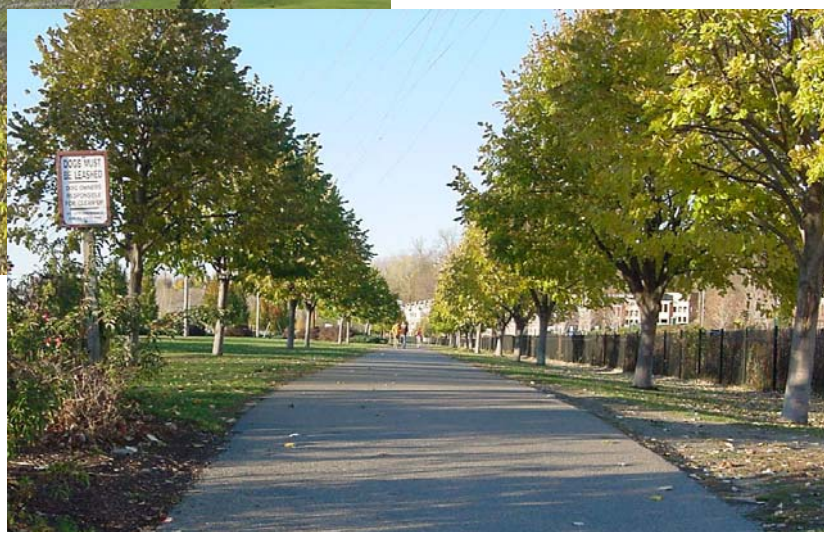

BURLINGTON BIKE PATH

IMPROVEMENT FEASIBILITY STUDY

2003

Prepared by:

I. PURPOSE AND NEED OF THE PROJECT

A. INTRODUCTION

The Waterfront Bike Path is a 7.5-mile transportation and recreation corridor that transects Burlington from its northern terminus at the Winooski River to its southern terminus at Oakledge Park along a former railroad bed. It traverses Burlington on the Lake Champlain shoreline, offering spectacular views of the lake and the Adirondack Mountains to the west. The bikepath links six major waterfront parks, as well as Burlington High School, services at the Ethan Allen Shopping Center, the Central Downtown Business District and UVM. The bikepath is also immediately adjacent to the Union Station Commuter Rail Station and the soon to be built Multi Modal Station. Finally, the bikepath is identified as a major corridor in Chittenden County as mentioned in the Burlington Alternative Transportation Path Master Plan and the Lake Champlain Bikeways program.

The Waterfront bikepath was built in 1985 and 1986. It is 15 years old and with an estimated 150,000 users annually, starting to show signs of deterioration. Because of the quantity and various types of uses, conflicts occur. These conflicts occur most during peak use times, which are early evenings on weekdays and afternoons on weekends. There are four major users: bicyclists, walkers, joggers and in-line skaters.

B. GOALS AND OBJECTIVES

The Waterfront bikepath is one of the first of its kind in Vermont. It draws many visitors to Burlington annually and is part of a larger bikepath network that draws many tourists to the region. Residents of Burlington and many surrounding towns use the Waterfront bikepath on a regular basis for transportation, recreation, and fitness. A significant investment has been made in the Waterfront path in the form of both capital costs and maintenance over the last 15 years. The city is committed to upgrading and rehabilitating the path to protect this important asset.

The overall goal of the project is to upgrade the bike path to current standards where possible and make the bike path safer and more user friendly. The path does not currently meet user demand and should be made wider, easier to navigate, and safer wherever possible. Generally the path is too narrow to accommodate bi-directional traffic, has inadequate shoulder space, poor sight distance and aging surface treatments. AASHTO's "Guide for the development of bicycle facilities" and Vermont's "Pedestrian and Bicycle Facility Planning Design Manual" recommend that shared use paths be 3m (10 ft) wide with minimum 2' shoulders on each side with additional lane width at areas of possible conflict such as sharp corners or bridges.

Additional impetus exists to renovate and redesign the bike path to accommodate the projected increase in use (i.e., the Winooski River Bridge connection to Colchester and other regional links being completed). Recent test programs have the following encouraging results: 1) The Double Ferry Weekend – Involving bike ferry service at both the Burlington to Colchester crossing and the Colchester to South Hero crossing, this one weekend pilot had 2,600 users; 2) Between late May 2001 and July 17, 2001 the Burlington – Colchester bike ferry had 4,160 boardings. These examples speak to the potential for a large increase in users if additional links are permanently constructed.

Finally, the city wishes to preserve existing green space along the corridor, enhance scenic pull-off areas, and provide safe and easy access from neighborhoods along the path.

This study will determine areas where the path is deficient in width, sight distance, turning radius, etc., and investigate whether or not these areas can be upgraded and how. The project report will list these areas and their proposed upgrades with conceptual designs and cost estimates.

C. EXISTING CONDITIONS AND PROPOSED IMPROVEMENTS

The character of the bike path contains distinct north and south sections (the centerpoint being Waterfront Park) each of which have some identifiable characteristics.

For the purposes of this report, the bike path was divided into a number of sections of similar cross section. The areas and their corresponding stationing are as follows:

1. Oakledge Park to Harrison Avenue	Station 0+00 to 15+20
2. Harrison Avenue to Blodgett Bldg.	Station 15+20 to 31+00
3. Blodgett Bldg. to Barge Canal Beach	Station 31+00 to 47+50
4. Barge Canal Beach to Treatment Plant	Station 47+50 to 70+00
5. Treatment Plant to Perkins Pier	Station 70+00 to 81+00
6. Perkins Pier to King Street	Station 81+00 to 85+00
7. King Street to College Street	Station 85+00 to 94+00
8. College Street to Lake Street	Station 94+00 to 111+75
9. Lake Street thru Urban Reserve	Station 111+75 to 145+00
10. Urban Reserve to North Beach	Station 145+00 to 169+00
11. North Beach to Little Eagle Bay	Station 169+00 to 208+00
12. Little Eagle Bay to Shore Road	Station 208+00 to 238+00
13. Shore Road to Staniford Road	Station 238+00 to 253+00
14. Staniford Road to Starr Farm Road	Station 253+00 to 277+00
15. Starr Farm Road to North Avenue Ext.	Station 277+00 to 330+00
16. North Ave Extension to Winooski River	Station 330+00 to 345+00

A map showing these sections is included in Appendix A.

Design Guidelines

The design guidelines discussed here explain many of the recommendations and repairs called for as a result of the existing conditions survey.

A. Signing and Striping

A uniform signing and striping program is recommended to maintain continuity along the length of the path. There are currently several different types of signs along this and other paths throughout the city. A uniform program would help aid local users and tourists alike. This report recommends a more comprehensive inventory of signs and striping throughout the city. Once this inventory is taken, a particular design should be chosen and implemented.

B. Resurfacing

In general, where existing asphalt patches mask an underlying problem with drainage or erosion, pavement rehabilitation is recommended. These areas are outlined in each section. Shoulders (12" to 18" wide) should be either installed or rehabilitated where appropriate (See Typical Cross Section in Appendix B – Design Guidelines). Any former sign or light pole bases within the limits of the path and shoulders should be removed and filled in.

The condition of the pavement has been evaluated on a section by section basis. Recommendations for surface treatment range from no treatment to full reconstruction. Wherever widening or pavement reconditioning is proposed, shoulders 12"-18" wide, consisting of sur-pac, shall be incorporated where feasible. Any areas to be widened should be repaved to ensure a consistent finish grade. The following table describes these treatments in more detail.

