bridges and embankment work, would be needed to implement the proposed alignment. It also reported that there were several hazardous waste sites near the recommended alignment and recommended a Phase One Environmental Site Assessment be prepared for those properties that were in the immediate vicinity of any path that might be developed.

Conceptual Alignment Analysis CVRP Barre Town, 1996 – The Conceptual Alignment Analysis for the Barre Town Segment of the Central Vermont Regional Transportation Path recommended an alignment for the path that primarily followed the State of Vermont railroad right-of-way (leased by Washington County Railroad) in the study area. The report did not discuss alternate alignments for the path. **Figure 4** shows the previously recommended alignment and alternatives for the Barre Town Segment within the study area of this update. The path was planned to be approximately 13 feet away from the center of the railroad tracks within the railroad right-of way.

The analysis did not identify any significant issues with the development of the proposed railroad alignment within the study area.

Merchants Row Master Plan, 2010 – The recent plan for Merchants Row includes a recommendation to add a shared use path along the northeast side of the railroad tracks between the tracks and the parking area. **Figure 4** shows the location of the recommended shared use path.

G. PREVIOUS COMMITTEE WORK

Since September 2009, Barre Town and Barre City Path Committees have been jointly examining options for linking the existing Millstone Hill West multi use path in Barre Town with Depot Square and/or the existing City/Town multi use path. They have examined several alternative route alignments and are currently focusing on a cross country alignment linking the area around the Barre City Elementary and Middle School with the area close to the Barre Town Elementary and Middle School. **Figure 4** shows the location of this alignment.

Appendix E provides a short history of the work of the Barre Town Paths Committee since 1992.

IV. POTENTIAL ALIGNMENTS

A. INITIAL LIST OF POSSIBLE ALIGNMENTS

The BRPD Team compiled an overall list of as many potential alternative alignments for a bicycle and pedestrian facility linking the Town and the City as they could identify. **Figure 9** shows the location of the numerous different alignment potentials that were initially considered. This list and accompanying map served as the starting point for the development of a more refined list of viable alternative alignments.

The potential alignments shown on **Figure 9** include numerous individual segments that the BRPD Team considered for their suitability for combining with additional segments to create possible alignments connecting the northern end of the Millstone Hill West path near the Barre Elementary and Middle Schools to the southern end of the proposed path on Merchants Row in downtown Barre City. **Appendix F** includes more information on these various potential alignments.

The BRPD Team's first review of the complete list of possible alternative alignment segments revealed significant, potentially insurmountable problems with many of them. These segments were eliminated in the first round of review. **Appendix F** includes more information on the basis for these initial eliminations. Some of the more notable problems encountered included:

- The difficulty of using the new Prospect Street bridge, due to the dangerous location of any bicycle or pedestrian crossings on Prospect Street on the east side of the bridge and the difficulty involved in reconfiguring the bridge to have a shared use path on the south side;
- The extreme steep slopes on the east side of the existing Barre City/Barre Town Multi Use Path at its northern end;

- The need to go quite far south and the need to cross Middle Road twice to avoid the rear of the properties along Silver Circle or Platinum Plain;
- The narrowness and limited expansion potentials for Wilson Street close to Route 14;
- The difficulties and safety issues associated with the placement of either bicycle lanes on or a shared use path along the north side of Route 14;
- The inability to link with Henry Street other than through the front yard of one of the residences on the street; and
- The continued opposition on the part of the railroad to the sharing of the railroad right-of-way for a multi use path.

B. REFINED ALTERNATIVE REVIEW

1. OVERVIEW

During the second phase of the review, the BRPD Team reviewed and reorganized the remaining potential alternatives into three segments with at least two potential alignments for each segment, as well as several alternative considerations for portions of the segments or other linkages. There was one additional alignment that covered both segments A and B. **Figure 10** shows the location of these alignments. With the exception of the alignment covering both segments A and B, the alignments were planned so that any alignment from one section would work with any of the alignments from the adjoining section, maximizing the potential viable combinations of alignments.

Table 1 presents an initial comparative review of the eight viable alignments as well as the six alternative sections. For segments A and B, there are two alternate alignments proposed as well as one alternative that combines both sections; for segment C there are three alignments being considered. Additionally, there are six alternatives that provide alterations for portions of the alignment options.

2. ALTERNATIVES

Alignment A-1 is an off-road alignment. Starting from the south end and proceeding generally north, the path leaves the existing Millstone Hill West Path close to the short path to the restrooms and passes along the southern end of the Town recreation fields and cemetery properties, skirts to the north and east of the existing wetland, crosses Graniteville Road, and continues west to the GMP transmission lines. The path follows the transmission line north to a residential development which it passes by to the south and west. This alignment segment ends as it wraps around the contours to meet Sterling Hill Road where it passes under the transmission lines.

