

DRAFT

Cochituate Rail Trail Spur Access Alternatives Analysis

This planning exercise for the Town of Natick and the Natick Mall was completed in essentially seven steps that included:

- Establish goals and objectives;
- understand the context;
- define design criteria;
- develop alternatives;
- define performance measures;
- evaluate alternatives; and,
- develop a plan of action.

■ Goals and Objectives

For this study, the following goals and objectives were defined:

- Enhance the existing bicycle/pedestrian network in and around the Natick Mall;
- Support the on-going development of the Cochituate Rail Trail (CRT) through planned connections and on-site improvements that enhance the area for bicycling and walking; and
- Develop a plan of action for connecting the planned Natick Mall Expansion with the planned Cochituate Rail Trail Spur located east of Speen Street.

■ Understanding the Context

Before exploring actual elements of a bicycle and pedestrian plan, it is important to understand bicycle and pedestrian planning principles and the context of this study.

In a densely developed suburban area, such as the Golden Triangle of Framingham and Natick, where development is relatively dense, there are many destinations within short distances of one another. The density of development creates a great potential for bicycling and walking as a means of shopping, having lunch, running errands, and, even, commuting. There are residential neighborhoods and open space/ recreational opportunities within close proximity of this area. This setting is likely to result in both utilitarian (transportation) and recreational bicycling and walking demands.

A first step in better understanding the context of this planning assessment involved conducting additional data and field reconnaissance. The inventory of existing conditions and identification of potential corridors and constraints included:

- existing transportation systems;
- land opportunities and constraints;
- planned transportation corridors or improvements;
- commercial centers -- shopping centers, malls and plazas;
- employment areas - large employment areas and industrial parks;
- public facilities -- parks, libraries, museums, municipal buildings, and schools;
- service facilities such motels, hotels, and restaurants; and
- modal transfer stations -- bus stops, commuter parking lots, and Logan Express -- that may serve as trip destinations for the commuting bicyclist.

The results of this data collection and field review are summarized in Figure 1.

■ Key Design Criteria for Shared-path

The following design criteria were established for the development of the CRT/ Speen Street alternatives based on AASHTO guidelines:

Design Speed (D)	20mph
Radius Horizontal Curve	95ft (with e=2%)
Superelevation	2% min 5% max.
Profile Grade	0.5% minimum 5 % maximum (ADA compliant)
Typical Section	Pavement width 10ft Shoulder width 2.5 ft (MHD)



-  Pedestrian/Bicycle Attractors
-  Pedestrian/Bicycle Generators
-  Existing Sidewalks
-  Not to Scale

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Figure 1
Proposed Pedestrian/Bicycle Connectivity

Natick Mall Expansion Project
Natick, Massachusetts

**■ Performance Measures for Speen Street / Cochituate
Rail Trail Crossing**

Performance measures help define important qualitative and quantitative variables to be considered in determining the desirability and effectiveness of a bicycle facility. The key variables considered as part of the study are briefly described below:

Accessibility

Readily accessible connections need to be considered a key component of any bicycle/pedestrian network. Accessibility is measured by the distance a bike facility is located from a specified attraction, the ease by which this distance can be traveled by bicycle, and the extent to which all likely origins and destinations are served.

Directness

Bicyclists and pedestrians, for the most part, both desire a direct and quick route to destination points. Studies have shown that most bicyclists will not use even a highly designed bicycle facility if it greatly increases the travel distance or trip time over that provided by less desirable alternatives.

Continuity

A proposed bicycle/pedestrian network should be viewed as a transportation system and provide continuous, direct connections to numerous attractions throughout the community. If gaps exist in the network, measures should be taken to provide safe and efficient short-term and long-term solutions.

Consistency

Providing consistent facility types should be a goal when planning and designing bicycle and pedestrian networks. Consistent facilities tend to reinforce user expectations and provide for better operations.

Route Attractiveness

Bicycle and pedestrian networks or portions of the network should encompass such factors as separation from motor traffic, proximity of visual aesthetics, connections to employment centers, major passive and active recreation areas, and the real or perceived threat to personal safety along the facility. These factors tend to encourage novice and

recreational bicyclists to view bicycling and walking as viable modes of transportation and enhance the effectiveness of the overall bicycle network.