Table 1. Surface Treatment Definitions and Associated Costs

Surface Treatment	Method of Repair	Cost for Repair
No Treatment Recommended	No surface treatment at this time. Monitor sections annually for signs of deterioration.	$0
Pavement Overlay	Pave over existing asphalt surface	$1.50/ft^2
Grind and Pave	Grind surface to remove pavement surface, regrade path for proper drainage and pave with 4" asphalt.	$2.50/ft^2
Surface reconstruction	Excavate pavement and subbase. Replace with new subbase materials, grade for proper drainage and pave with 4" asphalt.	$4.00/ft^2
Shoulder Reconditioning	Remove grass/vegetation. Install sur-pac.	$1.00/ft^2

C. Fencing

Any fencing proposed for the purposes of physical separation between users and safety hazards should be a minimum of 42" high and present an effective barrier. There are several different types of physical separation between the path and adjacent safety hazards (roadways, railroad tracks, and steep slopes). It is important that any physical separation employed fit in with the surroundings and be aesthetically pleasing to users and neighbors alike. The three types of fencing are used along the path and are recommended for repair or installation when noted in the existing conditions survey. Recommendations for fence types are based on existing fencing along the path and include wooden split rail, steel or aluminum picket, and chain link where needed to keep vegetation from the railroad right-of-way from encumbering the path. See Appendix B for fence detail sheet.

D. Slope Stability

Eroded and unstable slopes should be stabilized with vegetation, rip rap or slope work wherever necessary. Slopes should not exceed 3:1. If they do, fencing is proposed. Specific issues are addressed individually in the existing conditions survey below.

E. Maintenance

Considerable maintenance is performed each year on this path. Unfortunately, the funding does not exist to budget for preventative maintenance such as paving, striping and other important items. The

following list includes some preventative measures that should be incorporated into annual maintenance schedules as budgeting allows.

Cutting back of aggressive vegetation should occur as often as needed during the warm weather months to maintain safe sight distance and maximize effective width of the path.

Annual pavement condition survey to determine which areas need overlay, grind and pave, or surface reconstruction treatments. This data could be kept in a pavement condition database and reviewed each budget year to allow for paving dollars to be reflected in each maintenance budget.

Annual striping to ensure safety at intersections, rail crossings, and sharp curves.

Annual cleaning of culverts which drain the path and run underneath it to allow for proper drainage and protect pavement.

Existing Conditions Survey and Recommendations

South Sections

1. Oakledge Park to Harrison Avenue (Station 0+00 to 15+20)

This is the southern most section of the path. Station 0+00 is located at the foot of Flynn Avenue. The path, however, continues south through Oakledge Park into South Burlington.

The path is eight feet wide through this section. There is room to expand to ten feet on either side. Informal shoulders exist here which are probably used by runners. The pavement conditions are generally good with a few utility patches in need of repair. Sight distance is good here with the exception of the northern entrance to the bike path bridge crossing Englesby Brook.

Figure 1: It is difficult to tell where path begins and driveway ends. Further delineate this difference to improve safety.

As the path exits the wooded area just north of the bridge, it begins to approach the Harrison Avenue intersection. Generally, the pavement in this area is in need of repair. The shoulders are nonexistent and improper drainage has caused erosion and carryover of the gravel from an adjacent property making the area dangerous for users. A private driveway runs

parallel and adjacent to the path. Figure 1 (above) shows this driveway is gravel and the interface between the two is indistinguishable.

At the intersection, heading north, there is insufficient signage to warn the users of the path that they are entering an on-road area with traffic. Conversely, traveling south on the path, there is not sufficient signage to direct users across the street at the proper place. In addition, there is a blind intersection for path users heading north conflicting with vehicles heading east exiting the Harbor Watch condos.

An outdated catch basin grate at the intersection presents a hazard to bicyclists and in-line skaters.

Proposed improvements to this section include the following:

> Better path delineation is needed through Oakledge Park. This can be accomplished through the use of signage directing path users through the park or with colored or textured pavement, or striping.
>
> Widening to ten feet, pavement overlay, repair to utility/culvert crossings on section south of bridge. Total distance is approximately 1100'. (Station 0+00 to 11+00).
>
> North of the bridge (Station 11+00 to 15+20), 420' of pavement is in need of more extensive repair/rehabilitation. There is room to expand to 10 feet and establish proper shoulders. When shoulders are established, curbing should be added from station 13+20 to 15+20 (200') to properly delineate between the bike path right-of-way and adjacent driveways.
>
> As path is rebuilt through this section, drainage should be directed to the catch basin at intersection of Harrison Avenue and the bike path. This catch basin should be upgraded and fitted with a bike friendly grate.
>
> Signage or pavement markings should be added from all approaches warning users of the change from dedicated path to share the road and vice versa and of eastbound traffic exiting the Harbor Watch Condominium Development.

2. Harrison Avenue to Blodgett Bldg. (Station 15+20 to 31+00)

This section consists of both on and off road sections. The on-road section runs from station 15+20 to station 22+50. This section is a five foot wide bicycle lane located on the North side of the street. Bi-directional traffic is not possible in this narrow lane. Users tend to ride up the middle of the road as it is not a busy street. However, this is an undesirable situation as it raises the number of possible conflict points. Signage and striping is

lacking in areas. Catch basins need replacement. The pavement is in good condition through this section.

Past station 22+50, the path returns to a dedicated path. It travels parallel to the railroad. Through this section, the path is eight feet wide. There is no shoulder here and no room to expand. The pavement is cracking in many places. The 90 degree turn at Station 22+50 presents a hazard to anyone who falls near the guardrail (Figure 2). Sight distance is sufficient through Station 31+00. Growth of vegetation through fence on east side reduces the effective width of the path in some places.

Figure 2: Guardrail where Path meets Harrison Avenue

Proposed improvements to this section include the following:

New striping and installation of bike friendly catch basin grates along Harrison Avenue.(Station 15+20 to 22+50. A new configuration of this street (perhaps by widening the street to the north) would allow for one wider lane or uni-directional lanes on each side of the street

North of station 22+50, pavement is in need of repair. Grind and pave from station 22+50 to 31+00. Cut back vegetation more aggressively to increase effective width of the path here, as there appears to be no room for expansion without taking of private land.

Remove guardrail at 22 + 50 and install proper fencing. Wooden split rail is employed just north of this point and should be used here as well.

3. Blodgett Bldg. to Barge Canal Beach (Station 31+00 to 47+50)
This section consists of the area north of the Blodgett building. Generally, the path is eight feet wide. Sight distance is limited at times due to overgrowth of vegetation on the fence separating the path from the railroad. This section begins at the bridge at Blodgett (Station 31+00 and ends just past Blodgett Beach (Station 47+50). The Blodgett section is eight feet wide with one shoulder on the west side. This shoulder is sunken in and in need of rehabilitation. The pavement is in generally good condition

however, an overlay will be needed soon. Of most concern in this section is the Blodgett "S-curve". Figures 3 and 4 (below) show this area from the north and south respectively.

Figures 3 and 4 (above): Blodgett Curve looking north and south

The path takes a dogleg turn just north of the Blodgett building. Sight distance is very poor. The radius of the turn is too tight making it virtually impossible to navigate while staying on the correct side of the path. In addition, an abandoned rail spur crosses the curve at the most critical point.

Proposed improvements to this section include the following:

Pavement overlay (1650').

Vegetation should be aggressively cut back on the Blodgett building section (Station 31+00 to 35+00). There is no room for expansion along the length of the Blodgett building.

At the location of the S-curve (Station 35+00), the radius should be increased. This may be accomplished by moving the railroad fence back to flatten the curve. We recommend that the Department of Parks and Recreation request, from the railroad, that the fence be moved closer to the rail and the railroad spur to the Blodgett Building be removed. Blodgett Ovens would have to agree to give up the use of the spur as well. In addition to the increase in width

around this curve, centerline striping and pavement markings warning should be added to warn users of the sharp curve. See Appendix C for a conceptual sketch of the proposed improvements.

North of the Blodgett building (Station 35+00 to 47+50), the path is eight feet wide with one shoulder on the west side. The shoulder is in need of rehabilitation. The path can be widened here and a new shoulder established. Some grading will be needed to build up the west shoulder and establish drainage through this section. Trimming of vegetation is important here for sight distance and maintenance of effective path width.

