



FEASIBILITY STUDY

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prepared by

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in association with

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1 INTRODUCTION

Study Area

The City of Somerville hired Rizzo Associates to study the feasibility of constructing a bicycle/pedestrian facility linking the existing linear park at Davis Square to Lechmere (see Figure 1). The study area begins in the northwest and includes the abandoned section of the Lexington & Arlington Railroad between Cedar and Lowell streets. Heading southeast the study area encompasses the New Hampshire main line railroad from Somerville Junction (near Lowell Street) to Washington Street as well as parallel streets.

Owned by the Massachusetts Bay Transportation Authority (MBTA), the New Hampshire main line right-of-way (ROW) between Somerville Junction and Washington Street is characterized by a cut section, where the railroad tracks lie at a lower elevation in the middle with steep embankments on either side. ROW varies in the range of 100 to 150 feet. The location used to develop the rail-with-trail design is the Cross Street underpass, which has 87 feet clearance between the bridge abutments. The two-track New Hampshire main line located on the east side of the railroad ROW carries Lowell Commuter Rail trains, freight service and, in the near future, Boston-Portland passenger service. In the more distant future, the MBTA is likely to construct two tracks for the Green Line in this section.

From Washington Street, the study area continues along the freight railroad corridor running southeast to the Cambridge city line. This ROW is very wide and lightly used by trains. A single freight line runs along the northwestern side of the railroad ROW. Local landmarks along this side of the railroad are Independent Fabrications and Brickbottom Studios. The freight railroad crosses over the Fitchburg Division railroad on a bridge built to accommodate five rail lines. Just east of the City line with Cambridge, an abandoned spur leads to Lechmere. This spur is narrow and lies behind the hotel (under construction) and other buildings on the east side of the O'Brien Highway, opposite the existing Lechmere Station. In the future, the

MBTA is likely to construct a new Green line station on the east side of the highway, with service continuing to Tufts University.

Study Process and Public Involvement

A kick-off meeting for the study was held August 29, 2000. A public scoping meeting was held September 21, 2000 to gain input on the study process and insight on neighborhood issues. After reviewing existing reports and other background material and coordinating with City officials, a site walk was conducted through the two-mile long study area on October 27, 2000. The Rizzo Associates team who walked the corridor included a transportation planner, a transportation engineer, a structural engineer and a landscape architect. The City's project manager and a local resident also participated.

A technical advisory committee (TAC) was formed and consists of representatives of the City's traffic and parking, community development and police departments, two owners of Somerville bicycle-related businesses and a local resident/bicycle advocate. On January 17, 2001 the committee met and considered two alternatives (A and B) for constructing a bicycle/pedestrian facility from Cedar Street to the Lechmere area. A public meeting was held on January 23, 2001 where comments were offered on the two alternatives.

On February 12, 2001 City staff and Rizzo Associates met with MBTA planning and railroad operations representatives. The MBTA provided information about existing conditions and potential future changes in the railroad corridors within the study area.

A follow-up field walk was conducted on March 2, 2001. Rizzo Associates and an MBTA representative investigated the west embankment along the railroad between Central Street and the McGrath Highway. Cross section measurements were taken under the McGrath Highway and Cross Street bridges. This investigation led to the development of a third alternative (C), which is similar to Alternative A but keeps the path entirely on the west side of the railroad.

Why the “Somerville Community Path”?

This feasibility study originally began as an exploration of how to move bicycles from the end of the existing Somerville Bicycle Path at Cedar Street to the Lechmere district in Cambridge. However, it quickly became apparent that there was a need for more than just a transportation facility. The City of Somerville has very little open space, particularly open space that is located close to residential neighborhoods. Open spaces for passive and active recreation are an important part of a vibrant community. One of the most popular parks in the City is the existing Bicycle Path, which attracts gardeners, walkers and those seeking simply to relax, in addition to bicyclists. This proposed bicycle facility could also help serve these needs.

In order to make clear this additional goal for the extended bicycle facility, the City has named it the “Somerville Community Path.” This name makes it clear that this proposed facility would serve to link different parts of the City, in addition to providing a simple, safe way to travel through it by bicycle. As the project moves into design, the Community Path concept means that efforts to add benches, community gardens, and play facilities will be maximized and that the path will be easy to access, rather than “limited access.”

