Today’s Agenda

- Welcome and logistics 10 minutes
- Transportation Considerations 25 minutes
- Intersection Considerations 20 minutes
- Street Design Basics: An Interactive Exercise 50 minutes
- Public Comments 10 minutes
- Next Steps 5 minutes
Welcome and Logistics
NEW Expected Timeline

Issues & Opportunities, Existing Conditions

Conceptual Design

25% Design

2019

2020

J | F | M | A | M | J | J | A | S | O | N | D | J | F | M | A | M | J

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Public Meeting #1

Carl Barron Plaza Engagement

Public Meeting #2

Carl Barron Plaza Design Charrette

Public Meeting #3

Working Group Meetings
Public Walks
Today

River Street Reconstruction
Expected Timeline

Construction Process (2020-2022)

Public Meeting #4

75% Design

100% Design

Construction Bids

2020

2021

J  A  S  O  N  D  J  F  M  A  M  J  J  A  S  O
# Summer & Early Fall Schedule

## New Working Group Schedule
- ✔ Working Group #4 Tues. 5/28
- ✔ Working Group #5 Wed. 7/17
  - • Working Group #6 Tues. 9/24

## Other Summer and Fall Activities
- ✔ Mobility/Safety Walk: Tues. 5/14
- ✔ Outreach at Riverfest: Sat. 6/1
- ✔ Carl Barron Existing Conditions: Open House on Wed. 6/5 and outdoors on Sat. 6/8
- ✔ Urban Design Public Walk: Tues. 6/11
  - • Carl Barron Design Charrettes: Sat. 9/14 (outdoors) and Tues. 9/17
• Working Group #5 Wed., 7/17
  • Mobility 101
  • Interactive Exercises for Street Design

• Working Group #6 Tues., 9/24
  • Draft Conceptual Design Alternative Progress
Ground Rules

- Phones off
- Keep an open mind
- Respect other opinions
- Speak, and let others be heard
- Read agenda and materials before the meeting
- Request agenda changes prior to meeting
- Help us stay on schedule
- Public comments during public comment periods
Building toward the design stage

1. IDENTIFY ISSUES
   - Define and analyze challenges and opportunities through perceptions and data

2. ESTABLISH VISION
   - What are our goals, in the context of existing planning & policies?

3. ITERATIVE DESIGN
   - Discuss and evaluate concept alternatives
   - Develop the final concept

IMPLEMENTATION
Transportation Considerations
People may choose to walk, bike, take transit, or drive depending on different days and conditions. The City has policies in place to reduce drive alone trips in favor of sustainable, active modes. This means making walking, biking, and taking transit as comfortable and convenient as possible. Currently roughly 56-84%* of trips made on River Street are by car.

The city's goal is to reduce drive alone trips by 2020 to:
• 29% for residents
• 38% for workers

*Vehicular mode share ranges from 56-76% in the AM peak hour and 60-84% in the PM peak hour when comparing River Street at Green Street to River Street at Memorial Drive.
Who We Are Designing For
Resources and Standards
Pedestrian Dimensions

Considerations for People who Walk

Accommodate Side by Side Walking

Design Should Match Desire Line

Desire Line

Design
Dimensions and Considerations for People who Bike

* 6 ft Operating Width is Preferred

Dimensions and Considerations for People who Drive
Larger Vehicle Dimensions
Larger Vehicle Dimensions
Considerations for Freight/Goods

Delivery Needs

Truck Routes

Parking/Loading
Transportation Analysis Tools

Delay for People Who Walk

<table>
<thead>
<tr>
<th>LOS</th>
<th>Average Ped. Delay</th>
<th>Likelihood of Ped. Noncompliance</th>
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<tbody>
<tr>
<td>A</td>
<td>&lt;10 Seconds</td>
<td>Low</td>
</tr>
<tr>
<td>B</td>
<td>10-19 Seconds</td>
<td>Moderate</td>
</tr>
<tr>
<td>C</td>
<td>20-29 Seconds</td>
<td>High</td>
</tr>
<tr>
<td>D</td>
<td>30-39 Seconds</td>
<td>Very High</td>
</tr>
<tr>
<td>E</td>
<td>40-59 Seconds</td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>&gt;60 Seconds</td>
<td></td>
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</table>

Bicycle Level of Comfort

Source: Adapted from Urban Street Design Guide, NACTO

Source: City of Cambridge, MA
Transportation Analysis Tools

Vehicle Capacity Analysis

- Consider volume compared to capacity (V/C ratio)
- Measure queuing in peak times (50th and 95th percentiles)
- Level of Service – LOS - D and E is acceptable in an urban area