4. Barge Canal Beach to Wastewater Treatment Plant (Station 47+50 to 70+00)

The Barge Canal Beach area stretches from Station 47+50 to Station 58+00. This section ranges from eight to eleven feet wide with no shoulders. A safety rail is located on the western side of the path because the path is elevated on a sea wall for the length of the beach. By moving the safety rail to an outside mount on the seawall, 18-24 inches of pavement can be reclaimed for path width.
Figure 5 below shows the condition of this section of the path.

Figure 5: Path erosion near Barge Canal Beach

There appear to be erosion and other drainage related problems that are causing a number of sinkholes along this section. The pavement is uneven through this section. Surface construction is recommended. Sight distance is good here as this section is very straight and flat.

Figure 6: Poor visibility north of Barge Canal Bridge

At Station 58+00 there is a bridge over the mouth of Barge Canal. North of this bridge (Station 58+00 to 61+00) the bike path is eight feet wide with no shoulders. Sight distance is very poor as the path turns west. This problem is a combination of a fairly sharp corner and an overgrowth of vegetation. (see Figure 6). Resurfacing is needed through this area.

Beyond Station 61+00 the path opens up at Roundhouse Park. North of this small turnaround area the path remains eight feet wide, but with shoulders and room for expansion. The exception to this is from station 68+00 to 70+00. This area is eight feet wide with no shoulders and no room for expansion due to lighting on either side of the path. Pavement condition and sight distance are both good from Station 61+00 to Station 70+00 where this section terminates at the Main Wastewater Treatment Facility.

Proposed improvements to this section include:

The southern portion of this section (Station 47+50 to 58+00) should be rebuilt with new gravel subbase and asphalt. Drainage issues should be investigated prior to repair to alleviate similar problem in the future. This may require some shallow borings be taken along this section. A fabric liner should be installed before new subbase is put down to minimize the number of washouts. Install new safety railing on the outside of the seawall allowing for an additional 1.5' – 2' of width for path use.

Between Station 58+00 and 61+00, aggressive trimming of vegetation is recommended due to very poor sight distance. Provisions should be made here to improve access to the western side of the fence to make maintenance easier. This can be accomplished most easily by installing a gate along this section for access. There is no room for expansion from station 58+00 to 61+00. Pavement overlay through this section 300'.

Because new fencing will most likely be needed along the Barge Canal Beach area, this fence should continue through station 61+00.

North of station 61+00, there is room for widening to ten feet and addition of shoulders along 900' of path. This area is relatively flat and expansion should be straightforward. Widen, add shoulders, and add overlay (900').

5. Wastewater Treatment Plant to Perkins Pier (Station 70+00 to 81+00)

This section consists of three areas: 1) the area passing in front of the treatment facility (Station 70+00 to 75+00); 2) the area just south of the Perkins lot as the path turns east for a short distance (Station 75+00 to 78+00); and 3) the area parallel to Lavalley Lane and Perkins Pier (Station 78+00 to 81+00).

Figure 7: Erosion at riprap wall

In front of the Treatment Plant (Station 70+00 to 75+00), the path is eight feet wide with no shoulders. The west edge of the path is on the shoreline. Large riprap extends from the water level up to the path. There appears to be no room for expansion unless extensive work is done along the shoreline to extend the retaining wall, see photo above. The pavement condition is fair. Annual patching is required on the western edge of the path due to water damage, see figure 7 above. Sight distance is good here in this flat, straight section.

From station 75+00 to 78+00, the path turns east toward Lavalley Lane. The path in this area is eight feet wide with no shoulders. There is potential for widening in this area provided that some of the grassy area between the bike path and the Perkins lot can be used. Signing and striping are lacking around the turn and are needed due to its poor sight distance. Pavement condition is good in this area.

The 300' stretch of the path parallel to Lavalley Lane is ten feet wide with no shoulders. The pavement condition between stations 80+75 to 81+00 is very poor and the overall condition of the pavement is poor. A more defined boundary between the path and Lavalley Lane is needed. Sight distance is good here but more signage is needed near the Maple Street crossing.

Proposed improvements through this section include:

From station 70+00 to 75+00, expansion to 10 feet would be very costly due to the proximity of the path to the shoreline. Raising the

path through this section by a few inches may stop some of the annual inundation of water from the lake. Install concrete curb retaining wall to raise the path and prevent undermining of subbase during periods of high water. Reconstruct path with new subbase and surface treatment through this section (500').

North of station 75+00, there is room for expansion to the north of the path (75+00 to 78+00). Clearing or relocation of the trees separating the path and Perkins parking lot will be required to capture this area. This property is owned and operated by the City of Burlington. The small berm between the parking lot and the path will have to be removed and flattened to meet the grade of the path. Sight distance is difficult around the corners through this section. Signing should be added warning users of upcoming turns. Widen, add shoulders, and overlay (300').

From station 78+00 to 81+00, the path runs parallel to Lavalley Lane. The path is already 10 feet wide here and does not need widening. This portion of the path (300') should be rebuilt with new subbase and pavement. The path is located on the western edge of the access road to the Vermont Railway railyard. This land belongs to the railroad and because it is an access road which must accommodate travel by large tractor trailers, no large physical barriers such as bollards can be installed. However, in order to better define the separation between the road and the path, a curb should be installed This barrier is required where there is less than a five foot separation between the path and the road. In addition, the use of colored or textured pavement in this areas may provide better delineation of the path from the railyard access road.

Signing and/or striping are needed for both approaches to the Maple Street intersection warning users of vehicular traffic.

On Maple Street, pavement markings or signage east of the bike path shall be installed to warn motorists of the bike path crossing.

6. Perkins Pier to King Street (Station 81+00 to 85+00)

The path is eight feet wide with no shoulders. There is a large tree on the west side and a fence on the east side. The city should investigate whether or not the fence can be moved closer to the railroad tracks to make room for expansion of the path. At Station 82+50 there is a 90° bend that could be straightened or at least made wider so that the turn is easier to negotiate. Pavement condition is good here but an overlay will be needed within 5 years. Pavement markings are lacking at the intersection to alert westbound vehicular traffic of the path crossing.

Proposed improvements to this section include:

Overlay section 400'.

Based on the survey of the area, realignment could provide more manageable turns through this short section. A letter should be drafted to Vermont Railway on behalf of the Parks and Recreation Department requesting that the city be able to move the fence closer to the railroad tracks. If granted, this will allow expansion of path width and flattening out of the curve at station 82+50. There may be issues with the utility poles at the southern end of this section. The Department of Parks and Recreation should consult with Burlington Electric Department to determine the feasibility of moving any of these poles or pole supports. See Appendix B for a conceptual sketch of the proposed improvements.

The first five bollards on the north end of this section can be moved west to increase the shoulder width.

Signing and/or striping should be added on the bike path at both approaches to the King Street intersection. On King Street, pavement markings and/or signage shall be installed to warn motorists of the bike path crossing.

7. King Street to College Street (Station 85+00 to 94+00)

The path is eight feet wide through this section. This section is the only portion of the path on the east side of the railroad tracks. This section begins to enter the Waterfront area and is heavily used. The path lies between the railroad fence and the Wing building along the southern portion of this section. There appears to be room to expand the path to nine feet here. Beyond the Wing building, the path intersects the commuter rail station. This area has been striped and signed to alert path users to the commuter rail pedestrian crossing. There is little room for expansion here due to the constraints of the train station. A pavement overlay is needed in this area as the pavement condition is fair to poor with medium severity block cracking. Sight distance is good here but better markings may be needed with the expansion of the Basin Science Center and the growth of commuter rail ridership.

North of the train station, the path crosses College Street. At this point, the path crosses the railroad tracks once again. This is a very busy intersection between the vehicular traffic to the Basin Science Center and the Burlington Boathouse in addition to the traffic on the path and pedestrians coming down College Street to Waterfront Park. The crossing is currently striped. Better markings and perhaps textured, colored pavement on the approach to the crossing are needed coming from both directions.