Organization of Report

The draft report, outlining the recommended alternative is being presented to the TAC and the public in March 2001. The report is divided into the following sections:

- Background
- Alternatives Analysis
- Recommended Alternative

The first section contains background data on demographics and transportation. The three alternatives developed during the course of the

study are described and analyzed in the second section. The final section contains a more detailed description of the recommended alternative, including potential cost and phasing.

2 BACKGROUND

The need for bicycling facilities in Somerville is great. The City is changing and evolving as a new mecca for young people and as a desirable place for young people to live. Nearby colleges and universities in Cambridge, Boston, and Somerville/Medford have drawn students to Somerville to live along with families and older residents. Somerville's proximity to Boston and Cambridge has attracted many young professionals in the last 10 years and has contributed to the City's economic growth.

Somerville is in a strategic position as it evaluates the potential to develop bicycle facilities. The City is close to downtown Boston— a little more than 2 miles; Cambridge, a leader in the development of bicycle facilities, is Somerville's neighbor; and it has a close connection to the 11-mile Minuteman Bikeway that runs from Arlington to Bedford. These factors make Somerville a community that is key to regional efforts to improve cycling. A rail-with-trail or rail trail in the railroad right-of-way or other facility that would connect to the Linear Park and the Minuteman Bikeway would establish a valuable regional connection. It is estimated that on weekend days, as many as 200 cyclists per hour use the Minuteman Bikeway for a variety of activities. It is conceivable that a similar volume of cyclists could be accommodated on a trail in Somerville if connected to the Minuteman Bikeway or other significant off-street bicycle facilities.

In addition to the regional benefits, bicycle paths and lanes would serve a tremendous number of Somerville residents. Somerville's proximity to key attractions, including jobs, entertainment, educational institutions, and government buildings; a relatively low percentage of auto ownership per household, and a youthful and educated population that has a propensity to ride bikes make the city a good candidate for promoting bicycle use. Demographic data and information on cycling in Somerville can provide insight into the potential participation in cycling in Somerville and the degree to which bicycle facilities—in particular, off-street paths—might be used.

Demographics

Somerville is a very dense city with a combination of older neighborhoods and recently revitalized neighborhoods with a population of about 76,000. Despite trends showing increased population growth in the suburban and exurban areas, Somerville's population has remained stable over the last 10 years.

In general, participation in cycling is high among high school and college graduates. Over 75 percent of Somerville residents have a high school degree or higher, close to the Massachusetts average of 80 percent. Over 30 percent of the city's residents have a bachelor's degree or professional degree, higher than the Massachusetts average of 27 percent. Somerville has a low unemployment rate among residents, a little over 2 percent, and has a high percent of managerial and service professionals despite roots that were in blue-collar, industrial professions.

Although cyclists are represented in all age groups, participation in cycling is most common among children, students, and people under age 45. Even though the U. S. Census does not include students, the data indicate that Somerville is a young city: close to 15,000 residents are under the age of 20 and almost 41,000 of the 76,000 residents are under 44. In total, 72 percent of the residents are under the age of 44.

Participation in Cycling in Somerville

Participation in cycling in Somerville is high today. Some of the reasons include the fact that Somerville is a compact city, there are many young residents, a quarter of the households do not have a car available, and the city is close to major activity centers. Because statistically two of three trips made every day are less than five miles and 62 percent of all auto trips are less than five miles in length, cycling in Somerville is an appropriate travel mode choice for many.

To accommodate cyclists in Somerville, the city has begun to expand and improve its bicycle facilities. Existing off-street bicycle facilities in Somerville include the Linear Park from Alewife to Davis Square; the bicycle path from Davis Square to Cedar Street; and multi-use

paths along the Mystic River. The city has begun to improve cycling conditions by delineating bike lanes on streets; bike lanes have already been added to a portion of Washington Street. Because Somerville is centrally located next to Cambridge and adjacent to Boston, trips to work tend to be short and quick. The U. S. Census data show the average commute to work for a Somerville resident is 24 minutes. About 22 percent of Somerville workers commute less than 15 minutes and 57 percent spend less than 30 minutes commuting. A trip of 20 to 30 minutes is considered a manageable trip for many commuting cyclists.

According to the U.S. Census of 1990, auto ownership per household in Somerville is lower than the rest of Massachusetts in the country. About 25 percent of Somerville households do not have a car available at all and 47 percent of all households own only one car. Many residents use transit, walk, and bike to work. MBTA bus and rapid transit services are used by 27 percent of Somerville residents to get to work, and carpools carry another 11 percent.