Ease of Implementation/ Costs

Right-of-way, environmental, engineering, and funding constraints must all be considered during the planning process to ensure that implementation of the plan is actually feasible. "Constructability" (construction methods, staging, utility coordination, maintenance of traffic, etc.) is also of particular importance.

Safety and Security of Bicyclists

The design of bicycle and pedestrian facilities needs to be treated as any other transportation project, with personal and traffic safety as key design elements. Safety is an important part of any plan and includes education, enforcement, encouragement, and design of facilities. Safety conscious design should guide the development of all bicycle and pedestrian facilities. In addition, personal security issues need to be addressed, especially when dealing with shared use paths.

■ Alternatives Development and Analysis

Six conceptual alternatives were developed for this location. Plans and profiles for these concepts are provided as a separate attachment. These alternatives were then analyzed and compared to one another.

Table 1 presents an analysis of by the above-referenced performance measures for each of the six alternatives considered. For this analysis, the alternative treatments were ranked from best to worst in addressing the criteria.

Table 2 provides a more detailed alternatives assessment of the broader range of issues associated with the options being considered, including:

- Bicycle Connections
- Pedestrian Connections
- Right-of Way Impacts
- Site Impacts
- Conceptual Costs
- Design/Construction Issues
- Aesthetics

Table 1
Speen Street and Cochituate Rail Trail Crossing
Bicycle / Pedestrian Accommodation Assessment

Performance Criteria	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6
	Tunnel to Path	Tunnel to Garage	Bridge with Direct Ramps	Bridge with In-direct Ramps	At-grade with Access Modifications	At-grade with Access Modifications
<u>Bicycles</u>						
Accessibility	1	4	5	4	2	3
Directness	1	4	5	4	2	3
Continuity	1	5	2	5	3	4
Consistency	1	5	2	5	3	4
Route Attractiveness	3	4	5	6	1	2
Ease of Implementation	5	6	3	4	2	1
Safety/Security	5	6	2	4	1	3
Subtotals	17	34	24	32	14	20
<u>Pedestrians</u>						
Accessibility	5	3	6	4	1	2
Directness	5	3	6	4	1	2
Continuity	6	3	5	4	1	2
Consistency	6	3	5	4	1	2
Route Attractiveness	3	4	5	6	1	2
Ease of Implementation	5	6	3	4	2	1
Safety/Security	6	5	4	3	1	2
Subtotals	36	27	34	29	8	13
Overall Totals	53	61	58	61	22	33