Proposed improvements to this section include:

Ultimately, this section of the path should be relocated to the west side of the railroad to eliminate two rail crossings at King and College Streets and a crossing of the commuter rail platform. In order for this to occur, land owned by Lake Champlain Transportation will be needed for the realignment. The details of this easement have not yet been worked out. For this reason, that project is on hold. In the meantime, the city has added striping that directs users around the commuter rail platform. Colored pavement can be used here to designate path with one color and the commuter rail pedestrian walkway with another color.

The intersections at King and College Streets remain a safety hazard as both cross streets carry a large amount of tourist traffic that is unfamiliar with the bike path crossings. Better signage/striping is recommended at all approaches from both the bike path and the cross streets.

8. College Street to Lake Street (Station 95+00 to 112+00)

This area is known as Waterfront Park. It is the newest area of the path built in 1991. The path is ten feet wide through this corridor. Formal shoulders are not present here, however is it apparent that they are used informally through this section. There is room to expand the path to 12 feet or to install shoulders on both sides. The pavement condition and sight distance is good through this section.

Proposed improvements for this section include:

The path is in very good condition through this section. It may be widened to 12 feet if no impact is determined upon the adjacent double row of Linden trees. Sur-pac shoulders or turf could be added to give runners more room and separation from other path users. Better signage directing bicyclists to stay on the bike path as opposed to riding on the boardwalk is needed.

North Sections

9. Lake Street through Urban Reserve (Station 112+00 to 145+00)

This section is eight feet wide with no shoulders in some areas and narrow worn-down shoulders in others. Just north of the intersection with Lake Street, there are boulders on the east side of the path, separating the path and the gravel access road. These boulders can be removed to allow for path expansion, see figure 9 below. There is adequate width to widen to ten feet. Sight distance is good and pavement condition is poor throughout the

section. An overlay on the entire section is needed. There is ponding near station 121+50 (figure 8), which would be corrected by the resurfacing.

Figure 8: Path intersects with Sailing Center Drive - Ponding Evident

Figure 9: Boulders to shift east for path expansion

The base to a former signpost sits in the middle of the path at station 128+00. This should be removed and filled in. At four locations along this section, fire hydrants sit approximately two feet off the pavement edge. In order to widen the path to the west, these hydrants would have to be moved further away from the path.

At Station 135+00, the brush is overgrown. Clearing is needed here to provide continuous sight distance around the curve.

At station 137+00, shoulders reappear on either side and are in need of rehabilitation. As stated in the beginning of the Existing Conditions Survey, wherever paving is recommended, shoulders should be rehabilitated as well.

Proposed improvements to this section include:

The pavement condition is very poor. Grinding and paving is recommended from Station 112+00 to 145+00.

Widen to the east to 10 feet. This eliminates the need to move hydrants and eliminate utility/sign poles. The road is narrowed under this scenario, however, the road is more than wide enough to accommodate this work. Regrade, prior to paving, to improve drainage and pavement condition.

Clear vegetation more aggressively to improve sight distance around curve.

Maintain/re-install barrier between path and road using boulders, curb or bollards. This will prevent vehicles from damaging the edge of pavement.

Signage should be added to the bike path approach from the north as the path nears the Lake Street intersection. Informational signage informing users of amenities such as the Skate Park, waterfront park, boathouse, food, downtown, etc. These signs would be a part of the comprehensive sign program along the path.

10. Urban Reserve to North Beach (Station 145 to 169+00)

The path is eight feet wide through this section with some shoulders. Widening is possible in most areas on the east side only. The west side has steep slopes that would be very difficult to build up. Widening will not be feasible between stations 164+00 – 165+00 due to the steepness of the ravine through this section.

The pavement condition is poor and in need of an overlay. There are numerous culverts in need of cleaning out. Overland drainage areas show signs of erosion on slopes leading to path.

At North Beach, there is room to widen the path by filling on either sides of the path and filling slope areas just north of beach. There is a lack of signage here to tell users of the amenities at the beach and campground.

Proposed improvement to this section include:

Pavement overlay on entire section (2900').

From station 145+00 to 164+00, expansion to 10 feet is possible to the east. This may require extensive earthwork as the bank will be cut into and the resulting slope must be less than 3:1 to avoid future erosion.

There are some areas to the east where the slope has begun to erode due to footpaths that connect to the woods. In order to prevent further erosion, these slopes should be lined with stone and keyed in at the bottom with larger stone. Another option would be to install stairs on these footpaths. Doing either of these options may be undesirable to the city from a liability and ownership standpoint. If this is the case, these footpaths should be revegetated in an effort to cut back on traffic on these slopes.

All culverts should be cleaned out to prevent washout over the path. Line the swales leading to the culverts with riprap to prevent sediment and debris from building up in the culverts.

On the west side of the path, the split rail fence is in need of replacement. In addition, any areas where the slope is greater then

3:1, fencing should be added. During construction, the slope should be evaluated and stabilized, where needed.

11. North Beach to Little Eagle Bay (Station 169+00 to 208+00)

Section width is eight feet wide with one-foot wide shoulders. The drainage ditches on the west side of the path are wet even during the driest periods due to accumulation of debris and leaves in the ditch. Ponding was noted specifically under the diocese bridge along the walls on both sides at station 189+00. With the exception of the bridge over the beach access road at station 189+00, there appears to be room for expansion on the east side with proper side slope cut back. The shoulder on the west side near the footpath to the bluffs is in need of rehabilitation.

At Little Eagle Bay, from station 207+00 to 209+00, the eight (8) foot path must be maintained due to a legal settlement between the city and an abutting landowner. Signage and striping will be needed to alert users to the narrowing through this section.

Proposed improvements to this section include:

Install warning and promotional signing to alert path users of North Beach and its amenities. (See Figure 11 for photo.) Extend the fencing in each direction over the North Beach access culverts to protect the entire slope. (See Figure 10 for photo.)

Figure 10: Path over North Beach Culvert (left)

Figure 11: Intersection with North Beach Access Road (right)

Widen the path to ten feet from Station 169+00 to 207+00. Cut back and revegetate slope to gain path width. Overlay section 3100'.

Clean out the drainage swales adjacent to the diocese bridge and enhance with riprap.

12. Little Eagle Bay to Shore Road (Station 208+00 to 238+00)

This section is eight feet wide with room for expansion on either side. Sight distance is good throughout the section. Pavement condition is generally good with some cracking.

Proposed improvements to this section include:

Widen the path to ten feet starting at the northern boundary of Little Eagle Bay. Maintain this width through the entire section. Overlay section (3000').

Install warning and promotional signing to alert path users of Leddy Park and its amenities.

13. Shore Road to Staniford Road (Station 238+00 to 253+00)

This section is eight feet wide throughout with room for expansion. The path currently runs very close to some large trees and slopes on the western edge. There are some tight areas between trees on the east and manholes on the west. There are four manholes along this section. They are raised and pose a hazard as the path swerves around them.

Pavement condition is generally good with minor cracking. Sight distance is adequate at the Shore Road intersection. More signage and striping may be needed at the approaches to the intersection. Sight distance is poor at the Staniford Road intersection due to a raised water main. Raised crosswalks at both intersections alert motorists to the crossing. Signing and striping on the path could be added to warn users of the upcoming intersection.

Proposed improvements to this section include:

Lower the manholes to grade and install covers that are more visible and more bike/roller blade friendly.

Figure 12: Poor Sight Distance at Staniford Road Intersection

Eliminate the vegetation on top of the mound at the northwest corner (see figure 12) of Staniford Road. New pipe or insulating material which better protects the existing water main from harsh weather conditions may be available for use at this location. Install signs to alert users of poor sight distance.

Widen to ten feet and overlay section (1200'). Exceptions are various pinch points between the four sewer manholes on the west

of the path and large trees on the east of the path. To avoid the manholes, the path can be moved to the east a couple of feet through this section. If the path is not realigned, stripe the centerline of the path as it curves around the manholes.