Despite relatively few facilities for cyclists, cycling to work is already a significant travel mode. The census shows that only about 2 percent of Somerville residents ride bicycles to work. However, this number underestimates bicycle commuting because the data are collected in March when snow is still an issue in Massachusetts and the survey does not include bicycle trips made to connect with a transit vehicle. The census also does not include the many students living temporarily in Somerville. The Central Transportation Planning Staff (CTPS) estimates that the actual number of Somerville residents who bike to work is about 11 percent, including temporary college or post-graduate students. In addition, cycling for non-work trips, including recreation is not accounted for in the census.¹

¹ CTPS estimates that about 25 percent of workers in Cambridge ride bicycles to work. In Brookline, which has two off-street bicycle paths and has begun striping and signing throughout the town for bicycles, it is estimated that about 12 percent ride a bike to work.

Physical Setting

Somerville is a dense and geographically compact city. Its streets carry significant local and regional traffic. Many of the city's arterial streets carry high volumes of traffic both at peak hours and off-peak hours making on-street cycling an activity primarily for experienced adult cyclists. Local streets are frequently narrow with parked cars on one or both sides. Because so many of the streets are narrow and on-street parking is at a premium, many local and residential streets have been made one-way, creating a fairly complex street system. Most of Somerville is gently rolling terrain; however, several key destinations are located on hills, including the high school, city hall, library, and historic Prospect Hill.

The development of the community path using railroad right-of-ways would provide an off-street alternative for transportation and recreational cycling. Walking 'A' path for pedestrians and bicyclists along the railroad corridors in central Somerville could provide a flatter route from Davis Square to the Lechmere area in Cambridge. A highly visible off-street facility would attract transportation and recreation trips and serve as a valuable community resource. The community path would not merely run through the city, but would connect neighborhoods, commercial districts, parks and schools with numerous access points.

3 ALTERNATIVES ANALYSIS

Two alternatives were developed for the project and presented at public and advisory committee meetings in January 2001 (see Figures 2 and 3). Alternative A would provide a shared use path along the top of the railroad embankment between Lowell Street and the McGrath Highway, switching sides at Central Street and Aldrich Street. Bicycle/pedestrian bridges would be required at both locations. The path would follow within the west edge of the railroad ROW at/near the railroad grade from the McGrath Highway to the Lechmere area.

Alternative B is the same as Alternative A from Cedar Street to Medford Street. Bicycle routes would be established on existing streets connecting Union Square to the path. The primary route to Union Square would be School Street. The primary route from Union Square to the path would be Walnut Street. Both streets are one-way and have significant grades.

At the second public meeting held on January 23, 2001, the public expressed a strong preference for Alternative A. Nearly all those in attendance preferred an off-road bicycle/pedestrian facility (path) along the full length of the study area.

In February 2001, Rizzo Associates and the City of Somerville met with officials from the MBTA. It is likely that the MBTA will extend the Green Line from Lechmere to Tufts University with a double track adjacent to the New Hampshire main line in the study area.

The MBTA rebuilt the retaining wall system on the east side of railroad when they moved the NH main line tracks to their current location. There is a current need to rebuild the retaining wall system on the west side of the railroad. The existing wall system is failing in locations and many trees growing on the west embankment are leaning toward the railroad.

After learning more about existing conditions and future plans for the railroad corridor, a third alternative (C) was developed (see Figure 4). This alternative is similar to Alternative A but keeps the path entirely on

the west side of the railroad. Between Central Street and the McGrath Highway the trail would be located at the top of a new retaining wall on the west side of the railroad corridor. To support the trail, the wall system would be extended 3 to 4 feet above the necessary height for protecting the railroad and stabilizing the bank.

4 RECOMMENDED ALTERNATIVE

Project Description

Alternative C, the recommended alternative, would provide a rail trail linking the end of the existing bike path at Cedar Street in Somerville to the Lechmere area of Cambridge. The community path as defined in Alternative C consists of eight segments, as described in Table 1.