Alignment A-2 is a mix of on and off-road facilities. It begins on the Barre Town Elementary and Middle School campus as a multi use path across the school property to Websterville Road. After crossing the road, the path continues north as a shared use path on the west side of Pitman Road. West of the railroad right-of-way, the path turns to follow the existing sewer easement towards Quarry Hill Road, where the path follows the east and north sides of the roadway up to the railroad

crossing. The path crosses Quarry Hill Road adjacent to the railroad and then converts to on-road facilities with adjacent sidewalk on Cherrywood Drive. The sidewalk and bicycle routes cross Sterling Hill Road and continue on Silver Circle. Approximately 400 feet south of the crossing, the alignment converts back to a shared use path that heads down across slope close to the transmission line to reach Sterling Hill Road.

Alignment B-1 begins at Sterling Hill Road, where it heads south and west from the roadway and, through several switchbacks, moves, downhill to the small park behind the Hannaford store. The path crosses private property north of Wilson Road and uses an existing commercial driveway to intersect again with the lower portion of Sterling Hill Road. Here the path changes to on-road bicycle shoulders and adjacent sidewalk on the northeast side. It crosses Main Street via dual crosswalks and continues northwest on Bridge Street as bicycle lanes and new sidewalk to the intersection with the existing path.

Alignment B-2 also starts at Sterling Hill Road and proceeds north through the woods following old logging roads until it reaches Pouliot Avenue. At this point, the path changes to a sidewalk on one side of the road and wide shoulders on the roadways. The sidewalk is on the southwest side of the street. The path turns to the northwest on East Parkside Terrace, with the sidewalk on the northeast side of the street. The path continues as on-road bicycle lanes or wide shoulders with a sidewalk up Parkside Terrace to the intersection with the existing City/Town path and on to the entrance to the school.

Alignment A-B is a mix of on and off-road facilities. It starts at the northern end of the existing Millstone Hill West path and continues west along the south end of the school parking lot. The path then turns to the north along the west side of the parking lot and crosses the parking lot access drive via a crosswalk at its southern end just before it meets the parking lot. From here the path heads north on the east side of the parking lot access drive to Websterville Road. At Websterville Road, the multi use path ends. The route continues as on-road bicycle lanes and a sidewalk on the south side of Websterville Road. The sidewalk will follow the alignment recommended in the Barre Town Sidewalk study, prepared by Lamoureux & Dickinson (L&D), dated November 2009, with the exception that Websterville Road itself will be wider than shown on the cross sections in the L&D study to accommodate the bicycle lanes. The recommended cross section would be two 10-foot travel lanes with five-foot wide bicycle lanes on the outside of both travel lanes. This will place the sidewalk closer to the edge of the Websterville Road right-of-way than identified in the L&D report. A crosswalk at the end of the school parking lot access drive carries bicyclists heading west to the north side of Websterville Road. Pedestrians and bicyclists heading east cross Graniteville Road via a crosswalk on the south side of the intersection; bicyclists heading west will cross Graniteville Road via a signed bicycle crossing. The sidewalk will continue west on the south side of Sterling Hill Road to a point on the south side of the road just to the west of the access drive to the Commercial facility. Bicyclists will be accommodated on Sterling Hill Road by wide paved shoulders on both sides of the pavement to at least the west side of the commercial building access drive. A bicycle crossing at this point will bring bicyclists generally heading south on the path to the south side of Sterling Hill Road. The path turns south away from the roadway at or close to the location of the VAST trail, which is just to the west of the commercial building access drive. It soon turns west to

southwest again and generally follows the northern property line of the two parcels it crosses until it intersects the Green Mountain Power (GMP) transmission line. After crossing the GMP right-of-way, the path turns west and skirts the rear of the lots on the south side of Silver Circle. The path turns north on the west side of the lots on the west side of Platinum Plain and begins to descend the steep hillside. The path continues generally north while descending the hillside at approximately a five percent slope. There may be the need to have short sections of trail at more than a five percent grade to complete the descent by the time the path returns to Sterling Hill Road at a lower elevation. When the path meets Sterling Hill Road, it again converts to a sidewalk on the south side of the street in conjunction with paved shoulders on the roadway itself. The sidewalk and wider paved shoulders continue west to the intersection with South Main Street. At the intersection, pedestrians and bicyclists will cross South Main Street via the new pedestrian signals and crosswalks to be added with the new traffic signals already planned for the intersection. West of the South Main Street intersection, the sidewalk continues west on the north side of Bridge Street to the intersection with the south end of the existing Town/City path. Four-foot wide paved shoulders on both sides of the roadway will be provided for bicyclists. A bicycle crossing on Bridge Street brings south/east bound bicyclists to the south side of Bridge Street.