14. Staniford Road to Starr Farm Road (Station 253+00 to 277+00)

This section is eight feet wide with room to widen to ten feet on either side. Sight distance is good and pavement condition is generally good. The intersection of Starr Farm Road and the path has adequate sight distance. Raised crosswalks on Starr Farm Road help to alert motorists to the path crossing. Signing and striping could be added to alert users of the path of the upcoming intersection.

Proposed improvements to this section include:

Widen the path to ten feet and overlay (2400') .

The northern portions of the path have the most road crossings. Possible ways to enhance safety at intersections is to: 1) Flare out the path as it approaches the road to allow users to stop, pull over and look for cars; 2) Aggressively clear and trim back the vegetation at all intersections for improved sight distance.

15. Starr Farm Road to North Ave. Ext. (Station 277+00 to 330+00)

This section is eight feet wide. There is room to widen to at least nine feet and possibly ten feet. Widening should occur to the east in this section to avoid the manhole on the west side of the path at North Gate Apartments and to avoid having to fence the slope on the west side of the path just north of North Gate Apartments. The shoulder on the west side is in good shape and should be maintained. The stairs coming from the North Shore condominiums may need to be redirected if the path is widened. The walkway and steps from North Shore condos are in bad condition. Widening north of the condominiums should occur on the east side.

Sight distance is good at intersections and throughout the section. Pavement is in generally good condition with some cracking.

Proposed improvements to this section include:

Widen to nine feet throughout (600'), and ten feet where possible.

Pave the connection between the North Gate path and the bike path.

Where vegetative barrier cannot be established, install fence on the west side of the path north of the North Gate "overlook."

Slope stabilization is needed north of the overlook. There is approximately 50' of the bank which has slid down toward the lake. Sheet piles may be used to hold the bank in place and allow for widening through this section. If piles are not used, the bank will have to be cut back or filled to achieve a 3:1 slope. This could result in a loss of usable land for the path. This area should be studied in more detail and a solution to the slope stability problem should be implemented as soon as possible to avoid further damage to the path. This may mean that slope stabilization will take place before the entire project begins.

16. North Avenue Extension to Winooski River (Station 330+00 to 345+00)

This section is approximately six and a half feet wide. It should be widened to eight feet. Steep slopes on either side will make widening slightly more difficult and costly. Fencing is missing along the steep slopes throughout section.

The intersection of the path with North Avenue Extension has a steep approach from both north and south. Users must come to a quick stop to avoid rolling down into the road. Figure 13 below does not do justice to the sudden elevation drop prior to the intersection.

Figure 13: Looking North at the North Ave. Extension Intersection

Proposed improvement to this section include:

Advanced warning of the steep grade change at North Avenue Extension should be posted on signs or painted on the path. The grade of the path should be cut back 150' on each side of North Avenue extension. Presently the path is very steep making sight and braking distance an issue.

Widen the path to eight feet keeping within right-of-way.

Where vegetative cannot be established, fence both sides of the path due to steep slopes.

II. CONCEPTUAL ALIGNMENT

A. PROJECT BOUNDARIES - The project lies within the limits of the City of Burlington. The bicycle path begins in the south end of the city at Oakledge Park. From there, the path travels north approximately 7.5 miles along the waterfront to the Winooski River. The path runs along the waterfront in areas and along an old railroad bed in other areas. The path passes through parks, by city beaches and through neighborhoods.

B. ID PROJECT ALIGNMENT - See Appendix A for a map of the Waterfront Bike Path and the existing cross sections.

C. RECOMMENDED RE-ALIGNMENT AREAS - There are three areas where re-alignment of the path is recommended. The first is at the Blodgett S-curve (Station 35+00). The second is between Maple and King Streets (Station 81+00 to 85+00) and the third is in the north end between Shore and Staniford Roads (Station 238+00 to 253+00). These areas are highlighted in the corridor map in Appendix and discussed in more detail in Section I. The Blodgett S-curve and Maple St. improvements are shown conceptually in Appendix C. In addition, a summary of all proposed improvements is shown in tabular form in Appendix C.

III. RIGHT OF WAY

A. ID LANDOWNERS AND THEIR INTEREST IN THE PROJECT

There are approximately 545 landowners along the bike path corridor. These landowners and their addresses are listed in Appendix D.

Historically abutting landowners have been supportive of the bike path. Many of them have access to the path from their property. They are interested in maintaining their access points as well as seeing that the path is maintained and remains free of trash, debris, brush overgrowth, and general disrepair.

Vermont Railway, which leases the railroad right-of-way from the State of Vermont, is concerned with any improvements that bring the bike path closer to the main rail line. For this reason, this report emphasizes close communication between the city and the railroad to identify and address those areas where expansion or realignment will require some changes to the easements.

Right-of-way acquisition from the Lake Champlain Transportation Company is anticipated for the proposed relocation of the path to the west side of the railroad tracks between King and College Streets. Because this design has not yet been finalized, exact square footage calculations have not yet been made.

IV. UTILITY IMPACTS

A. WHAT EXISTING UTILITIES ARE IN THE AREA

There are many existing utilities in the area of the bike path. In the waterfront area, there are both telephone and fiber optic lines owned by Verizon and AT&T respectively. Overhead utility lines can be found near the waterfront and at each street intersection. These lines are owned by: Burlington Electric; Green Mountain Power Corp.; Adelphia Cable; and Vermont Electric Company. There are no utilities located underneath the path with the exception of culverts that collect rain water on the east side of the path and convey the runoff under the path to its final discharge point. Those utilities (poles, fire hydrants) that are directly adjacent to the path and must be moved, can be relocated through coordination with the Department of Public Works and Burlington Electric Department. A municipal water line runs on the west side of the path north of Staniford Road.

B. HOW WILL THEY BE IMPACTED

Path widening may impact some utility poles and fire hydrants. They can be relocated easily with interdepartmental coordination. If the option to relocate the bike path to the west side of the railroad tracks between King and College Streets is pursued, two telephone and fiber optic manholes may need relocation.

The Staniford Road water line will be replaced with new material which will allow the cutting down of the high vegetation that is currently causing sight distance problems in this area.

V. NATURAL AND CULTURAL RESOURCES

A. NATURAL RESOURCES

See appendix E for GIS maps of the following natural resources in the corridor.

1. WETLANDS

There are some areas adjacent to the bike path that appear to have some wetland characteristics. Most notably on the eastern edge of the path at Leddy Park and further south near Little Eagle Bay. Any proposed improvements in these areas or any others would include a wetland evaluation. The GIS mapping shown in Appendix E represent wetlands recognized by the City's Municipal Development plan. There has been no wetland delineation performed for this corridor.

2. LAKES/PONDS/STREAMS/RIVERS

The path runs adjacent to Lake Champlain and terminates at the mouth of the Winooski River. It does not cross either body of water and it is not expected that any improvements to the path would result in any impact to the lake or river.

3. FLOODPLAINS

There are areas near the path that appear to be within the high water mark of Lake Champlain. See Appendix E for Floodplain delineation. This delineation represents the floodplain as determined by the 1:9600 Flood Insurance Rate Maps.

4. ENDANGERED SPECIES

Appendix E represents significant natural areas as defined by the City's Municipal Development plan. It also includes a letter from the State of Vermont's Nongame and Natural Heritage Program listing rare, threatened, and endangered plant species found in the vicinity of the project. The path will be surveyed by the Nongame and Natural Heritage program prior to any final engineering design or construction.

5. FLORA/FAUNA

Appendix E represents significant natural areas as defined by the City's Municipal Development plan. This map does not represent a delineation of endangered species for the city. See Appendix E for Vermont's list of rare, threatened, and endangered species found in the vicinity of the project.

6. STORMWATER

Culverts will be cleaned and rehabilitated as part of the project. Additional stormwater from the widening of the path will not impact existing culverts or cause deterioration of existing water quality. Best management practices regarding proper swale rehabilitation and maintenance will be employed along the north end of the path where sewer and stormwater are separated.

