

# BELMONT COMMUNITY PATH FEASIBILITY STUDY

Public Meeting #10 –  
Study Recap/  
Recommendations

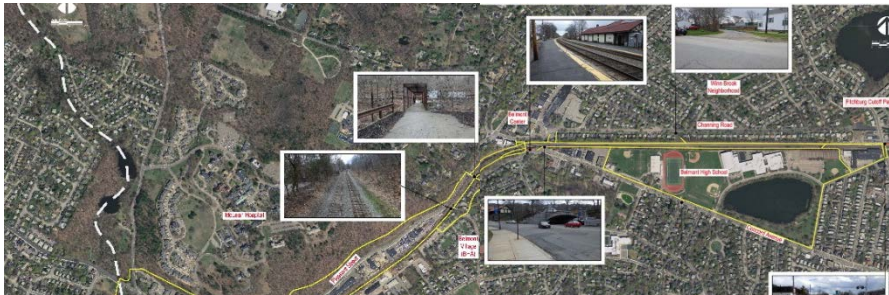
November 2, 2017



# AGENDA

- |                        |                 |
|------------------------|-----------------|
| 1. Introduction        | Russell Leino   |
| 2. Purpose and Process | Kathleen Fasser |
| 3. Study Recap         | Amy Archer      |
| 4. Final Scoring       | Kathleen Fasser |
| 5. Recommendations     | Amy Archer      |
| 6. Town Next Steps     | Amy Archer      |
| 7. Public Engagement   | Open Discussion |

# PURPOSE/LEVEL OF DESIGN

- To recommend a single route that will best serve the Town's residents AND function as a segment of the MCRT.
  - Feasibility study intended to advance to conceptual design and planning cost estimate
    - Define path options
    - Quantify impacts
    - Quantify costs
    - Weight and rank alternatives
- 
- An aerial photograph of a suburban area with a proposed transit route highlighted in yellow. The route starts in the lower left, moves east, and then turns north. Several inset photographs are placed along the route: a station platform, a street view, a road view, a station platform, a street view, and a station platform. Labels in red text are placed near the route, including 'Station', 'Station', 'Station', 'Station', 'Station', and 'Station'. A dashed white line indicates a road or boundary. A small inset in the bottom right corner shows a street view of a residential area.



# PUBLIC ENGAGEMENT GOALS

- A collaborative effort
  - Engaging and considering all stakeholders equally
  - Reflecting interests in project decisions
  - Responsibility of ALL to engage in respectful civil discourse

# PROJECT GOALS

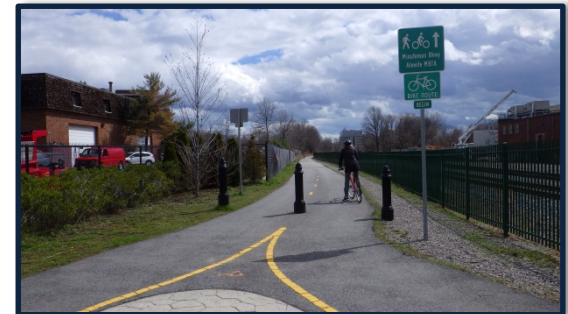
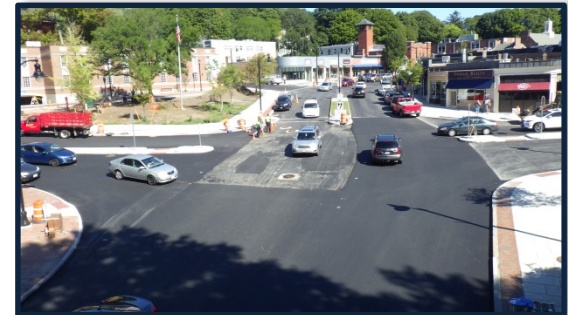
## ■ ADVANCE

- Convert CPAC alignments to conceptual design
- Include connections and access
- Determine need for structures – retention and crossings
- Identify various path attributes/amenities

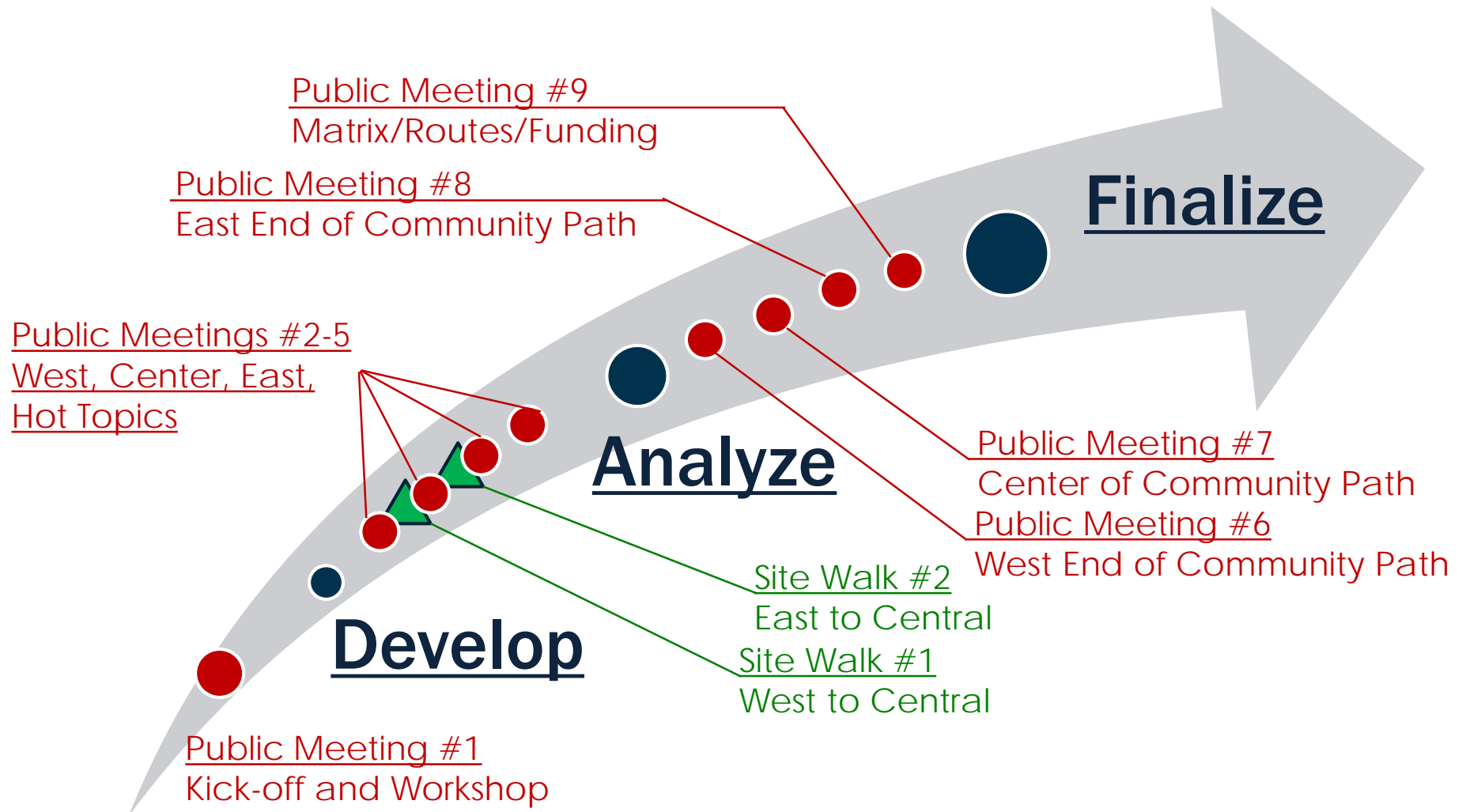
## ■ EVALUATE

- Environmental – parks, wetlands, species
- Social – serviceability
- Land – public vs. private, historic
- Cost – capital and funding