Alignment C-1 starts at the northern end of the existing City/Town shared use path and heads north as bicycle lanes and an east side sidewalk along the Fairview Street. A bike crossing on Fairview at the end of the existing path brings bicyclists heading south on Fairview Street on the west side of the street to the end of the existing multi use path which is on the east side of the street. At the northern end of Fairview Street, a bike crossing on Brooklyn Street also brings southbound bicyclists from Prospect Street to Fairview Street. The bicycle lanes continue up and down Prospect Street between Fairview Street and the eastern end of the bridge over Stevens Branch. A crosswalk on the east side of the bridge brings pedestrians and northbound bicyclists to the north side of Prospect Street, where a very short shared use path along the north side of Prospect Street crosses the railroad tracks to join the proposed shared use path on the east side of the railroad in Merchants Row.

Alignment C-2 breaks from the existing City/Town shared use path approximately 700 feet south of Fairview Street and heads downhill to intersect with Branch Street before it turns east and descends to Brooklyn Street. The path continues north on Branch Street as a bicycle route and adjacent sidewalk. Crosswalks on Brooklyn Street bring the path to the west side of the Prospect Street bridge over Stevens Branch. From there the path would follow the route of Alignment C-1 to reach Merchants Row.

Alignment C-3 starts at the southern entrance to Rotary Park as a multi use path through the park to Mill Street. At this point, the path heads up the right-of-way for Blodgett Avenue before it heads north again paralleling Mill Street on the west side. The path heads north across country to Brooklyn Street, but avoids the steep hill at the southern end of Brooklyn Street by heading east closer to the banks of Stevens Branch. It follows the western bank to the north to rejoin Brooklyn Street at its low point south of the last structures on the east side of the street. The path changes to on-road wide shoulders and adjacent sidewalk with a bicycle crossing bringing southbound bicyclists on the west side of Brooklyn Street to the path. At the intersection with Prospect Street, the

sidewalk and wide shoulders join to cross a new bridge to the south of the existing Prospect Street bridge. A bicycle crossing brings southbound bicyclists from the bridge to the west side wide shoulder on Brooklyn Street. On the east side of the bridge, the path crosses Prospect Street, turns to the east and crosses the railroad tracks on the north side and adjacent to Prospect Street.

Alternative 1 breaks from the existing City/Town shared use path approximately 800 feet south of Fairview Street and angles downhill to the north to join with Brooklyn Street. From this point, the path would follow the alignment of Alternative 1 north to Merchants Row.

Alternative 2 provides a route for a potential spur to the high school. It starts where Alignment C-3 departs from Mill Street and continues northeast on Mill Street as a bicycle route with accompanying sidewalk on the east side to the intersection with South Main Street. A crosswalk at the end of Mill Street brings pedestrians and northbound bicyclists to a shared use path along the west side of Main Street. The path stays on the west side of Main Street north to the intersection with Ayers Street, crossing Jail Branch via a new pedestrian and bicycle prefabricated or recycled historic bridge. At this point the path converts to bicycle lanes and sidewalks on Ayers Street, heading east to the front of the high school or to Crimson Tide Way which it could follow into the high school campus.

Alternative 3 provides another potential spur to the high school. It heads from Alignment C-3 and crosses Stevens Branch via a new bicycle/pedestrian prefabricated or recycled historic bridge. On the east side of the river, the path follows the northern edge of the transmission station property east to Main Street. From this location the path would follow the alignment of Alternative 2 to the high school.

Alternative 4 converts the existing grass path that starts at the eastern end of the Blodgett Avenue right-of-way and heads north and uphill to join with the existing City/Town path.

Alternative 5 provides a sidewalk and adjacent bicycle lanes on Websterville Road and Sterling Hill Road between the Barre Town Elementary and Middle School campus to the intersection of Sterling Hill Road and Cherrywood Drive. The sidewalk alignment would be as recommended in the Barre Town Sidewalk study, prepared by Lamoureux & Dickinson, dated November 2009.

Alternative 6 provides an alternative to using bicycle lanes on Bridge Street to reach the southern end of the City/Town path. At the intersection of Bridge Street and Main Street, Alignment B1 would convert to a multi use path heading east on the north side of Bridge Street. The path would cross Stevens Branch either via a new pedestrian bridge or a path incorporated into the new roadway bridge currently in the design process.