7. HAZARDOUS WASTE

There is no evidence that hazardous waste will be encountered in any improvements proposed to the bike path.

8. FOREST

There are no forested areas along this corridor.

B. CULTURAL RESOURCES

1. HISTORIC

A consultant was hired to conduct a historical resources evaluation on the bike path corridor. According to the consultant's report, there are no significant historical resources located within the proposed area of disturbance. See Appendix F for the complete Historical Resources Evaluation performed for this project.

2. ARCHEOLOGICAL

A consultant was hired to conduct an archaeological resources evaluation on the bike path corridor. According to the report, a review of historic maps for Chittenden County indicates that there are no existing significant historic resources within the project corridor. A field inspection of the corridor revealed sixteen areas sensitive for prehistoric archaeological sites. A phase I study is recommended prior to any construction to determine if the sites are indeed archaeologically sensitive. See Appendix F for the complete Archaeological Resources Assessment performed for this project.

3. ARCHITECTURAL

See Appendix F for the Archaeological Resources Assessment and the Historical Evaluation.

4. PUBLIC LANDS

The bike path passes through six city park areas; Oakledge Park, Perkins Pier, Waterfront Park, North Beach, Leddy Park, Starr Farm Park and is adjacent to the Winooski Valley Park District's park at Mayes' Landing at the mouth of the Winooski River. The bike path is an integral part of all of these parks and will remain so in the future. The path runs parallel to the railroad land owned by the State of Vermont. This land will not be negatively impacted by any proposed bike path improvements.

5. AGRICULTURAL LANDS

There is no agricultural land within the bike path corridor.

VI. PRELIMINARY COST ESTIMATE

The preliminary cost estimate for the proposed improvements is presented in two ways below. Table 3 summarizes all of the improvements and their overall cost. Table 4 presents the costs per section based on the expected phases of construction. The following list describes each of the cost estimate categories:

Overlay: Pave over existing asphalt surface

Grind and Pave: Grind surface to remove pavement surface, regrade path for proper drainage, where necessary, and pave with 4" asphalt.

Rehab: Excavate pavement and subbase. Replace with new subbase materials, grade for proper drainage and pave with 4" asphalt.

Shoulders: Establish shoulders 12"-18" wide by lining path with sur-pac on either side.

Widening: Excavate to proper width, add subbase, grade, compact and pave with 4" asphalt.

Culverts: Remove debris from culverts to allow for proper drainage. At the time of cleaning, evaluate inside of culvert to determine if culvert pipe needs repair or replacement.

Fencing: Installation of new fencing according to proposed design standards. Removal of existing fence may be required in some spots.

Signs/Striping: Addition of signs or striping where proposed.

Clearing: Removal of vegetation which encroaches upon path or reduces visibility.

Utility Relocation: In cases where utilities lie within the limits of proposed work, utility poles, fire hydrants, etc., will be relocated.

Realignment: Realignment is proposed in three areas of the path. Generally, realignment includes excavation of earth to desired width, new subbase, grading for drainage and paving with 4" asphalt. In addition, excavation and installation of sur-pac to either side of path for shoulders is included in this estimate.

Erosion Control: Slopes are to be stabilized through the establishment of vegetation, cutting back of slopes, paving of footpath landings, installation of fence and repair of improper drainage ways. Specifics for each erosion control measure are discussed in Section I.

Mobilization: One time cost to prepare area for construction.

Water Line Modification: This is proposed at the Staniford Road intersection to allow for the removal for the mound of earth which currently presents sight distance hazards for users of the path. This project includes the replacement and/or insulation of approximately 50 feet of water line, earth work and landscaping,

Table 3
Waterfront Bike Path Proposed Improvements Cost Estimate
1-Oct-02

Construction Costs					
		Unit Cost	Unit	Quantity	Cost
Overlay		1.50	sf	265,700	$398,550.00
Grind and Pave		2.50	sf	44,000	$110,000.00
Surface Reconstruction		4.00	sf	14,800	$59,200.00
Shoulders		1.00	sf	91,860	$91,860.00
Widening		4.00	sf	59,740	$238,960.00
Clean Culverts		1,000.00	ea	3	$3,000.00
New Catch Basin Grates		500.00	ea	2	$1,000.00
Fencing		2.50	lf	11,050	$27,625.00
Signs/Striping		10,000.00	ls	1	$10,000.00
Clearing		5,000.00	ls	1	$5,000.00
Utility Relocation		5,000.00	ls	2	$10,000.00
Realign		4.00	sf	10,000	$40,000.00
Water Line Work		150.00	lf	50	$7,500.00
Erosion Control		1,000.00	each	3	$3,000.00
Mobilization		20,000.00	ls	1	$20,000.00
Subtotal					$1,025,695.00

Preliminary Engineering	$205,139.00
Right-of-Way	$102,569.50
Acquisition	$0.00
Project Administration	$133,340.35
Subtotal	$1,333,403.50
Contingency - 30%	$400,021.05
Total	$1,733,424.55

There is currently no allotment for land acquisition because the city hopes to obtain easements for any work occurring on non-city property. The best example of this would be at the Blodgett S-curve. If the city realigns the path through this section, it would approach the Blodgett Company about an easement. The funds for obtaining these easements are included in the right-of-way line item.

Table 4
Waterfront Bike Path Improvements Cost Estimate by Section
01-Oct-02

Southern Rehabilitation – Oakledge Park to Perkins Pier

Construction Costs - Southern Rehab - Oakledge Park to Perkins Pier				
	Unit Cost	Unit	Quantity	Cost
Overlay	1.50	sf	41,100	$61,650.00
Grind and Pave	2.50	sf	11,000	$27,500.00
Surface Reconstruction	4.00	sf	14,800	$59,200.00
Shoulders	1.00	sf	16,860	$16,860.00
Widening	4.00	sf	11,240	$44,960.00
Clean Culverts	1,000.00	ea	1	$1,000.00
New Catch Basin Grates	500.00	ea	2	$1,000.00
Fencing	2.50	lf	1,550	$3,875.00
Signs/Striping	10,000.00	ls	0.333	$3,330.00
Clearing	5,000.00	ls	0.333	$1,665.00
Utility Relocation	5,000.00	ls	0	$0.00
Realign	4.00	sf	3,000	$12,000.00
Water Line Work	150.00	lf	0	$0.00
Erosion Control	1,000.00	each	0	$0.00
Mobilization	20,000.00	ls	1	$20,000.00
Subtotal				$253,040.00

Preliminary Engineering	$50,608.00
Right-of-Way	$25,304.00
Acquisition	$0.00
Project Administration	$32,895.20
Subtotal	$328,952.00
Contingency - 30%	$98,685.60
Total	$427,637.60

Table 5
Waterfront Rehabilitation – Perkins Pier to North Beach

Construction Costs - Waterfront Rehab - Perkins Pier to North Beach				
	Unit Cost	Unit	Quantity	Cost
Overlay	1.50	sf	49,600	$74,400.00
Grind and Pave	2.50	sf	33,000	$82,500.00
Surface Reconstruction	4.00	sf	0	$0.00
Shoulders	1.00	sf	23,700	$23,700.00
Widening	4.00	sf	15,800	$63,200.00
Clean Culverts	1,000.00	ea	1	$1,000.00
New Catch Basin Grates	500.00	ea	0	$0.00
Fencing	2.50	lf	5,800	$14,500.00
Signs/Striping	10,000.00	ls	0.333	$3,330.00
Clearing	5,000.00	ls	0.333	$1,665.00
Utility Relocation	5,000.00	ls	1	$5,000.00
Realign	4.00	sf	4,000	$16,000.00
Water Line Work	150.00	lf	0	$0.00
Erosion Control	1,000.00	each	1	$1,000.00
Mobilization	20,000.00	ls	1	$20,000.00
Subtotal				$306,295.00