## ■ ADVISE AND RECOMMEND



# PROCESS

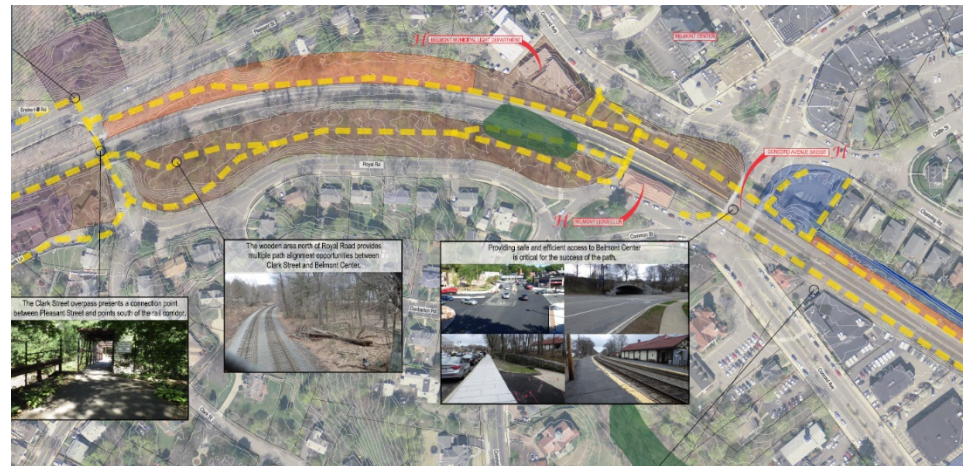




# STUDY RECAP

## DATA COLLECTION

- ✓ Review of past studies, presentations, reports and surveys
- ✓ Coordination with BOS, CPIAC and Town departments/committees
- ✓ Extensive field walks
- ✓ GIS mapping



# STUDY RECAP

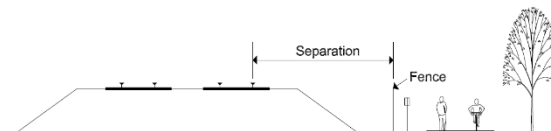
## DEFINE DESIGN STANDARDS AND GUIDELINES

Elements of Design	Standard Value
Width	10' – 14' (11' for passing, 8' in pinch)
Shoulder	3' – 5'
Object Offset	2' minimum
Vertical Clearance	8' minimum (10' recommended)
Design Speed	18 mph
Curve Radius	60' minimum
Cross Slope	2% maximum (1% recommended)
Running Grade	5% recommended maximum (ADA)
Structures	Bridges preferred to underpasses

- Max speed through Belmont – >45 mph
- Required running offset – 25' with fence
- Allowed minimum at pinch – 15' with barrier
- Required vertical clearance – 22'-6" top of rail to bottom of structure
- Ability to tunnel under? – Yes, currently do culvert work; cut and cover on weekends
- Required tunnel depth – Location specific due to presence of underground utilities, power lines, other buried apparatus
- Ability to cover over station – Not opposed if done properly (ventilation/lighting)



Exhibit 11-17  
Separation Between Track and Path



Source: Adapted from the VTrans Pedestrian and Bicycle Facility Planning and Design Manual

Exhibit 11-18  
Recommended Separation between Active Rail Lines and Paths

Type of Rail Operation	Setting Characteristics	Recommended Minimum Separation
High Volume/ High Speed 11 trains or more per day Max speed over 45 mph	Typical Conditions	25 feet with fence, 15 feet with a solid barrier
		15 feet with fence or other physical barrier
	Constrained Areas (cutfill, bridges, etc.)	15 feet with fence or other physical barrier
	Vertical Separation of at least 10 feet	20 feet



# STUDY RECAP

## INITIATE PUBLIC INPUT – Meeting #1 and Site Walks

- **Path Context Map** – Add your local knowledge



- **What is Most Important?**

- Rank the importance of each trait

WHAT IS MOST IMPORTANT? Belmont Community Path Feasibility Study			
WHAT SHOULD BE THE IMPORTANCE OF THE FOLLOWING PATH TRAITS WHEN RANKING THE ALTERNATIVE PATH ALIGNMENTS?			
	Least important	Important	Most important
Avoid or protect cultural resources and fragile environmental areas			●
Minimize need for environmental permits		●	
Use existing open spaces when feasible		●	
Take advantage of the natural topography	●		

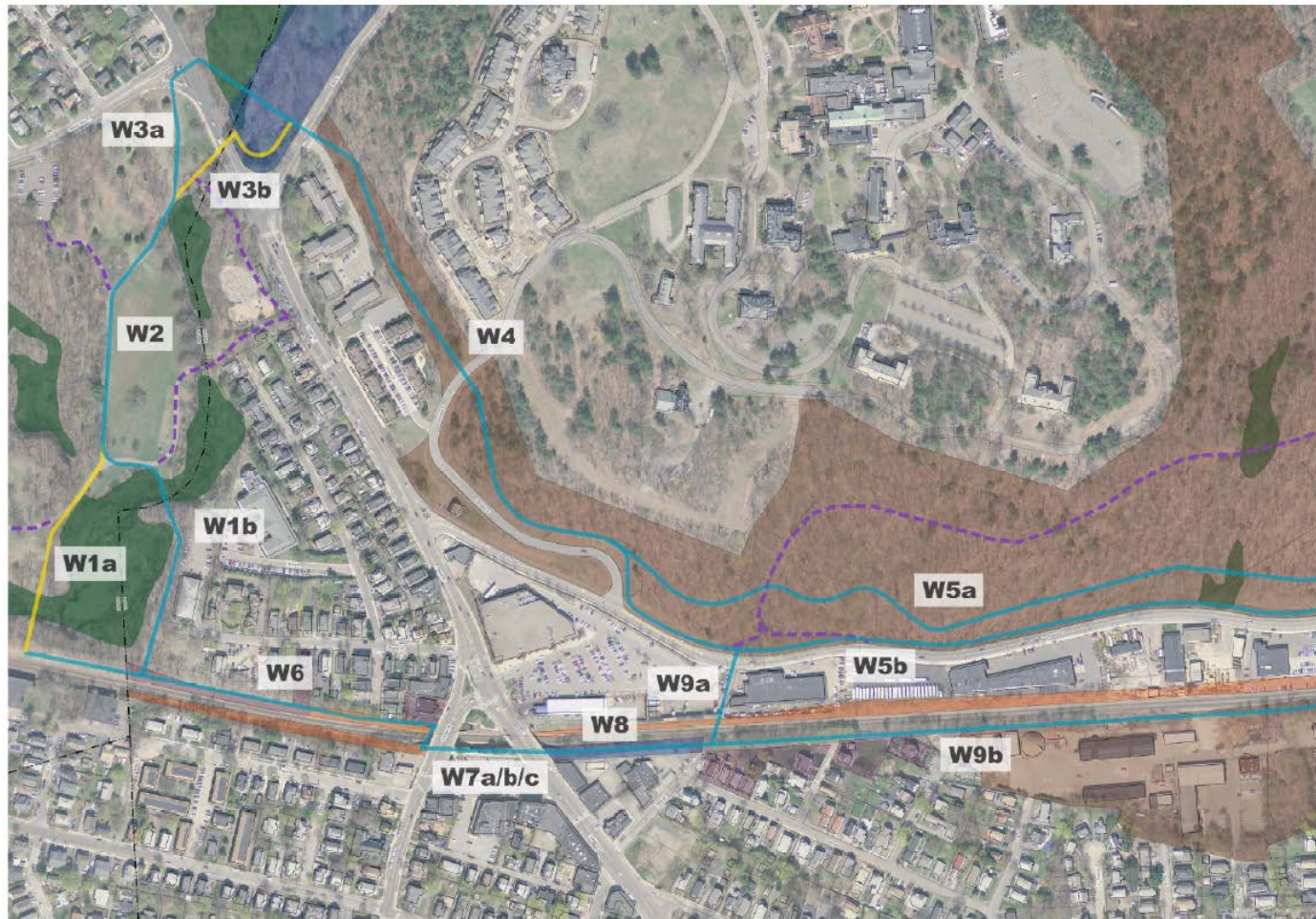
- **Attribute Preferences**

- Which do you prefer?