V. FACTORS INFLUENCING THE SELECTION OF THE PREFERRED ALIGNMENT

A. OVERVIEW

None of the eight Alignments would be easy to construct. Nor would any of them provide an easy bicycle ride; each has at least one section with an extended uphill/downhill ride, although the grade and length of the inclines vary. Pedestrians would find any combination of segments generally acceptable, with the acknowledgement that each contains an uphill climb that complies with ADA requirements.

The additional six Alternatives have been included in the discussion because they each provide a means of at least partially addressing some of the more troublesome or expensive sections of the main alignment segments. **Table 1** provides a comparison of the alignments for each section and the six alternatives. The information in **Table 1** contributed to the overall evaluation of each that led to the recommendation of the preferred alignment. The following sections provide a bit more information on the factors affecting the decision.

B. SECTIONS A & B

Alignment A-1 is an off-road shared use path while Alignments A-2, B-1, B-2, and AB each are a mix of on-road facilities and off-road shared use path. Alignments A-1 and B-2 would create attractive off-road alignments that would provide interesting walking and riding facilities.

Alignment A-1 would contain a new non-intersection, un-signalized crossing of Graniteville Road and would require some impacts to the wetland on the east side of the road close to the crossing.

Alignment A-2 has several more negative aspects, including:

- The routing through the industrial park and the resulting interaction with trucks,
- The potential plans by the Town to use the sewer easement as a future road for trucks,
- The need to cross Quarry Hill Road, and
- The difficulty of finding an acceptable alignment for the portion of this section between the eastern end of Cherrywood Drive and the start of Section B on Sterling Hill Road.

Alignment B-1 would need to include numerous switchbacks on the hill east of the small Town Park behind Hannaford Supermarket. These switchbacks could involve an extensive amount of grading in order to construct a path that both meets ADA requirements and provides a facility that could be readily used by all types of users. There is the very real potential that bicyclists would find it easier or even necessary to walk their bicycles up the switchbacks rather than ride them, and bicyclists coming down hill would need to carefully control their vehicles to keep them from going out of control.

Alignment B-1 also could necessitate the relocation or deeper placement of the existing waterline that runs east from the pump station behind Hannaford.

Alignments A-1, B-1, B-2 and A-B would require easements to cross privately owned parcels. Alignment B-1 would severely limit the future development potential of at least one parcel; Alignments A-1, B-2, and A-B would, if properly located, only slightly limit the layout options for future development on the private parcels. To make Alignments A-1, B-2, and A-B work, the granting of easements by all private parcel owners would be needed.

Alignments B-1 and AB would use a planned signal with a pedestrian phase, but the signal, which does not now exist, would need to be modified to include a crosswalk and pedestrian signal on the North Main Street southbound approach to the intersection. Alignment B-2 would include the crossing of Route 14 at an existing signalized intersection, where motorists are already accustomed to seeing bicyclists and pedestrians crossing the street at the crosswalks, using the pedestrian signals.

The number of attractions that would be accessed by Alignments B-1 and AB is greater than for alignments A-1, A-2, and B-2.

The ability to use at least half of the existing City/Town Path, a shorter overall length of multi use path, and the lower costs associated with the alignment were the deciding factors in the recommendation of AB as the preferred alignment for these sections.

C. SECTION C

Alignment C-1 is the least expensive of the three alternative alignments for Section C, but its existing grade and curves on Prospect Street make it unsuitable for all but the most experienced bicyclists. Alignment C-2 will require the removal of existing on-street parking spaces that serve the residents that live on Branch Street. Branch Street itself is also relatively narrow, even when the on-street parking is removed, making the roadway unsuitable as a shared roadway. Widening of the roadway would also be difficult. Alignment C-3 will require creating a shared use path across several steep slope areas. It also needs a small bridge to cross an unnamed stream in a gully. These limitations are more easily overcome, however, than those associated with Alignments C-1 or C-2, making it the preferred, although still challenging, alignment for Section C.

D. ALTERNATIVES 2 & 3

Both alternative access routes to the high school require a new pedestrian/bicycle bridge. Alternative 2 also necessitates a shared use path along the side of Route 14 that crosses at least 2 commercial access drives. It also places bicyclists on a narrow road that needs to be shared with motorists. Lastly, Alternative 2 adds much more length to the distance those traveling to the high school need to cover when coming from the north. Alternative 3 is a much shorter and more direct route for users coming from both the north and the south. The bridge for Alternative 3, however, will need to be longer and larger than the one required for Alternative 2.

The directness of the route to the high school and the lack of crossings of commercial driveways make the alignment of Alternative 3 more desirable than that of Alternative 2.