Preliminary Engineering	$61,259.00
Right-of-Way	$30,629.50
Acquisition	$0.00
Project Administration	$39,818.35
Subtotal	$398,183.50
Contingency - 30%	$119,455.05
Total	$517,638.55

Table 6
Northern Rehabilitation – North Beach to Winooski River

Construction Costs - Northern Rehab - North Beach to Winooski River				
	Unit Cost	Unit	Quantity	Cost
Overlay	1.50	sf	175,000	$262,500.00
Grind and Pave	2.50	sf	0	$0.00
Surface Reconstruction	4.00	sf	0	$0.00
Shoulders	1.00	sf	51,300	$51,300.00
Widening	4.00	sf	32,700	$130,800.00
Clean Culverts	1,000.00	ea	1	$1,000.00
New Catch Basin Grates	500.00	ea	0	$0.00
Fencing	2.50	lf	3,700	$9,250.00
Signs/Striping	10,000.00	ls	0.333	$3,330.00
Clearing	5,000.00	ls	0.333	$1,665.00
Utility Relocation	5,000.00	ls	1	$5,000.00
Realign	4.00	sf	3,000	$12,000.00
Water Line Work	150.00	lf	50	$7,500.00
Erosion Control	1,000.00	each	2	$2,000.00
Mobilization	20,000.00	ls	1	$20,000.00
Subtotal				$506,345.00

Preliminary Engineering	$101,269.00
Right-of-Way	$50,634.50
Acquisition	$0.00
Project Administration	$65,824.85
Subtotal	$658,248.50
Contingency - 30%	$197,474.55
Total	$855,723.05

The total cost to perform the project in phases is approximately $68,0000 more than to do it all at once. However, it would be very difficult to justify closing the entire path when work is occurring in one section. It also makes sense to break the project into phases that span more than on fiscal year so that budgeting for the improvements is easier.

VII. PUBLIC INVOLVEMENT

A. PUBLIC SUPPORT

On July 25, 2001, the Department of Parks and Recreation hosted a public meeting to inform citizens and the bicycle/pedestrian community of the bike path improvement study and to gather their input.

About a dozen people attended this meeting. In addition to the comments of those in attendance, many emails were from those who could not attend stating their support and giving suggestions for improvement. The following list is a summary of the comments and recommendations that were made at the meeting or in emails. The responses are shown in italics.

- Signage: generally pertaining to way finding* - *Included in recommendations*
- Private facilities on side of path – *Restroom facilities are located at the Community Boathouse on the Waterfront as well as at North and Leddy Beaches.*
- Unpaved running path beside bike path* - *A sur-pac shoulder is either present or proposed wherever possible.*
- Open up to cross-country skiing by sufficiently packing snow (i.e. with the use of snowmobiles) – *The path is not maintained in the winter in order to allow for skiing and snowshoeing.*
- Improve maintenance of path – e.g. Blodgett's area covered with overgrown branches along path, subject to vandalism* - *Proposed in maintenance guidelines.*
- Install ramp at Blodgett stairs leading down to street* - *A ramp here may not be feasible due to the length needed to install a safe and handicapped accessible structure. There is a fully accessible entrance to the bike path from Sears Lane just one block south of the Lakeside Avenue entrance.*
- Area of path between Little Eagle Bay and Winooski River is of concern to senior citizen and handicapped users; complaining of being run off path by aggressive bikers and rollerbladers onto dangerous shoulders of path. – *Users of the path are encouraged to use and encourage others to use positive behavior on this public corridor.*
- Separate walking path – *A separate walking path is not feasible nor is it needed if users use proper etiquette when using this path.*
- Signs for proper user etiquette (re: passing, speed, etc.)* - *This may be incorporated into the signing program.*
- Commercialism may distract from aesthetics of path. – *Private development is permitted and allowed through the city's planning and zoning process through which the public and all city departments have the right to review and comment.*
- Guidelines should be printed in Free Press before put on signs. – *This is possible.*

- Benches at North End overlooks are always dirty*. – *Added to maintenance guidelines.*
- Use of correctional center for maintenance labor. – *This has been done in the past in the city and may be a possibility in the future.*
- Manicured look at waterfront is nice but not desired for the rest of the path. The untouched areas have their own aesthetic quality. – *The city agrees that each section of the path has its own unique qualities.*
- Painted line down the middle of the path can help with traffic flow. – *Centerline striping is proposed where the path has sharp turns or blind curves.*
- Install mile markers. – *This should be part of the signage improvement plan.*
- Proctor Place is a dangerous corner due to drainage, can it be paved?* - *Improvements are proposed at this intersection.*
- Standing water in between Killarney Drive and North Beach*. – *Improvements are proposed through this section.*
- Add signs to deter littering. – *May be part of the signage improvement program.*
- Picnic tables north of Waterfront Park at railroad. – *Comment not clear, however, amenities are located at city parks and scenic overlooks.*
- Asphalt sealer coating on Stowe Bike Path seems to work well. – *Pavement sealing is included in the proposed paving regimen.*
- Path near seawall is always in bad shape due to flooding*. – *Improvements are proposed for this section.*
- Widen path to 10 feet with crushed stone shoulder for jogging. – *This is proposed where possible.*
- Pavement markings at all intersections*. – *Proposed.*
- Improve drainage with repaving*. – *Proposed.*
- Improve sight distance at intersections by cutting back vegetation and hedges. – *Proposed.*
- Realign path around Blodgett S-Curve to make it safer*. - *Proposed.*
- Rehab and maintain portion of path south of Harrison Avenue*. - *Proposed.*
- Raise elevation of path just north of wastewater treatment to avoid flooding during periods of high water. * - *Proposed.*
- Sweep the path periodically and after heavy rainstorms for user safety. – *Sweeping is done on a biweekly during the summer months by the Dept. of Parks and Recreation.*
- Have railroad boxcars north of the skate park removed for aesthetic purposes. – *This issue has been brought up in the past. The railroad has the right to store trains on its tracks, however, this issue may be reiterated during discussions with the railroad regarding Waterfront Path issues.*
- Increase funding for annual maintenance (potholes, dips and bumps, obstructed views at intersections, drop-offs of shoulders, missing or faded signage and stencils. – *Recommended*
- Create a comprehensive and integrated signage system * - *Proposed.*

- Involve existing groups in bike path stewardship, planning and improvements. – *The city has a very active public involvement process used in any city project.*
- Improve connections with signage, stencils, maps and public awareness campaigns. - *Proposed.*
- Create a link from Howard Street across Barge Canal to bike path*. *There is private land between Howard Street and the bike path not to mention that development in the Barge Canal is severely restricted due to the subsurface contamination. This proposal is not feasible at this time.*
- Install a handicap accessible to the path from Lakeside Avenue*. *As stated, this ramp would be very long and take up a large amount of right-of-way which may not be available. There is a fully accessible entrance to the path at Sears Lane, just one block south of Lakeside Avenue.*
- Create pedestrian stairways from the Old North End to the bike path and waterfront. – *This is a project separate from the path.*
- Create a safe and bike-friendly route from the bike path into downtown. – *Referred to Public Works bicycle and pedestrian coordinator.*
- Provide access to all public open space along the path such as the Lakeview Cemetery. – *Lakeview can be accessed by way of North Beach and Institute Road.*
- Create an easily understood, continuous pathway through Oakledge Park to Austin Drive. - *Proposed.*
- Move the telephone pole next to the Sears Lane crossing in the Lakeside neighborhood.
- Development and installation of public art along the bike path. – *Possible in some areas but constrained in other areas by right-of-way width.*
- Special events celebrating, and potentially raising funds for, the bike path. –
- Address North Avenue extension crossing sloping down to the road so steeply. – *Improvements proposed in this area.*
- Build bikepath bridge over Winooski River. – *Separate project.*
- New separate paved path through Leddy Park to North Avenue and Ethan Allen Park. – *Currently, a share the road path exists on the Leddy Access road. This may be striped to make it more user friendly.*
- Rehab drainage ditches on either side of bike path through rock cut. - *Proposed.*
- New paved path connector to north end of North Beach gravel lot. – *Paved access exists at the south end of North Beach. There is no desire, at this time, to add pavement to this natural area.*
- New North Beach Access – Install new pedestrian bike path bridge, remove old underpass with concrete abutments. – *This is a significant project and requires more study.*
- Address North Beach path intersection. People stop in the middle of the path. – *Users are encouraged to use proper etiquette on the path at all times. This is a heavily congested area during the summer and caution and slow speed should be used.*