Table 1. Recommended Alternative: Segments

| Segment | Project type |
|--|---|
| 1 Cedar Street to Lowell Street Lexington & Arlington Railroad (LARR) | bike path (rail to trail) |
| 2 LARR to Visiting Nurses Association (VNA) rear access road | high retaining wall (ramp) |
| 3 VNA to Central Street parking lot | bike path on existing trail |
| 4 Central Street to McGrath Highway New Hampshire Main Line/Lowell Division | trail at top of railroad embankment, west side |
| 5 Approach to McGrath Highway | high retaining wall (ramp) |
| 6 McGrath Highway to Washington Street New Hampshire Main Line, Lowell Division | trail at west edge of ROW at/near railroad grade |
| 7 Washington Street to Lechmere Spur Freight Railroad | trail at west edge of ROW at/near railroad grade |
| 8 Lechmere Spur (Cambridge) | bike path (rail to trail) |

Beginning in the northwest at Cedar Street, a 12-foot wide paved bicycle path would be constructed on the former railroad bed (see Section 1). The path would be at railroad grade under Lowell Street and then climb along the west bank to connect to the existing access road behind the Visiting Nurses Association (VNA). A reinforced concrete retaining wall would be constructed to support the trail up the embankment.

Heading southeast from the VNA property, the path would follow an existing dirt trail on flat terrain. The path would then connect to an existing, lightly used parking lot, which runs to Central Street.

The community path would cross Central Street at grade and then be located in the western edge of the railroad ROW at/near the top of the embankment all the way to the McGrath Highway. The New Hampshire main line railroad is located in a cut section from Central Street to the McGrath Highway. The main line is on the eastern side of the cut. This two-track line was relocated to the eastern limit of the ROW to make room for a double-track section of the future Green Line extension. When the main line was relocated, the embankment on the east side was reconstructed using a tiered bin wall structure manufactured by Evergreen. Flat areas within the railroad ROW at the top of these walls are suitable for trail development.

It will be necessary that a similar new retaining wall system be constructed on the west side of the railroad ROW to accommodate the Green Line extension. This improvement should be made now to protect the existing railroad. Two new tracks will be constructed for the Green Line adjacent to the existing two-track main line railroad. When the new retaining wall is built on the west side of the railroad ROW, it would be easy to add somewhat to the height of the wall, leaving room to develop a trail.

The community path would drop from the top of the railroad embankment down to the railroad grade at the McGrath Highway. A

The segments are numbered from north to south and illustrated in Figures 5 - 10.

T-wall consisting of precast reinforced concrete units would be constructed to support the trail (ramp) along the bank. The ramp would be approximately 300 feet long. It would be constructed with an eight percent grade with five-foot long landings every 30 feet. The ramp would meet the requirements of the Americans with Disabilities Act (ADA), and it would be bikeable.

From the McGrath Highway to the railroad junction just south of Washington Street, the trail would be located adjacent to the western limit of the railroad ROW. A minimum of 14 feet would be provided for the trail with a 15-foot offset from the near rail of the future Green Line. A typical section for the two-track NH main line, two-track Green Line and trail is illustrated in Section 2. The lateral distances available under Cross Street and the McGrath Highway are about 87 and 120 feet, respectively.

The separation of the trail from the railroad (offset) could be increased to about 30 feet between Washington Street and the abandoned Lechmere spur (see Section 3). The lightly used single-track freight rail along the western edge of the railroad ROW would be relocated toward the center of the ROW. The estimated cost of \$400,000 per mile to relocate the freight line is much lower than the cost of building an interlocking extension at the main line junction near Washington Street. When the Green Line extension is constructed, the freight line should be interlocked with the main line, south of Washington Street.

A connection to the trail will be needed at Washington Street to provide access to the community path from East Somerville. A potential location for connecting to the path is in the vicinity of Cataldo Ambulance on the north side of Washington Street. From this access point, the community path would follow along the west side of the railroad bridge over Washington Street.

From Washington Street to the Cambridge line, the path would follow along the west side of the railroad ROW, offset from the relocated freight rail line by about 30 feet. The path would be constructed through the westernmost of five platforms on the bridge spanning the Fitchburg Division railroad. The tracks would be removed and decking and railing installed for the path.

Just south of the bridge over the Fitchburg Division, the path would enter Cambridge. The most feasible option currently would be to take the trail down the abandoned spur to a location just across the O'Brien Highway from the MBTA's Lechmere Station. This ROW has been preserved; however, there is only sufficient room for a path or a single-track railroad.