VI. POTENTIAL IMPACTS OF THE PREFERRED ALTERNATIVE

A. TRANSPORTATION FACILITIES

The main portion of the preferred alignment crosses VT Route 14 at the soon-to-be signalized intersection with Sterling Hill Road and Bridge Street, using the crosswalks and pedestrian signals to be included in the project as well as one additional crosswalk and signal that will need to be added. The spur to the high school would also cross VT Route 14 at the existing signalized intersection with Ayers Road with crosswalks and pedestrian signals. No significant impacts are expected to the operations of these intersections with the development of the proposed shared use path. **Figure 11** shows the location of these potential impacts.

The preferred alignment will add a new crosswalk on Prospect Street to the east of the new bridge over Stevens Branch. The path should not change other aspects of Prospect Street. The new crosswalk, close to the existing railroad crossing, should not impact traffic operations on Prospect Street.

The preferred alignment will create a new sidewalk along the south side of Websterville Road, the south side of upper Sterling Hill Road, the south and north sides of lower Sterling Hill Road, the north side of Bridge Street, and the east side of Brooklyn Street where there is no sidewalk now. There appears to be room for these sidewalks within the right-of-way with minimal impacts to the adjacent houses, trees, and shrubs except as noted below.

The proposed sidewalk on Websterville Road, as proposed in the Sidewalk Study, would lie at the same elevation, separated by a curb, as the roadway. The cross section would consist of two eleven-foot lanes, two feet of paved shoulder on each side and a five-foot wide sidewalk on the south side. The outside edge of the sidewalk would be 18 feet away from the centerline of the Websterville Road. This leaves a little more than six feet to the edge of the right-of-way and the property line of St. Sylvester's Cemetery in which to construct a retaining wall as needed to facilitate the sidewalk construction. The proposed addition of at least four-foot wide paved shoulders on each side of the roadway would reduce the area available for a retaining wall to approximately four feet. If this is found to be too small a distance, it would be possible to shift the road slightly north within the right-of-way so that the entire width of paved area, including the sidewalk, is more centered within the right-of-way, which would place the centerline of the road itself slightly to the north of the centerline of the right-of-way. This shift could be accommodated easily on the east by adding most of the recommended four-foot widening on the north side of the road. On the south side, the shift could also easily be reconciled with the wider roadway cross section at the intersection with Graniteville Road.

The preferred alignment includes recommendations to extend the wide paved shoulders and sidewalk that will be constructed as part of the bridge reconstruction project on Bridge Street east to the intersection with VT Route 14. This would require the widening of Bridge Street by approximately two feet on either side, or four feet on the south side of the roadway. The Town currently has a pending application for an enhancement grant with VTrans to construct a sidewalk on the north side of Bridge Street that does not include a consideration of the widening of Bridge Street to more readily accommodate bicyclists. The addition of paved shoulders at least three feet wide will need to be considered if the Town receives the enhancement grant and moves forward with the sidewalk plans.

The preferred alignment also includes the recommendation to add an additional pedestrian signal and crosswalk on the southbound approach of VT Route 14, South Main Street, to the intersection with Bridge Street and Sterling Hill Road. The addition of a three foot paved shoulder and a second crosswalk on Route 14 will need to be incorporated into the plans being developed for the placement of a traffic signal at the Route 14/Bridge Street/Sterling Hill Road intersection. Additionally, the preferred alignment includes restriping the existing paved shoulders on VT Route 14 south of the intersection to at least the existing park and ride coupled with increasing the maintenance of the shoulder area to keep it in good condition for bicyclists.

The preferred alignment will also create a bicycle route on the lower section of Sterling Hill Road and on portions of Brooklyn Street, with the roadway shared between vehicles and bicycles.

The preferred alignment should have no impacts on other transportation facilities in the study area, including Mill Street, the railroad, or the existing multi use paths, other than to increase the use of the paths.

B. UTILITIES

The preferred alignment will run in or cross over the Green Mountain Power transmission line easements.

One guy pole and one utility pole on Websterville Road and one additional guy pole on the upper portion of Sterling Hill Road will need to be relocated to make room for the new sidewalk on the south side of the street. Five utility poles will need to be relocated on the lower portion of Sterling Hill Road east of Henry Street also to make room for the new sidewalk. One additional utility pole on the north side of the Bridge Street trailer park road may need to be moved to make room for the new sidewalk, if the pole is not relocated as part of the bridge replacement project. Four utility poles on the south side of Bridge Street will need to be moved to allow the widening of the street. Several utility poles may also need to be relocated on Brooklyn Street to allow the addition of the sidewalk on the east side of the road. **Figure 11** shows the location of these potential impacts.