# STUDY RECAP

## ALTERNATIVE CONCEPTUAL DESIGN – Meetings #2 - 5



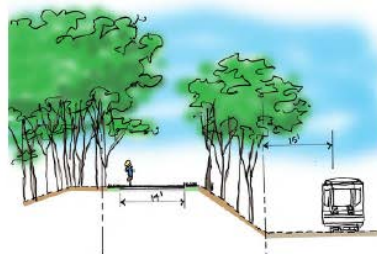


# STUDY RECAP

## ALTERNATIVE CONCEPTUAL DESIGN – Meetings #2 - 5



Example crossing at intersection (W3a)



Potential path along rail (W6)



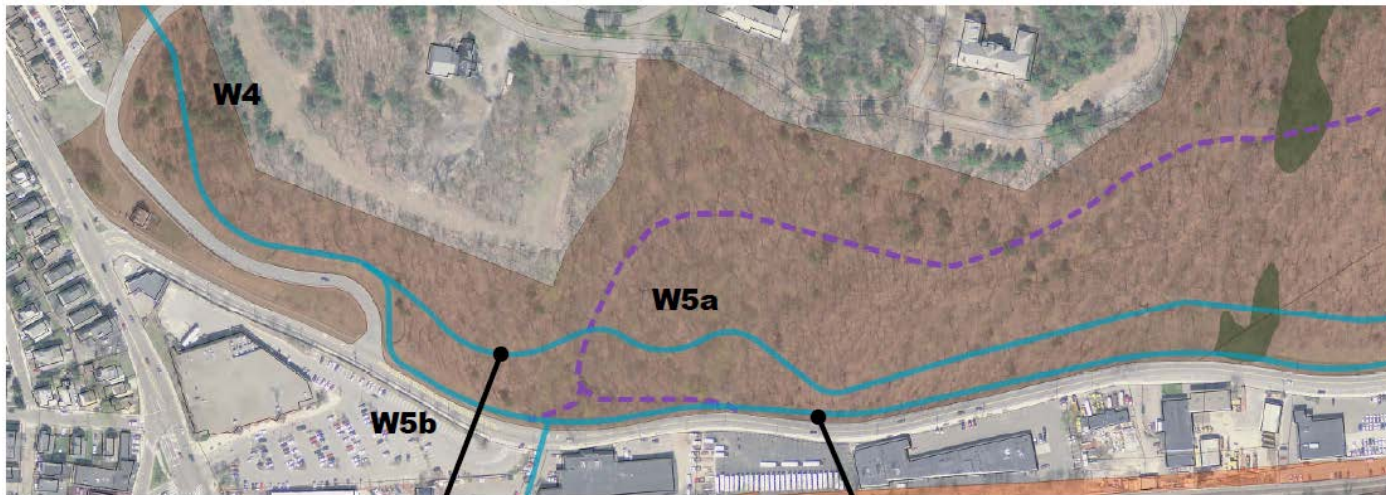
Example boardwalk (W1)



Potential Waltham connection to Beaver Brook (W1b)

# STUDY RECAP

## ALTERNATIVE CONCEPTUAL DESIGN – Meetings #2 - 5



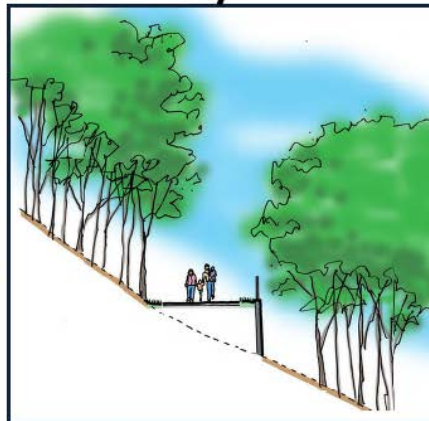
### Wooded (W4/5a):

Requires 12' wall

Minimum 30'  
swath removal  
of mature forest

3.25 acres impact  
to mature forest

Limited access



### Pleasant Street (W5b):

Utilizes existing wall

Reduces impacts by over  
1/2 mile

Increases connectivity to  
business

Increases potential for  
corridor redevelopment



# STUDY RECAP

## ALTERNATIVE CONCEPTUAL DESIGN – Meetings #2 - 5



Alignment of path from Waltham connection to being elevated over inbound platform (W7a) — green: grade change, blue: level.



Changing elevation to accommodate partial high platform for ADA train boarding.



User experience on train platform and elevated path within existing station box — anticipate MBTA will require at least partial wall; would recommend see-through edge treatment to extent possible.



# STUDY RECAP

## ALTERNATIVE CONCEPTUAL DESIGN – Meetings #2 - 5



Traverse Roadways (W7c):

Path could rise to Lexington Street and connect to existing platform



Box Over (W7b):

Allows for park space

Great connectivity to business/community

Headhouses with elevators convert to multi-modal station

More direct path route



Box Over with Church Street One-Way Westbound (W7b):

Maximum park space

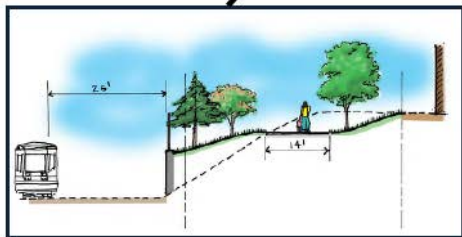
Increased connectivity to business/community

Replicate existing parking along store fronts



# STUDY RECAP

## ALTERNATIVE CONCEPTUAL DESIGN – Meetings #2 - 5



Directly East of Waverley Station (W8):

MBTA recommended offset from rail

Requires 6-8' wall

Tree plantings both sides

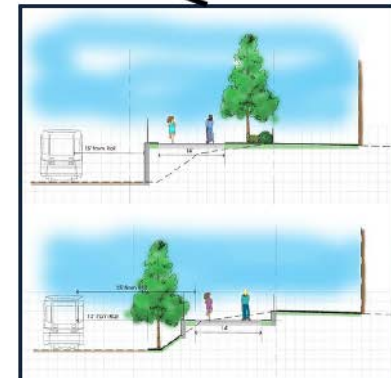
Encroachment to single property owner



Potential Crossing using Paper Street to Pleasant Street (W9a):

Minimal retention needed

Highly visible, signalized crossing needed at Pleasant Street



Continue East to DPW (W9b):

Runs along 7 residential properties

Narrowest pinch at eastern end — width for tree planting on one side

# STUDY RECAP

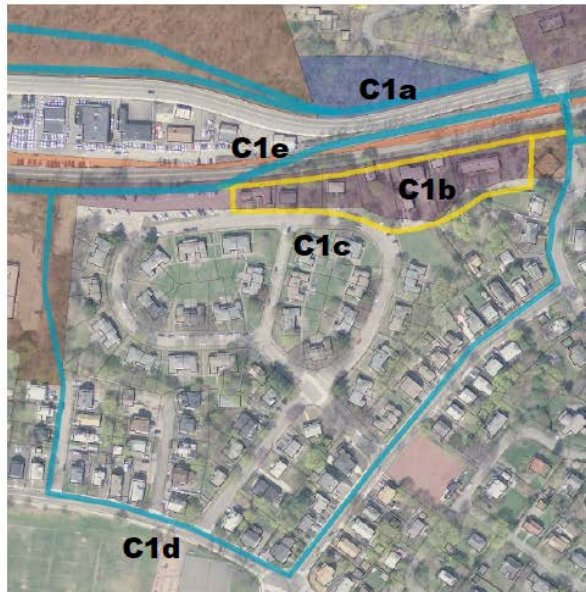
## ALTERNATIVE CONCEPTUAL DESIGN – Meetings #2 - 5





# STUDY RECAP

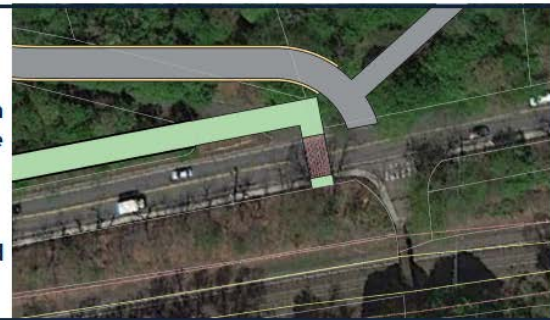
## ALTERNATIVE CONCEPTUAL DESIGN – Meetings #2 - 5



Cross Pleasant Street (C1a):

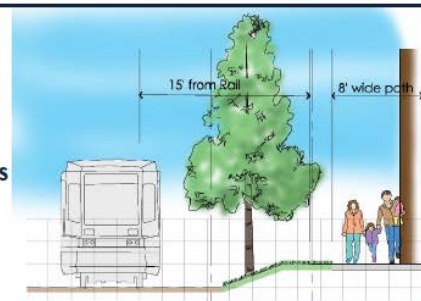
Opportunity to realign and signalize Snake Hill Road