- Install and maintain 2-3 ft wide leveled shoulders on both sides of path between Urban Reserve and North Beach. – *1-2 ft shoulders are proposed where possible, including this section.*
- Paved connector through Catholic Diocese property to North Avenue. – *This is private property. This may occur if and when the property is redeveloped.*
- Loop paved path in Urban Reserve to give kids and parents a place to learn how to ride. – *No development is allowed in this area until a master plan is developed.*
- Realign/relocate path west of railroad tracks between King and College Streets. – *Future project.*
- Realign bike path on west side of red brick building near Perkins Pier. – *This idea does not seem feasible due to environmental and right-of-way constraints.*
- Patch holes on seawall section of bike path west of railroad tracks and Barge Canal*. - *Proposed.*
- Work with South Burlington for better signage to get to the South Burlington trails beginning near Oakledge. - *Proposed.*

*** Item that was mentioned more than once**

Many of these comments and suggestions have been incorporated into the report. Others, such as the integrated signage study, have been recommended for further study.

A second meeting was held January 30, 2002 to present the report to the public. A copy of the draft report was made available to the public before the meeting. Approximately a dozen people attended the meeting and had very positive comments about the report and general questions regarding funding and timelines for construction. In addition, the report was presented to the Parks and Recreation Commission for their review and comment as well. Comments from the public, commissioners, and state project manager are incorporated herein.

B. POTENTIAL PROBLEMS

There are no foreseeable controversial issues involving the public that will result from the proposed improvements. All of the proposed improvements are mentioned in the public comments. The city welcomes the public feedback and views the users as a resource for noting changes in conditions of the path.

The major challenge of this project as it relates to public relations is the staging of construction. As mentioned in the Section VIII below, construction will be staged in three sections. Good communication with the public will be important in keeping users updated on which portions of the path are open.

VIII. COMPATILIBITY WITH PLANNING EFFORTS

Improvements to the Burlington Recreation Path are critical to the sustainability of Burlington's on- and off-road network of bicycle and pedestrian routes. The bike path is critical as a transportation mode and recreation path between the south and north ends of the City. In addition, the bike path carries a large volume of bicycle and pedestrian traffic into Burlington's downtown.

This winter, the City of Burlington will be working with a consultant to study north/south on-road options for bicyclists and pedestrians traveling to and from the central commercial district. As part of this study, the consultant will also be looking at improving the on-road network by also identifying east/west connections to downtown. The waterfront bike path is an important transportation link with north/south and east/west connections in the City. Improvements to the path will greatly enhance the effectiveness of these alternative transportation modes in the city.

Improvements to the Waterfront Bike Path are called for in the 2001 Burlington Municipal Development Plan and have been in the Burlington Department of Parks and Recreation Capital Plan since fiscal year 2000. The 2001 Long Range Transportation Plan prepared by VTrans calls for the need for "Prioritization of desired facility and/or facility improvements" with respect to bike paths and the 1996 Alternative Transportation Path Comprehensive Plan describes the Burlington Bikepath as the "spine" of the regional path network. For this reason, the city believes that these improvements are a high priority within the city and the state.

IX. PROJECT TIMELINE

The ideal timeline for work to occur is in the late fall or early spring as the number of users is fewest at these times. The project will most likely be done in phases of the following groups of sections:

Southern Rehabilitation: Oakledge Park to Perkins Pier (Station 0+00 to Station 85+00)
Waterfront Rehabilitation: Perkins Pier to North Beach (Station 85+00 to Station 169+00)
Northern Rehabilitation: North Beach to Winooski River (Station 169+00 to Winooski River)

The material needed to complete the scoping process is largely contained within this report and should not take more than a couple of months to complete. The following table estimates time to design and construct the three phases.

Task	Southern Rehab	Waterfront Rehab	Northern Rehab
Preliminary Engineering	8 months	5 months	4 months
Construction	4 months	4 months	6 months

Preliminary engineering includes permitting, acquisition of right-of-way, design, preparation of bid documents and specifications and the bid process.

Most of the design time on the Southern and Waterfront portions will be spent negotiating with the railroad and securing the proper easements. If the Southern portion is completed first, negotiations for the Waterfront portion should be easier and less time consuming, as the issues are less complicated. The Northern portion alignment is fairly straightforward, however, there are some construction issues with regards to slope that will require the time allotted.

It is expected that construction would occur over the course of about 18 months. The first section would occur in the spring or fall. Construction would then move to the second and third sections 6 and 12 months later respectively.

With the proper funding in place, the City could undertake the design immediately to be ready for the spring 2003 season. Funding sources may include city capital, surface transportation funds, or other grant sources. If the city chooses to pursue funding through the VTrans Bike and Pedestrian Program, the timeline will be pushed back at least two years as the program is fully dedicated in the immediate future.

X. VIABILITY

A. WHY SHOULD VTRANS CONSIDER THE PROJECT PROPOSAL?

Improvements to the Burlington bike path are critical to the sustainability of Burlington's on- and off-street road network of bicycle and pedestrian routes. The path is also critical as a transportation mode and recreation path between the south and north ends of the city. In addition, the path carries a large volume of bicycle and pedestrian traffic into Burlington's downtown.

Due to the bike path's age (over 15 years old) and heavy use (150,000 users annually) its condition mandates repairs. Any improvements will adhere to the **1999 AASHTO Guide for the Development of Bicycle Facilities** and the **Draft 2002 Vermont Pedestrian and Bicycle Facility Planning and Design Manual.** The path is a tourist and transportation asset to the city, county and state and would be even more so if the much discussed future links are built. The State of Vermont is planning to build a bicycle and pedestrian bridge at the mouth of the Winooski River between Burlington and Colchester next year. This will increase recreational and commuter traffic on the path by connecting with the Colchester bike network, improving transportation options in Chittenden County. It is these types of

transportation links that are a focus of the Chittenden County Metropolitan Planning Organization.

Currently, Burlington Public Works is working with a consultant to study the north/south on-road options for bicyclists and pedestrians traveling to and from the central commercial district. As part of this study, the consultant will also look at improving the on-road network by identifying east/west transportation connections to downtown. The Burlington waterfront bike path is an important transportation link with north/south and east/west connections in the city. Improvements to the path will greatly enhance the effectiveness of these alternative transportation modes in the city.

B. IS THE PROJECT RESPONSIVE TO A COMMUNITY NEED?

This project is very responsive to the community's desire to see more transportation and recreation alternatives for the reasons stated above.

C. IS THE PUBLIC GOOD SERVED BY SPENDING LOCAL, STATE, AND FEDERAL DOLLARS ON THESE IMPROVEMENTS?

These improvements are very crucial in the continuing expansion of options to today's average path user and commuter. Due to the large number of current users and the anticipated growth in users the bike path needs to be brought up to the current design standards to ensure safety. There also is the economic side of the issue - with over 1,000 users daily at peak times looking for small amenities, lunch or shopping on Burlington's waterfront of downtown – the path is an economic benefit to the city and state.

D. ARE THERE OTHER CONSIDERATIONS THAT SHOULD BE MADE BEFORE THIS PROJECT IS ADVANCED?

Improvements continue annually on the path, but are restricted to current funding. Current funding allows for maintenance where needed, but could not cover the necessary improvements. The current path was identified 20 years ago as the right location since it is mostly a former railroad right-of-way, travels along the waterfront and is easy to access from Burlington's neighborhoods, its downtown and the waterfront.