There should be no impacts to existing sewer lines.

The portion of the trail that descends the hillside west of Platinum Plain will be constructed over a water line. The grading for the trail will need to be carefully planned to not impact the water line. If the grade of the path as it crosses the water line does not allow maintaining at least 5 to 6 feet of earth over the water line, a portion of the line may need to be reinstalled at a lower elevation to make sure that it remains frost free year round.

C. NATURAL RESOURCES

1. WATERCOURSES

The preferred alignment will require a new pedestrian/bicycle bridge across the Stevens Branch directly to the south of the existing Prospect Street bridge, as well as new bridge across the unnamed stream joining the Stevens Branch from the west across from Jail Branch. The installation of the preferred alignment will also necessitate the extension of the existing culvert under Sterling Hill Road at its eastern end close to Graniteville Road and the installation of a new culvert on the unnamed intermittent stream on the south side of lower Sterling Hill Road where the path meets the road. The link to the high school will also require a new pedestrian and bicyclist bridge across the Stevens Branch just to the north of the confluence with Jail Branch. **Figure 11** shows the location of these potential impacts.

2. TOPOGRAPHY

The path will need to traverse steep slopes as it descends from the higher ground west of Platinum Plain to the lower portions of Sterling Hill Road. This descent will need to cross at least one section where the cross slope is steep. The path will also need to traverse steep slopes as the path descends from the higher ground near Rotary Park to the low area close to Stevens Branch approximately across from where Jail Branch joins the river. There are two sections in particular along this portion of the path directly to the south of the transmission line that have almost no areas with slopes less than at least 30 percent. These especially steep areas will require the creation of a level bench for the path by cutting and filling along the side of the slope. These two areas are locations where the path may be reduced to eight feet wide to minimize the amount of disturbance to the slope. **Figure 11** shows the location of these potential impacts. The preferred alignment will also need to descend to the crossing of Sterling Hill Road by gently descending towards the roadway along the side of the cut.

To the south of Silver Circle, there are also two small areas where the land slopes steeply for a short distance between two relatively level fields; the path will need short switchbacks to accommodate the grade change. These two areas can be seen on the preferred alignment.

3. WETLANDS

No significant impacts to wetlands are anticipated for any portion of the path. There is the potential that there could be small wetland areas along Stevens Branch along the northern portion of the

preferred alignment. It should be possible to align the path to avoid these wetlands but it may not be possible to avoid the 50-foot wide buffer areas around wetland also regulated by the State.

4. WATERBODIES

No impacts to waterbodies are anticipated.

5. FLOODPLAINS

The path will lie very close to the floodplain of Stevens Branch. The specific alignment will need to be analyzed to understand its exact relationship to the floodplain and the floodway. There appears to be room to place the path above the floodplain and below Brooklyn Street.

If the path is found to lie within the floodplain, it may be necessary to look at using a raised boardwalk where the path is in the floodplain. It may also be appropriate to use a long sloping bridge across the unnamed stream opposite Jail Branch in conjunction with fill material to take the path up to the end of Brooklyn Street. This could require short sections of the trail in this location to exceed a five percent grade. The path design would need to adhere to the special requirements within the ADA regulations that allow short areas to go up to eight percent grade. The Brooklyn Street right-of-way extends several hundred feet south of the physical end of the roadway and could potentially be used as this alternate alignment.

6. FLORA

There will be some removal of forests to develop the preferred alignment. The clearing will be most significant along the portions of the path that cross steep slopes, but these impacts could be minimized by using retaining walls on the upper and lower portions of the cut into the slope.

There could be a potential impact to a large silver maple tree along the north side of Bridge Street just east of the entrance to the mobile home park. The sidewalk, if not routed around the tree, would most likely require the tree's removal. This should be examined in more detail as this portion of the preferred alignment is examined in more detail.

7. FAUNA

No noticeable negative impacts to fauna are anticipated due to the development of the proposed.

8. ENDANGERED SPECIES

No impacts to endangered plant or animal species are anticipated as a result of the construction of this path.

D. CULTURAL RESOURCES

1. HISTORIC RESOURCES

There is the potential for adverse effect to the historic character of lower Sterling Hill Road due to the addition of sidewalks on the side of the streets. The sidewalks along Sterling Hill Road will be at least 30 feet away from the front of the houses east of Henry Street; they will be closer to the houses west of Henry Street. The sidewalk could lie approximately five feet away from at least two houses on Sterling Hill Road that are very close to the street.