Increases sight line and decreases road grade (20% to 12%)



Continue past BHA along south side of rail (C1b):

Minimum offset to rail (15') and minimum path width (8') has impact on residential buildings along Pearson Road and Clark Lane



Continue through BHA development and along Clark Lane (C1c):

Pearson Road



Clark Lane



# STUDY RECAP

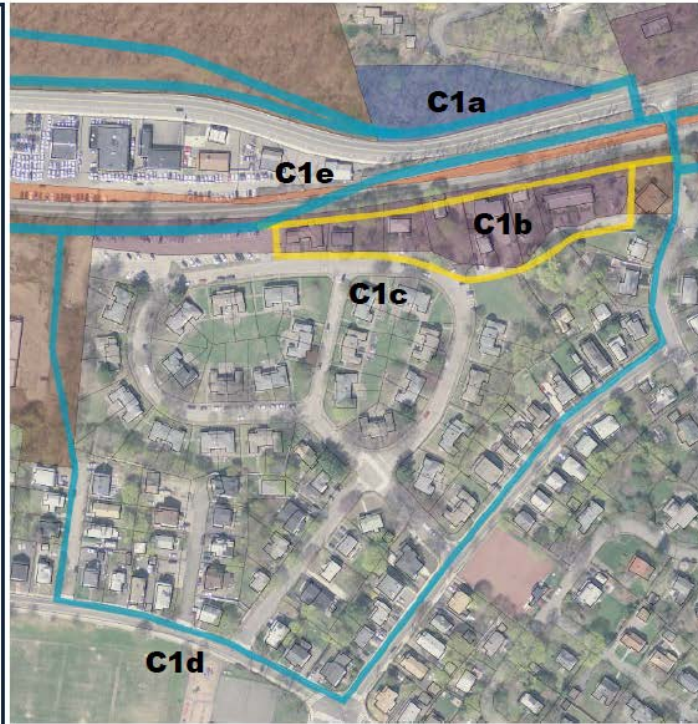
## ALTERNATIVE CONCEPTUAL DESIGN – Meetings #2 - 5

Continue along road network (C1d):

Connects via Midland Street to Town Field and BeechStreet Center.



Could convert Waverley Street and Beech Street to one-way couplet.

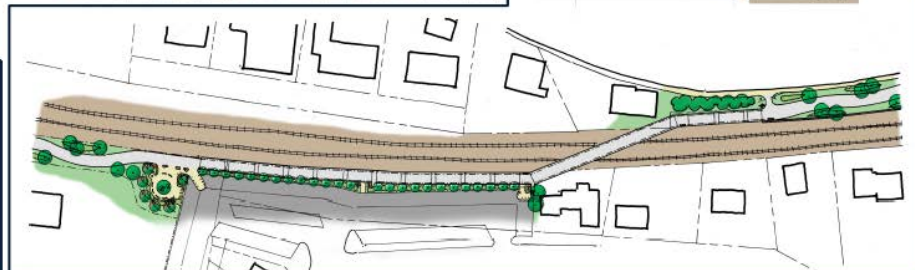
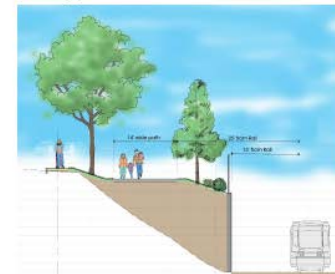


Crossing from BHA to south side of Pleasant Street (C1e):

Structure along BHA parking functions as sound barrier.



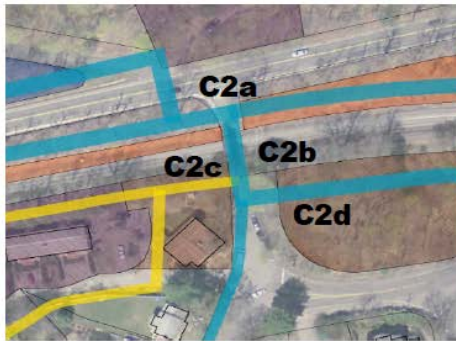
Requires wall (approx. 18' tall) along Pleasant Street — 600'.





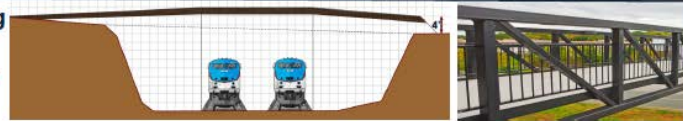
# STUDY RECAP

## ALTERNATIVE CONCEPTUAL DESIGN – Meetings #2 - 5

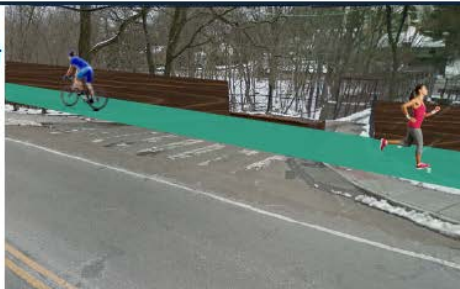


Crossing at the existing Clark Street bridge (C2b) requires raising the structure approx. 5' to meet MBTA clearance.

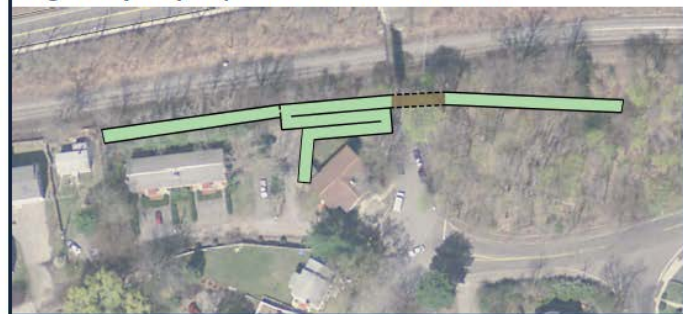
Structure will also be widened to 14' proposed path width.



Crossing on the south side of Pleasant Street (C2a) retains the existing Clark Street bridge.

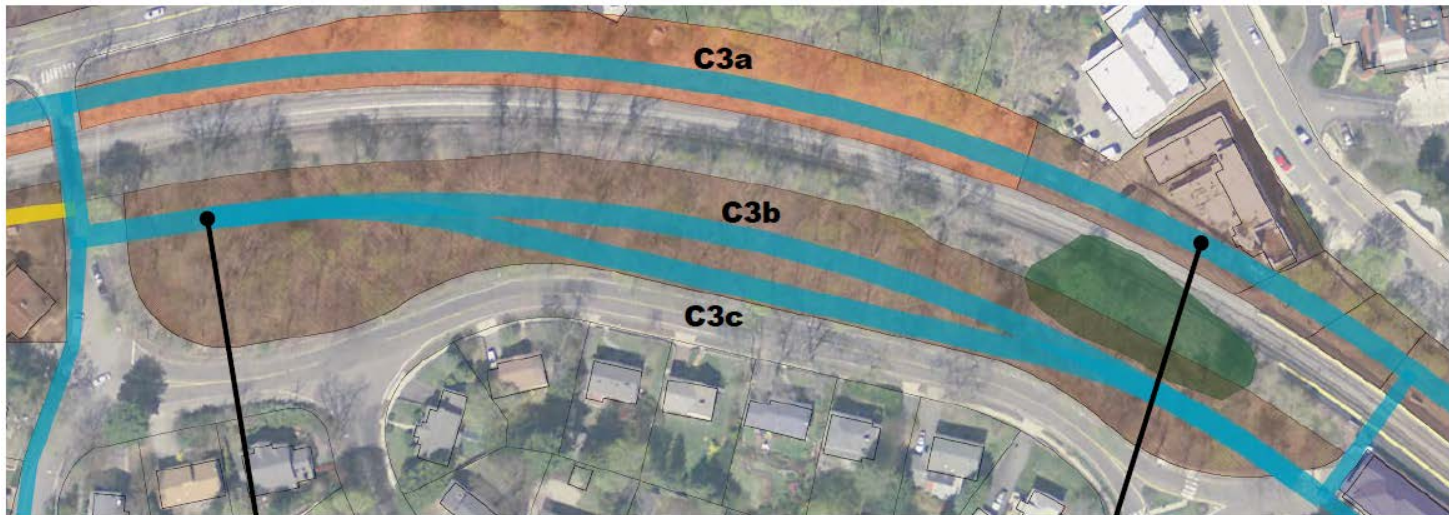


Going under Clark Street (C2c) or crossing Clark Street at-grade (C2d) requires retained structures.