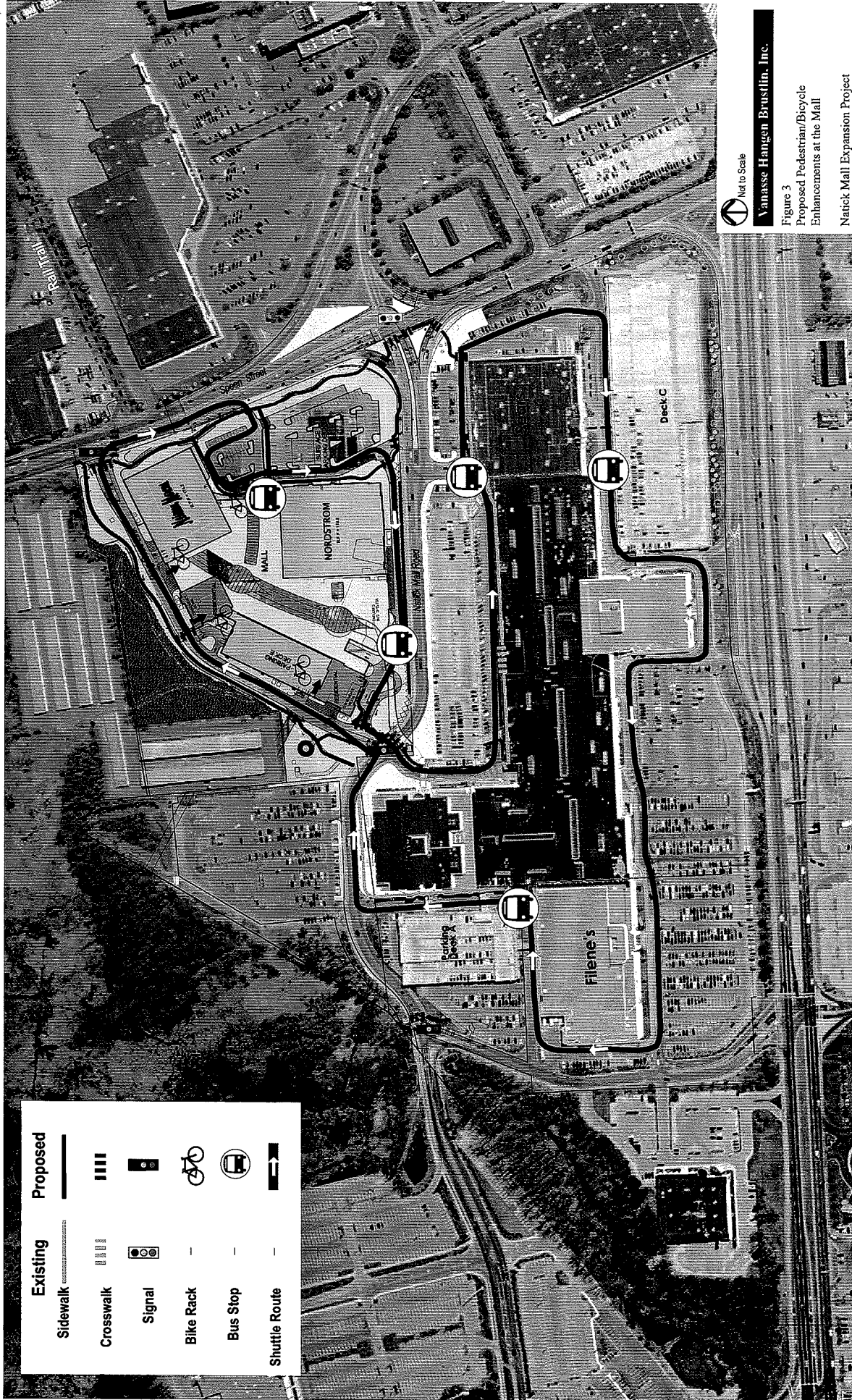


- High Visibility Pedestrian Crossing System
- Proposed Pedestrian/Bicycle Enhancements

⊕
Not to Scale

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Figure 2
Proposed Pedestrian/Bicycle Connectivity
Natick Mall Expansion Project
Natick, Massachusetts



Existing	Proposed
Sidewalk	
Crosswalk	
Signal	
Bike Rack	
Bus Stop	
Shuttle Route	

Not to Scale
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 Figure 3
 Proposed Pedestrian/Bicycle
 Enhancements at the Mall
 Natick Mall Expansion Project
 Natick, Massachusetts