There is the potential for adverse effect to the historic character of one residential structure along the north side of Bridge Street due to the addition of a sidewalk on the side of the street in conjunction with the two-foot widening of the roadway. The changes to the roadway could bring the sidewalk closer than five feet to the front of the residence. It may be possible to shift most of the road widening to the south side of Bridge Street to mitigate the adverse impact on this residence. It might also be possible to locate the sidewalk on the south side of Bridge Street, but this would require a crosswalk on Bridge Street at the end of the Barre City/Barre Town Multi Use Path west of the bridge. It would also not align with the proposed sidewalk on the north side of Sterling Hill Road on the east side of Route 14. The widening will also bring the edge of the road to within about ten feet of the entry to the upper floors of the building on the southwest corner of the Bridge Street/Route 14 intersection.

Because the proposed sidewalks are located on the east side of Brooklyn Street, there is little potential for adverse effect to the historic character of the house along Brooklyn Street.

Appendix C provides additional information on potential historic resource impacts.

2. ARCHEOLOGICAL RESOURCES

Two areas along the preferred alignment are sensitive for archeological resources. These areas have not been positively identified as having archeological resources, but rather there is a high likelihood that archeological resources could be located in these areas. The assessment is based on the use of a sensitivity model developed by the State based on the characteristics of the location of known archeological resources found over many years.

These areas should be field tested to determine if they do indeed contain archeological resources. If they do, there are well accepted multi use path construction methods that can be used in these areas to eliminate impacts to the resources, leaving them in place for future examination. It would also be possible to do further research and examination of the archeological resources if adequate funding sources can be found to support the work. Once the resources have been properly examined, there would be no restrictions on the construction process through these areas.

When this project moves forward, the testing should be completed as the first step, after which the decision can be made as to how the area needs to be treated prior to the construction of the path.

Appendix D provides additional information.

3. OPEN SPACE AND PUBLIC LANDS

The proposed path alignment uses some portions of public lands. This use is considered to be compatible with other uses of these public lands and no negative impacts or conflict of uses are anticipated.

4. AGRICULTURAL LAND

No impact to agricultural land or resources is anticipated as a result of the construction of this path.

5. LAND USE

There are no impacts or conflicts due to the proximity of the proposed path and industrial lands as a result of the proposed alignment.

The preferred alignment does cross several private parcels and easements will need to be secured on these parcels. In most cases, the path, as shown in the preferred alignment, will have minimal impacts on future potential development of the undeveloped parcels, and will not impact the existing uses of those parcels that are already developed. The two potential exceptions are the two parcels to the east of the residential parcels on Platinum Plain. Due to the need to begin reducing the elevation of the path, the alignment will bisect these parcels. This could potentially limit the development potential of these two parcels. Subsequent design work on the path should seek to minimize, as much as possible, the impacts to future development potential on these parcels, while still accommodating the drop in elevation without the use of switchbacks.

E. PLANNING DOCUMENTS

The proposed alignment appears to be in compliance and is supported by existing municipal and State plans and regulations.

VII. INITIAL ESTIMATES OF PROBABLE CONSTRUCTION COSTS

Table 2 presents the initial estimates of probable construction costs for the preferred alternative and the additional spurs and linkages. The cost for the preferred alternative is divided into the phases described in the next section. Appendix G contains information on several of the assumptions that went into the estimates.

One cost that has not been included in these estimates is the right-of-way acquisition costs. As noted in **Table 2**, there are at least 20 properties along the preferred alternative where easements will be needed.

VIII. IMPLEMENTATION

A. PHASING

The phasing plan for the preferred alignment attempts to provide a set of smaller path segments of approximately equal length that could be developed in whatever sequence becomes most appropriate as funding and community support dictate. The individual segments are also meant to be viable as free standing path segments that can provide a viable multi use path on their own until other adjacent segments are added.

Figure 12 shows the recommended phases of the path. In order to remove any implied prioritization from the phasing plan, the different phases are labeled by color or facility names. In addition to the six different phases of the primary route of the preferred alignment, there are four additional phases that include the various spurs and linkages that are part of the preferred alignment. As possible, look at ways to improve roadway linkages, even temporarily, between the various portions of the path as they are implemented to provide as comprehensive a system as can be maintained until the entire path is complete.

The purple phase is shown as including the link at its northern end to Silver Circle. If the adjacent blue phase is actually developed first, it would include the Silver Circle link, so that it had two accessible end points.

Table 3 provides a comparison of the different phases.

B. PERMITTING

The Town and/or the City will need to acquire several permits in order to construct the various phases of the preferred alignment. **Table 4** provides details on the specific permits that will most likely be needed for each phase. The assumption made in determining if permits are needed is that the path will be designed and permitted in phases. If multiple segments or the whole path is designed and permitted as one, there are several permit thresholds such as Act 250 and Stormwater Discharge that could be triggered which would not have been met for the individual phases.