# STUDY RECAP

## ALTERNATIVE CONCEPTUAL DESIGN – Meetings #2 - 5



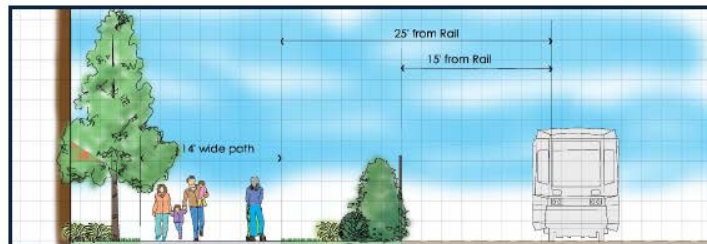
Royal Road Woods  
(C3b/c):

No walls required.

Allows for greater  
offset from rail.

Wetland locations  
may require  
boardwalk.

Could connect to  
Royal Road.



North Side of Rail (C3a):

No walls required.

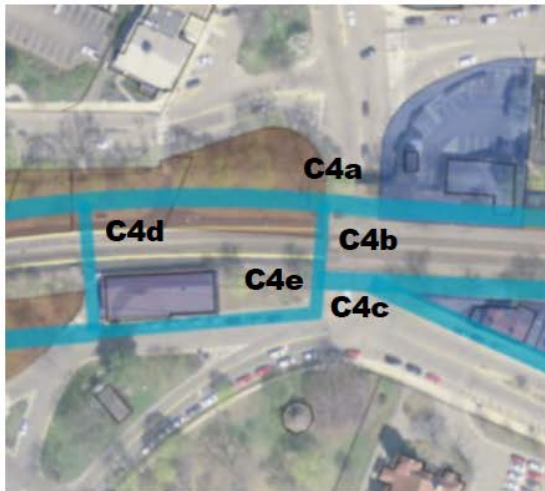
Room for edge treatments  
on both sides.

Increases connectivity to  
Police Station and  
Municipal Light  
Properties.



# STUDY RECAP

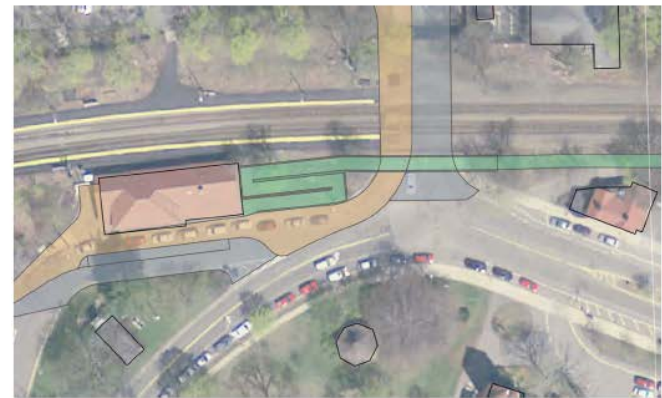
## ALTERNATIVE CONCEPTUAL DESIGN – Meetings #2 - 5



Continue North (C4a): Create park and enhance downtown connection.



Switch Sides (C4b) or Continue South (C4c): Narrow pavement width on Concord Avenue in underpass and/or signalize crossing.



Continue East along South Side of Rail (C4e): Requires switchback adjacent to Belmont Center Station.



# STUDY RECAP

## ALTERNATIVE CONCEPTUAL DESIGN – Meetings #2 - 5





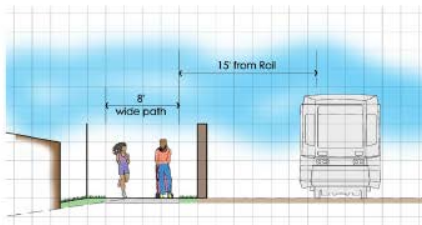
# STUDY RECAP

## ALTERNATIVE CONCEPTUAL DESIGN – Meetings #2 - 5

Continue along north side of rail (E1a):

Minimum offset plus  
minimum path width  
past bank — 25'

Room for edge  
treatments on both  
sides along MBTA/BCF



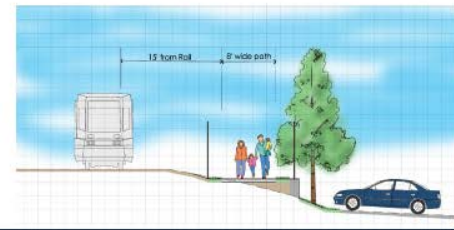
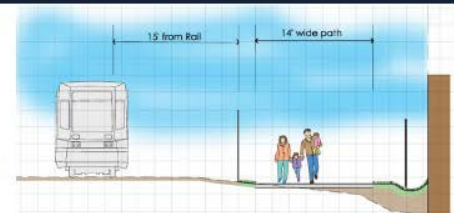
Cross and continue along Concord Avenue (E1c):



Continue along south  
side of rail (E1b):

Minimum offset to  
rail plus recom-  
mended path width  
past post office.

Minimum offset to  
rail plus minimum  
path width east of  
post office to avoid  
parking impacts



# STUDY RECAP

## ALTERNATIVE CONCEPTUAL DESIGN – Meetings #2 - 5

### Depress Path and Alexander Avenue (E2a):

Works for path running along north side of rail only.

Requires more extensive walls to provide openness.



### Straight Underpass (E2c):

Works with alignment along south side of rail or connection from Concord Avenue.

Alexander Avenue would depress to underpass similar to Yerxa Road underpass.



### Switchback (E2b):

Allows path running on north side to bypass the underpass.

Works with path on either side of rail or along Concord Avenue.

Requires less walls and is less costly.

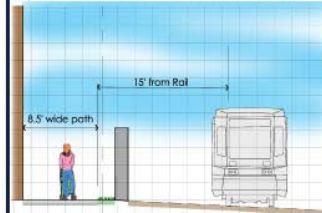
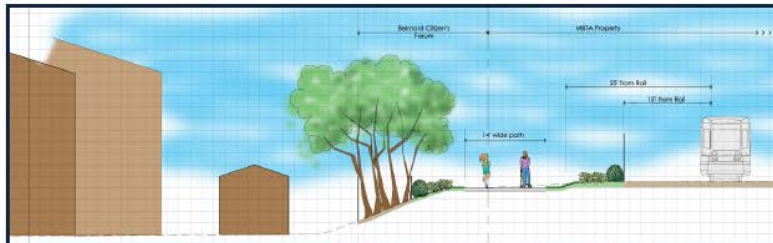
Has a somewhat "boxed in" feel.





# STUDY RECAP

## ALTERNATIVE CONCEPTUAL DESIGN – Meetings #2 - 5



Continue along north side of rail (E3a):

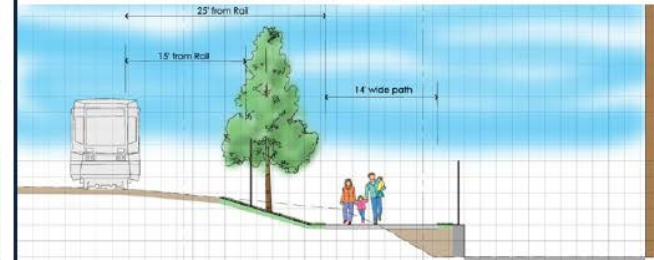
Possible cross section shown along BCF land.

Pinches at F&M building.

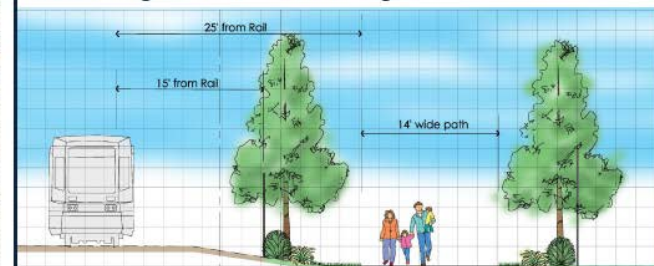


Continue along south side of rail (E3b):

Maintain drive aisle behind high school.



Run along north side of existing tennis courts.