TABLE 2
Cochituate Rail Trail Spur/ Speen Street Crossing Alternative Evaluation

<i>Speen Street Alternative</i>	Bicycle Connections		Pedestrian Connections		Right of Way Impacts Property Acquisition, Easements	Site Impacts	Conceptual Costs	Design/ Construction Issues	Aesthetics
	(See Also Table 1) Advantages	Disadvantages	(See Also Table 1) Advantages	Disadvantages					
<i>Alternative 1 Tunnel Crossing Connecting to Shared-Use Path</i>	Continuous bike route from CRT to shared-use path. Fully protected crossing of Speen Street for those that use it.	Tunnel limits access to east side of Natick Mall and to path from Speen Street Corridor. At-grade crossing may still need to be accommodated.	Fully protected crossing of Speen Street for those that use it.	Circuitous access for all but those traveling from/to CRT to/ from Shared-use path. At-grade crossing needs to be accommodated.	Requires easement from Town of Natick for Access through Right of Way. Requires easement or land purchase from IN Home Furnishing and Cloverleaf Mall. Requires access agreement with GGP. Coordination with Utility Companies.	Requires relocation of subsurface stormwater detention system. Park is divided and reduced in area by the ramp system.	\$4,400,000 Does not include maintenance costs.	Maintenance of traffic on Speen Street. Barrier needed to shield drop at mouth of tunnel. Utility conflicts/ coordination.	Park is divided and reduced in area by ramp system. Minimal impacts along Speen Street.
<i>Alternative 2 Tunnel Crossing Connecting to Parking Deck D</i>	Direct connection to Mall facility. Fully protected crossing of Speen Street for those that use it.	Tunnel use impacted when Mall is closed. Poor connection to shared-use path. At-grade crossing still needs to be accommodated.	Direct connection to Mall facility. Fully protected crossing of Speen Street for those that use it.	Tunnel use impacted when Mall is closed. At-grade crossing needs to be accommodated. Does not address majority of anticipated users.	Requires easement from IN Home Furnishing and Town of Natick for Access through Right of Way. Requires access agreement with GGP. Coordination with Utility Companies.	Conflict with primary ventilation tunnel for parking deck D. Negatively impacts parking layout and efficiency below grade. Loading dock impacts.	\$2,550,000 Does not include maintenance costs.	Site construction makes option not feasible to construct.	Minimal impacts along Speen Street.
<i>Alternative 3 Bridge Crossing with Direct Ramps on Both Sides</i>	Continuous bike route from CRT to shared-use path. Fully protected crossing of Speen Street for those that use it.	Bridge limits access to east side of Natick Mall and for a considerable distance along path. At-grade crossing seen as more desirable by some users. At-grade crossing may still need to be accommodated.	Fully protected crossing of Speen Street for those that use it.	Circuitous access for all but those traveling from CRT to/ from shared-use path. At-grade crossing still needs to be accommodated.	Requires easement from IN Home Furnishing and Town of Natick for Access through Right of Way. Requires access agreement with GGP. Requires easement or land purchase from IN Home Furnishing and Cloverleaf Mall.	Park is divided and reduced in area by ramp system.	\$2,300,000 Does not include maintenance costs.	Maintenance of traffic on Speen Street. Bridge over Speen Street will likely require center pier which would be difficult to accommodate in center of Right of Way. Significant constructability issues due to constrained site. Impacts sight distance for traffic signals on Speen Street. Potentially impacts sight distance for IN Home Furnishing driveway. Utility Conflicts/ Coord.	Walls up to bridge will negatively affect views along Speen Street.
<i>Alternative 4 Bridge Crossing with Switchback Ramps on Both Sides</i>	Fully protected crossing of Speen Street for those that use it.	Circuitous and constrained bicycle connection. At-grade crossing seen as more desirable by some users. At-grade crossing may still need to be accommodated.	Fully protected crossing of Speen Street for those that use it.	Circuitous pedestrian connection will likely not be utilized. No room for At-grade crossing.	Requires easement from Town of Natick for Access through Right of Way. Requires access agreement with GGP. Requires easement or land purchase from IN Home Furnishing and Cloverleaf Mall.	Switchback ramp negatively impacts landscape buffer and sidewalks along Speen Street.	\$1,350,000 Does not include maintenance costs.	Maintenance of traffic on Speen Street. Impacts sight distance for traffic signals on Speen Street. Potentially impacts sight distance for IN Home Furnishing driveway. Utility Conflicts/ Coord.	Switchback ramps are particularly unattractive.
<i>Alternative 5 At-grade Crossing, with Modified IN Home Furnishing Access</i>	Accommodates all bicyclists on Speen Street. Provides fairly direct route to both Natick Mall and shared-use path. Consistent with other crossings along CRT.	Requires bicyclists to use pedestrian signal at Speen Street.	Accommodates all pedestrians on Speen Street. Provides most direct route.		Requires easement or land purchase from IN Home Furnishing and realignment of driveway.	Minimal	\$185,000 Does not include maintenance costs.	Maintenance of traffic on Speen Street. Impacts sight distance for traffic signals on Speen Street. Potentially impacts sight distance for IN Home Furnishing driveway.	Minimal Impacts
<i>Alternative 6 At-grade crossing, without Modified IN Home Furnishing Access</i>	Accommodates all bicyclists on Speen Street. Provides fairly direct route to both Natick Mall and shared-use path. Consistent with other crossings along CRT.	Requires bicyclists to use pedestrian signal at Speen Street. Requires path crossing of IN Home Furnishing driveway along Speen Street.	Accommodates all pedestrians on Speen Street. Provides most direct route.		Will likely require easement from IN Home Furnishing.	Minimal	\$180,000 Does not include maintenance costs.	Requires reconfiguration of driveway to IN Home Furnishing.	Minimal Impacts