The City of Cambridge is currently developing plans for the Lechmere area, North Point and the Charles River waterfront. The desire line of many pedestrians and cyclists traveling south and east would be to continue into Boston. Up to this point the path has stayed between the railroad and the O'Brien Highway, without crossing either. It would be desirable to connect the path from Lechmere to the Charles River Bridge without crossing a railroad or busy highway. The City of Cambridge will determine how the path is constructed in Cambridge. Constructing the Somerville Community Path to Cambridge and similar action by Cambridge to continue the path to the Charles River Bridge and Museum of Science would result in a continuous regional bikeway from Bedford to Boston.

The community path will cross six streets at grade, providing connections to neighborhoods, schools and other attractions:

- Cedar Street
- Central Street
- Sycamore Street
- School Street
- Medford Street
- Walnut Street

At these locations, a Zebra-striped crosswalk would be installed with advance warning signs. The locations appear to have adequate stopping sight distance for approaching motorists. Average daily

traffic on most of these streets ranges from 3,500 to 7,600 vehicles per day.

The crossing of Medford Street will need to be west of the railroad bridge because of the skewed intersection. The existing sidewalk on the north side of Medford Street would be improved to bike path standards for a short distance to connect to the crossing. A pedestrian/bicyclist-activated traffic signal may be considered at this location.

A connection to Washington Street would be made on the north side of the street west of the railroad. Additional connections to the path would be considered during the design phase of the project.

Order-of-magnitude Cost Estimate

An order-of-magnitude construction cost estimate is provided in Table

2. The 2.25-mile-long project is estimated to cost approximately \$1.55 million. Of the total, the path would cost about \$1 million; and the two ramp structures would cost about \$550,000.

Potential Phasing

The first part of the project (Segments 1 - 3) could be constructed relatively soon and would extend the existing rail trail from Cedar Street to Central Street. The VNA has expressed a willingness to allow the path to connect to the fire access at the rear of their building.

The second part of the project (Segment 4) will require that the MBTA reconstruct the retaining wall on the western side of the railroad between Central Street and the McGrath Highway. This wall is in need of reconstruction irrespective of the future needs of the Green Line. The City of Somerville can seek funding (e.g., from the Transportation Enhancement program) to pay the cost of constructing a path at the top of the new bin wall.

The third part of the project (Segments 5 - 7) will require relocation of the existing single-track freight railroad from the western edge of the

ROW to the center of the ROW. The track would be relocated from the McGrath Highway to the Lechmere Spur. A path would be constructed along the western edge of the ROW at/near railroad grade after the freight line is moved.

Extension of the project into Cambridge (Segment 8) can initially be accomplished along the Lechmere Spur, until such time as specific plans for the Green Line are developed.

Table 2. Order-of-magnitude Cost Estimate

| Segment | Project type | Length (feet) | Unit cost (per linear foot) | Total Cost (OM*) |
|---|---|---------------|-----------------------------|--------------------|
| 1 Cedar Street to Lowell Street Lexington & Arlington Railroad (LARR) | bike path (rail to trail) | 1,355 | \$55.00 | \$74,525 |
| 2 LARR to VNA rear access road | high retaining wall (ramp) | 295 | --- | \$285,000 |
| 3 VNA to Central Street parking lot | bike path on existing trail | 200 | \$45.00 | \$9,000 |
| 4 Central Street to McGrath Highway New Hampshire Main Line/Lowell Division | trail at top of railroad embankment, west side | 3,600 | \$50.00** | \$180,000** |
| 5 Approach to McGrath Hwy (trail drops from top of embankment to railroad grade) | high retaining wall (ramp) | 295 | --- | \$285,000 |
| 6 McGrath Highway to Washington Street New Hampshire Main Line, Lowell Division (future Green Line) | trail at west edge of ROW at/near railroad grade | 1,600 | \$50.00 | \$80,000 |
| 6 Relocate existing freight track | | 2,200 | \$75.75 | \$166,667 |
| 7 Washington Street to Lechmere Spur Freight Railroad | trail at west edge of ROW at/near railroad grade | 3,300 | \$45.00 | \$148,500 |
| 7 Relocate existing freight track | | 3,300 | \$75.75 | \$250,000 |
| 8 Lechmere Spur (Cambridge) | bike path (rail with trail) | 1,300 | \$55.00 | \$71,500 |
| TOTAL | | 11,945 | --- | \$1,550,192 |

*OM = order of magnitude construction costs excluding landscaping, lighting and other trail amenities.

** Cost of new bin wall on west side of railroad corridor not included in estimate (to be provided by the MBTA).

All rail-with-trail sections include cost of fence between rail and trail.