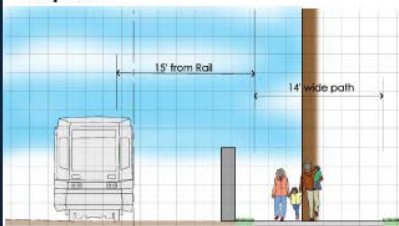


Traverse new high school campus (E3c):

MSBA approved for reconstruction.

Coordination with campus design team needed.

Pinch to minimum offset at Crate Escape building. Has structural impact.



# STUDY RECAP

## ALTERNATIVE CONCEPTUAL DESIGN – Meetings #2 - 5

Concord Avenue Linear Park (E3d): Condensing paved area to that needed for vehicular lanes and on-street parking allows for 33' minimum width park on north side of Concord Avenue adjacent to high school property.



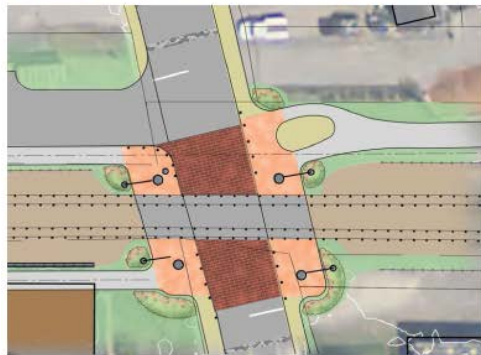
Traverse Winn Brook Neighborhood (E3e): Makes connection to Winn Brook Elementary School and avoids pinch point west of Brighton.





# STUDY RECAP

## ALTERNATIVE CONCEPTUAL DESIGN – Meetings #2 - 5



Cross Brighton Street At Grade (E4a):  
Use highly visible pave treatment and wide sidewalks.



Cross Brighton Street (E4b): Elevate to 16' west of French and Mahoney building.



Cross Brighton Street and Rail (E4c): Elevate to 24' west of Brighton Street and cross road/rail diagonally. Impacts building southwest of road/rail intersection.

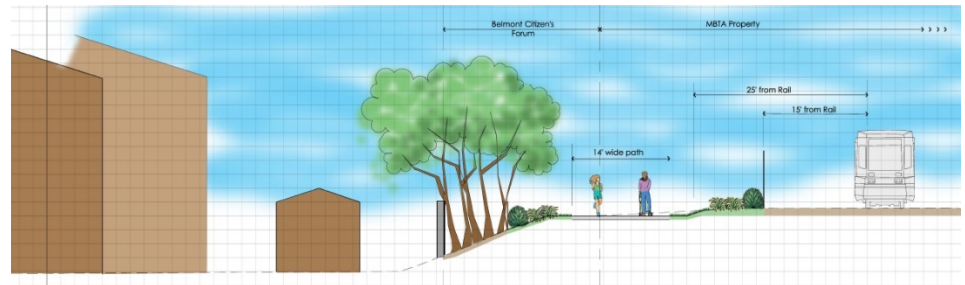
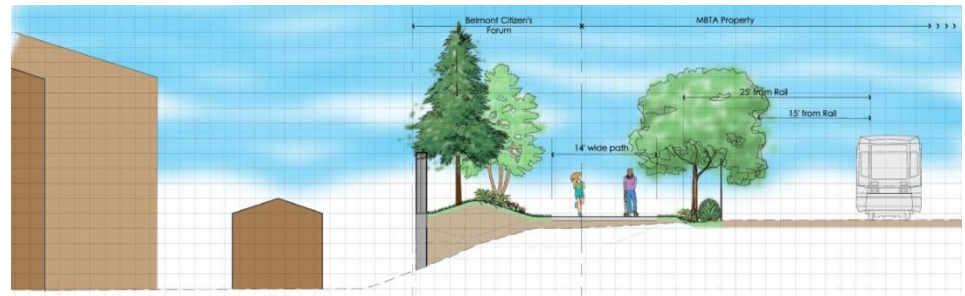
# STUDY RECAP

## ALTERNATIVE COSTS/ADVANCED SCORING – Meetings #6 - 9

- Computed higher option costs for all alternatives inclusive of detailed components

- Path
- Shoulders
- Plantings
- Hardscape
- Amenities

- Expanded to range of costs for applicable alternatives



# STUDY RECAP

## ALTERNATIVE COSTS/ADVANCED SCORING – Meetings #6 - 9

- Considered structure and path elements of cost as well as contingency

- Drainage
- Rail Coordination
- MOT incl. Rail

### BELMONT COMMUNITY PATH

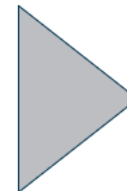
PATH	\$15.4 M
<u>PLUS CROSSINGS</u>	<u>\$12.5 M</u>
TOTAL	\$27.9 M

- Compared at district level and to surrounding communities

DISTRICT 4  
\$3 M/MILE



BELMONT  
PATH  
\$13.5M/MILE



DISTRICT 6  
\$20 M/MILE

# STUDY RECAP

## ALTERNATIVE COSTS/ADVANCED SCORING – Meetings #6 - 9

- Developed final matrix with 23 criteria under 5 primary categories

- User Experience
- Environmental and Cultural Impacts
- Design Attributes
- Transportation
- Cost

- Identified Fatal Flaws

### FATAL FLAWS – Not compatible with identified goal, eliminated from route consideration

1. Direct impact to an existing residential dwelling
2. Over 5,000 sf of loss to high quality wetlands
3. Path location is infeasible to patrol or too difficult to access in emergency situations or impedes access to other areas under Town responsibility
4. MBTA has rejected the proposed alignment/know private owner will not agree/requires speculation about usability of land at time of BOS determination
5. Alignment crosses an intersection with various negative conditions including excessive vehicular traffic volumes, multiple approaches/conflict points, poor sight lines, and lack of signal/inability to add signalization or alignment crosses 5 or more highly trafficked driveways within 500 linear feet of path

# FINAL SCORING

x2

CRITERIA
<u>User Experience</u>
Ease of Access
Aesthetics
Comfort
Directness
Vehicular conflicts
Conflicts with pedestrian way
<u>Environmental and Cultural Impacts</u>
Wetlands
Historic resources
Mature Woodland
Wildlife

<u>Design Attributes</u>
Encroachments necessary/MOU
Fire and Safety
Potential Partnerships
Distance to residential structures
<u>Transportation</u>
Connectivity to Destinations (Resources, Amenities and Transit)
Ease of universal public accessibility
Consistency with regional plans (MCRT/Wayside Trail)
Impact on existing traffic/transportation
Rail conflicts/proximity
<u>Cost</u>
Range of Construction Costs
Operations and Maintenance Costs
Qualify for Funding
Value Added