C. FUNDING

The Town and City already have a good funding base for the construction of the preferred alignment due to the one million dollars bequeathed to them jointly by Mr. Charles Semprebon. As generous as this gift is, it is not enough to construct the complete path. The Town and City will need to find additional sources of funding. In order to maximize the potential sources so that State and federal funding could be a possibility, the BRPD Team recommends that the plans for the path be developed in compliance with the *Manual*.

Below is a list of various funding sources that could be used to help with the implementation of the plan, including:

- The federal Transportation Enhancement Grant Program administered by VTrans;
- The federal Land & Water Conservation Fund administered by the Vermont Department of Forests, Parks, and Recreation;
- The federal Recreational Trails Program, administered by the Vermont Department of Forests, Parks, and Recreation;
- Bikes Belong Grants;
- The National Scenic Byways Program grants;
- Potential health grants promoting healthy living;
- The Robert Wood Johnson Foundation;
- MCI/Worldcom Royalty Donation Program (For this and several subsequent ideas, see <http://www.americantrails.org/resources/funding/TipsFund.html>);
- Clif Bar Sponsorship;
- Trail sponsorships (and possibly naming rights); and
- RockShox's Grants.

Other potential sources exist. Some additional resources that may provide insight into additional funds include:

<http://www.americantrails.org/resources/funding/Funding.html>,
<http://rlch.org/>, and
<http://atfiles.org/files/pdf/bicentennialsourcebook.pdf>.

Appendix H contains a more detailed table on the various federal funding sources that could be used not only for the trail but for signage and other elements that would help to make a more interesting and community enhancing path.

D. CONSTRUCTION

The construction process for this path will vary considerably by phase. Some of the phases are focused solely on existing streets or right-of-ways. Others consist solely of the construction of a new multi use path across variable terrain, some of it quite steep. In these locations, the construction process will need to be carefully managed so as to minimize disturbances beyond the width of the path or its adjacent clear zone. Especially in these difficult locations, the path itself, most likely, will serve as the access to un-constructed segments further along the alignment. Erosion control will be critical for these portions of the path, as well as for those portions of the overall alignment that come close to wetlands or other areas where there is the potential that erosion from the construction site could harm downstream environments.

E. EASEMENT

The preferred alignment requires several easements or right-of-ways across private property. In most cases, the alignment of the path preserves the ability of the land to be used for other purposes. (The incorporation of the recommended modifications to the City and Town zoning regulations described in **G.1 Zoning** below will ensure that the properties would not be penalized for granting easements for the path.) As the municipalities work to secure rights to implement the preferred alignment, they should make the land owners aware of the tax and development benefits of donating rather than selling an easement or right-of-way for the path. If land owners are interested in cooperating, but would prefer to sell the easement or right-of-way, the municipalities need to be well informed of the Federal process of acquiring right-of-ways to make sure that they do not inadvertently violate some of the provisions.

F. MAINTENANCE

The level of maintenance the path will require varies depending on the surface material. Based on the use of asphalt on previous paths, the maintenance discussions here are based on the continued use of asphalt as the surface material for new paths.

G. OTHER RECOMMENDATIONS

1. ZONING

Since neither the City nor Town Zoning laws appear to significantly address multi use paths, several modifications to these laws should be considered by the municipalities. Both should consider exempting multi use paths from overall lot coverage when they are located in easements donated by the land owners. This will ensure that the donation of an easement to the community does not adversely affect the future land use potentials for the parcel. This exemption should not apply if a land owner sells or is otherwise financially compensated for the easement.

The Town should consider adding recreation or multi use paths as permitted or conditional uses in some, if not all, of its zoning districts.

2. FRIENDS OF THE PATH

The City and the Town should encourage the formation of a “Friends of the Path” organization. Such an organization could help raise additional private funds for the development and maintenance of the path. The organization could also assist or lead in the acquisition and resale of parcels over which easements are needed but difficult to maintain, if such a condition arises. The parcels could be purchased with funds raised by the group and then resold after adding the easement. This would allow the recirculation of all or at least part of the funds used to make the initial purchase.

The information that the BRPD team has received indicates that there may be one property associated with the Blue Phase whose owners have initially indicated that they are not interested in

granting an easement for the path, but they have expressed some interest in selling the property. This would be the sort of parcel that a Friends group could purchase and resell. The location of the path on the particular property would have little overall impact on the ongoing residential uses of the rest of the property.