# FINAL SCORING





# FINAL SCORING





# FINAL SCORING



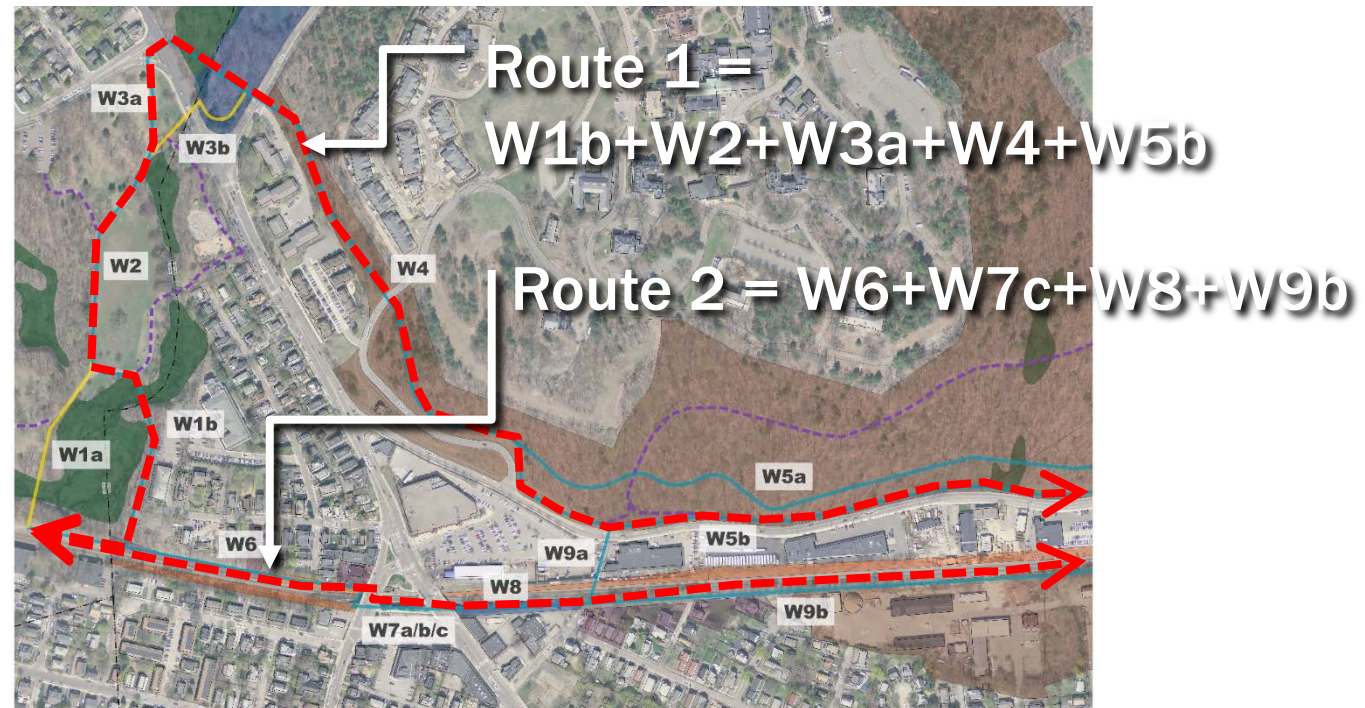


# ROUTE EVALUATION

What is a ROUTE??

- combination of high-ranking alternative alignments for the full length of the Study Area  
**WITH NO FATAL FLAWS**

EXAMPLES

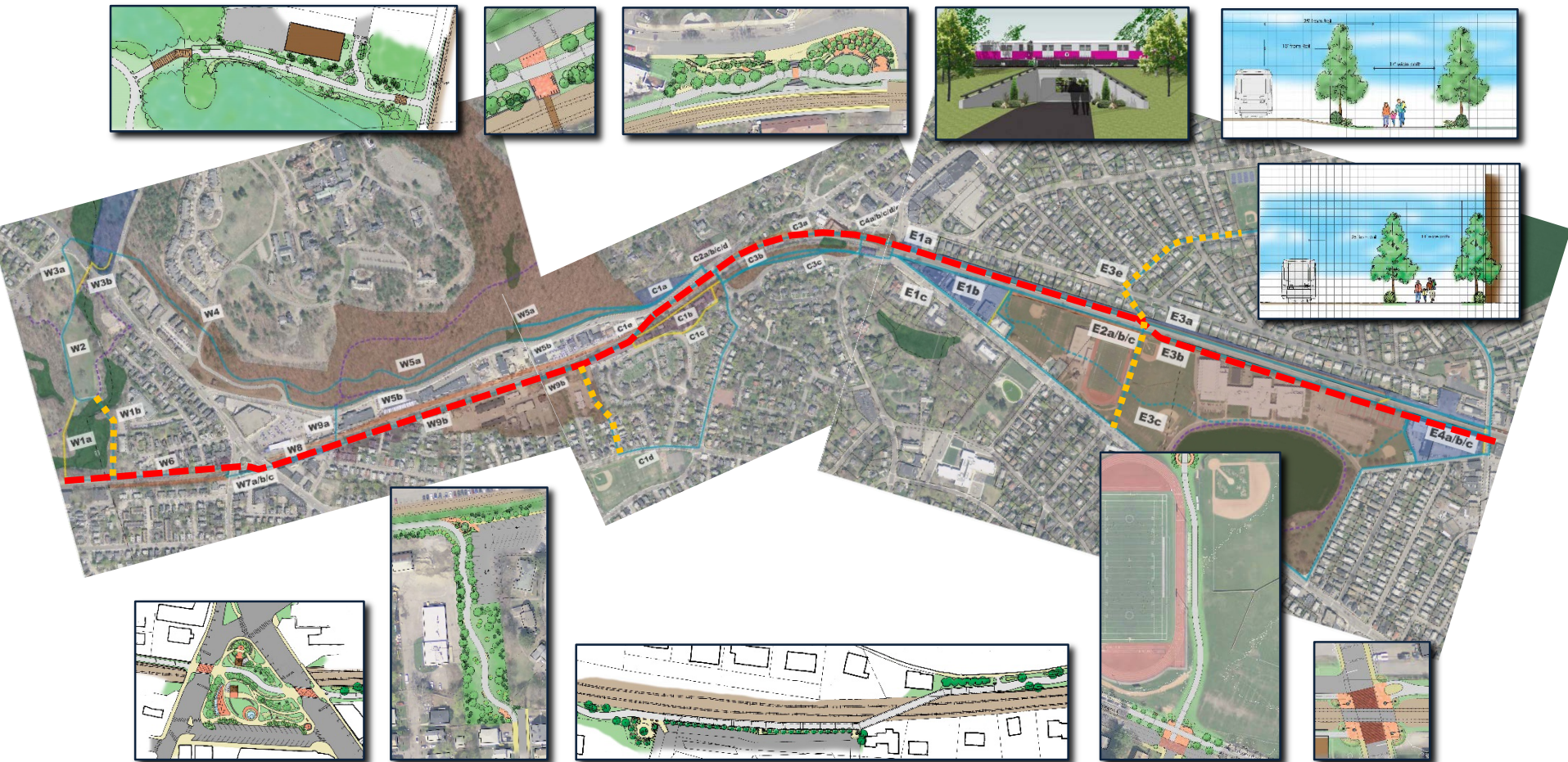




# RECOMMENDED ROUTE

W6, W7b, W8, W9b, C1e, C2a, C3a, C4a, E1a, E2a, E3b, E4a = 76 Average Score

**\$27.9 Million**

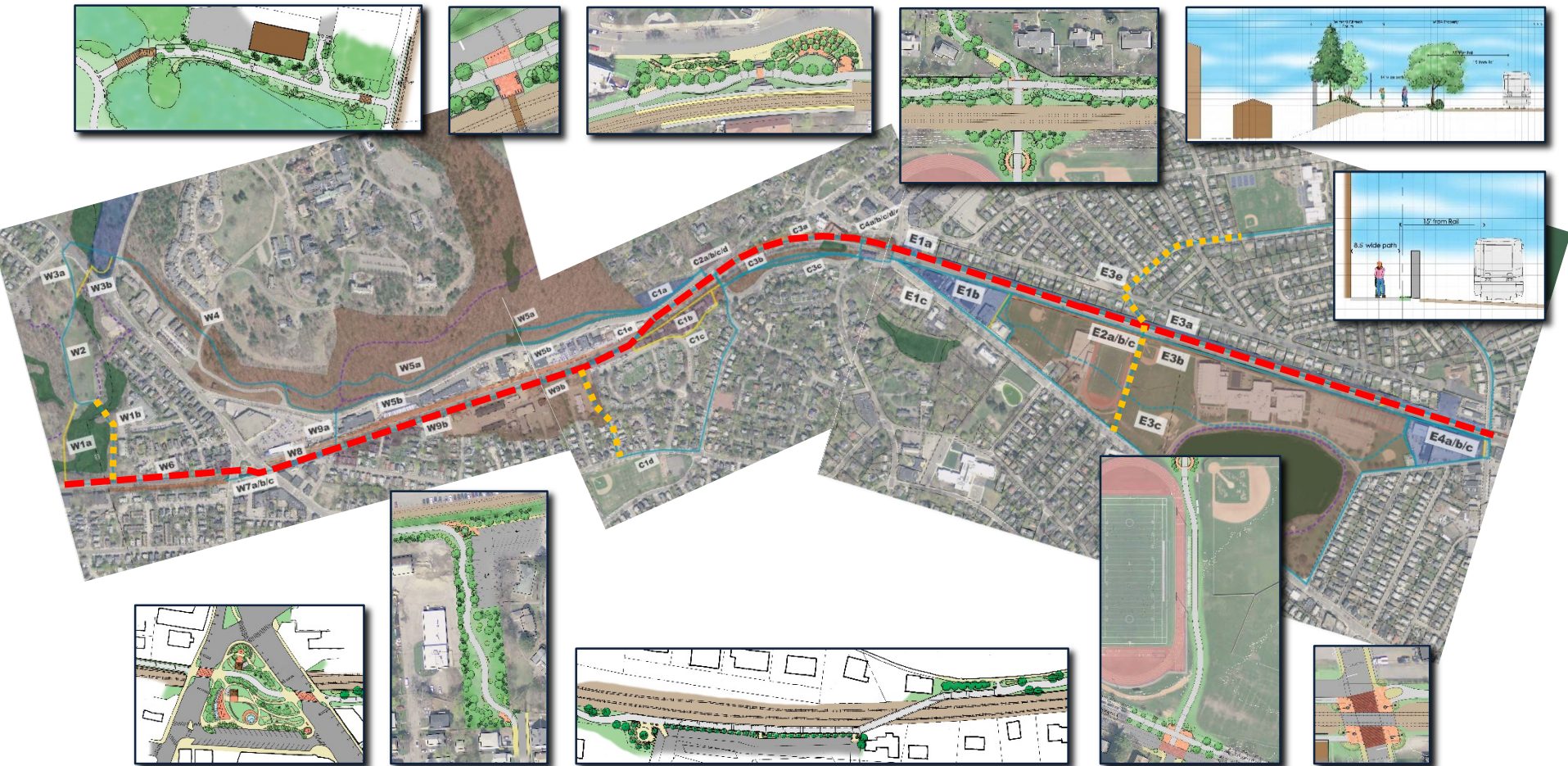




# CONTINGENT ROUTE 1

W6, W7b, W8, W9b, C1e, C2a, C3a, C4a, E1a, E2a, E3a, E4a = 75 Average Score

**\$31.8 Million**

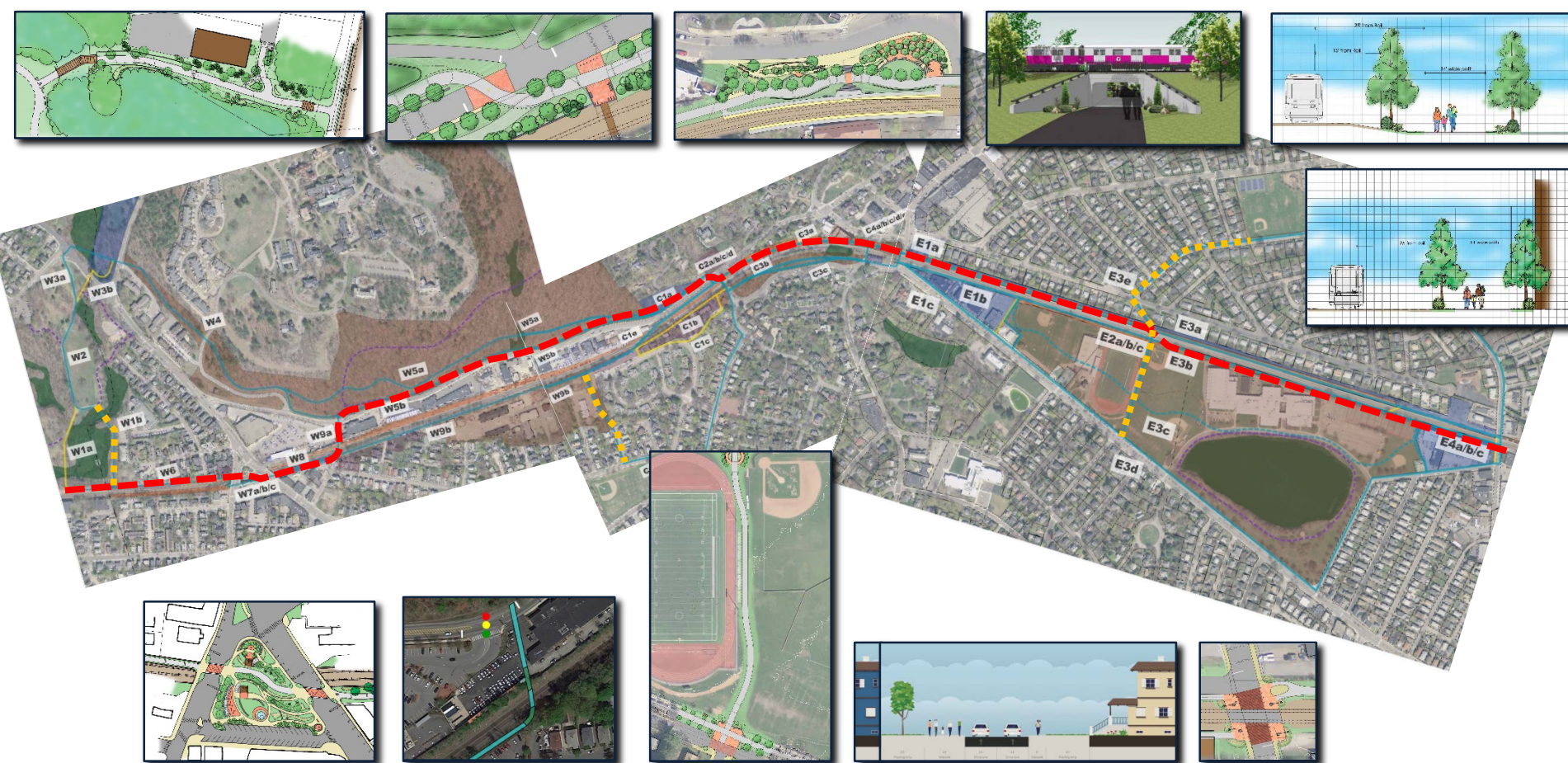




## CONTINGENT ROUTE 2

**W6, W7b, W8, W9a, C1a, C2a, C3a, C4a, E1a, E2a, E3b, E4a = 75 Average Score**

# \$25.1 Million





# RECOMMENDATIONS

## ■ Funding

- Seek total amount of highest cost route option
- Prepare for phasing
- Consider allocating to other projects (HS-MSBA)
- Indicate priority for Town



# RECOMMENDATIONS

- Construct spurs through initial or subsequent funding
  - W1b: Connect to Beaver Brook - \$0.73 M
  - C1d: Connect to Town Field - \$0.79 M
  - E2c: Connect to Concord Avenue - \$0.44 M
  - E3e: Connect to Winnbrook Elementary - \$0.77 M



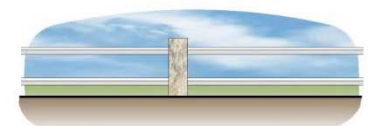
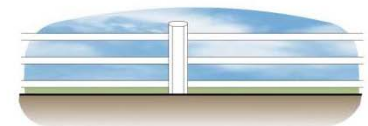
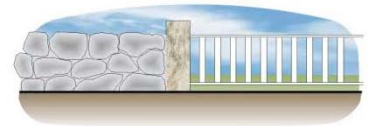
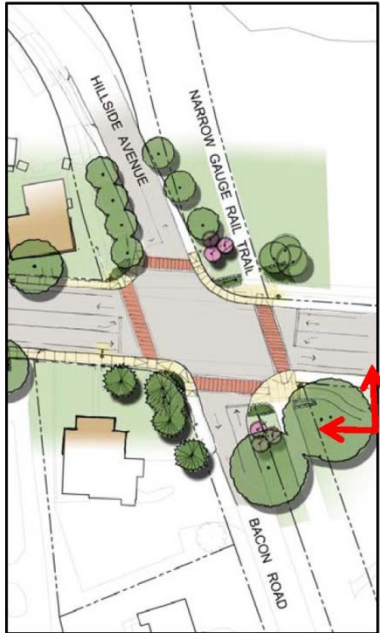
# WHAT'S NEXT?

- Study Recommendation Reviewed by BOS – Winter 2017
- Town Pursue Funding for Preliminary/Final Design – Spring 2018
- Town Issue RFP for Design and Select Consultant – Summer 2018
- Preliminary/Final Design with State Agency Review – 2018 & 2019
- Town Procure Funding/Property for Construction Phase – 2019
- Construction of Belmont Community Path – 2020 & 2021



# PUBLIC PROCESS – DESIGN PHASE

- Renderings to show perspective
- Array of alternatives and treatments within specific areas



# PUBLIC PROCESS – DESIGN PHASE

- Smaller focus groups
- Opportunities for abutter input



# DISCUSSION

**Time to provide any input that you would like the Town and CPIAC to consider moving forward.**

<http://www.belmont-ma.gov/community-path-implementation-advisory-committee-cpiac/pages/community-path-feasibility-study>

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