Transit Delay and Reliability

- Consider volume compared to capacity (V/C ratio)
- Level of Service – LOS - D and E is acceptable in an urban area
- Compare delay to minimum running time and minimize delay due to:
  - Congestion
  - Traffic Signal Delay
  - Dwell Time
- Total delay is the vehicle delay multiplied by the number of people on a bus
- Reliability is important to reduce bus bunching and provide predictable service
- MBTA plans its service based on 90th percentile travel times
Design Goals

- Safe
- Inclusive
- Human Scale
- Ecological
- Multimodal
- Activated
- Resilient
Multimodal Safety

Bicycle Crash Types

- Rear-End
  - Traffic congestion
  - Unexpected pedestrian crossing (no crosswalk)

- Angle
  - Inadequate clearance interval/timing
  - Sight obstructions
  - Parking near corners

- Sideswipe
  - Insufficient space to pass turning vehicle or maneuver around parked vehicle

- Bike/Ped
  - Concurrent phasing
  - Traffic congestion
  - Door or Right/Left Hook

Figure 3.17: Primary Bicycle Crash Types

- Pedestrian crash
- Bicycle crash
Pedestrian Crossings

Pedestrian Hybrid Beacon/HAWK

Curb Ramps and Detectable Warning Strips

Signalized

Crosswalk Illumination

Uncontrolled

Rapid Flashing Beacon
Separated Bike Lanes

- Raised—No Parking
- Raised—Buffered w/ Parking
- Street Level – Buffered
- Separated with Flexposts
- Raised Mountable Curb
- Protected Intersections
- Signal Control
Separated Bike Lanes

• Bike Lane Width
  • Typically 5-6 ft. wide*
  • Greater than 7 feet allows for greater comfort, side by side riding, passing
  • More width may be required for maintenance needs

• Separation/buffer Width
  • 1 to 3 feet* or grade-separated depending on type

• Things to Consider
  • Volume of Bicycles
  • Type of Separation

• Note that a "cycle track" in Cambridge is used to refer to a grade separated bicycle lane.

*Cambridge Bicycle Plan

<table>
<thead>
<tr>
<th>Facility Dimensions</th>
<th>One-Way Cycle Track</th>
<th>Two-Way Cycle Track</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Minimum$^1$</td>
<td>Preferred$^2$</td>
</tr>
<tr>
<td>Cycle Track Width</td>
<td>5’</td>
<td>7’</td>
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<tr>
<td>Separation$^3$</td>
<td>1’ to 3’</td>
<td>3’+</td>
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</table>

Source: City of Cambridge Cycle Tracks White Paper

Source: FHWA – Separated Bike Lane Planning and Design Guide
Bus Priority

Bus Lane

Transit Signals/Bus Queue Jump
Bus Priority to Address Delay and Reliability

Transit Signal Priority

Green Extension

Queue Jump Lane (with TSP)

Green Reallocation

Red Truncation

Source: NACTO Transit Street Design Guide
Traffic Calming

- Pinch Point
- Chicane
- Pedestrian Crossing Island
- Constrained Sight Lines
- Raised Side-Street Crossing
- On-Street Parking
- Signal Progression
- Street Trees
Many Demands on Curbside Space

Greening and Green Infrastructure

Food Trucks

TNC pick-up/drop-off

Activation

New demands for curbside space are emerging
Factors Determining Curbside Uses

- Existing conditions
- Land use
- Neighborhood context
- Public input on neighborhood needs
- Observations
- Public feedback on design alternatives
New Mobility Blueprint

Re-think the use of right-of-way

• Modal boundaries blurring – less people use only one form of transportation.

• Adapt policy to accommodate new forms mobility in ways that meet City goals. For example:
  • Preserve affordability and equity of transportation
  • Reduce congestion and GHG emissions
Intersection Considerations
River Street @ Putnam Example
Signal Phasing

- 3-phase signal
- Exclusive pedestrian phase
- Permissive Putnam Avenue left-turns
Signal Technology

- Coordination
- Actuation
- Signal Equipment

Signal cycles operate in a progression along a corridor for efficiency of movement.

Traffic Flow

Optimized Signal Timings

Lane Use Signage
Operations/Capacity Analysis

- Vehicle Queues in Feet
- User Delay in Seconds
- Management of Vehicle Operations
  Important for Safety of all Users

Average & Maximum Queues

AM (7:00-10:00 AM)
- Average Queue
- Maximum Queue

PM (4:30-7:30 PM)
- Average Queue
- Maximum Queue

Based on field measurements of vehicle queues
Geometry

- Lane configurations
- Crosswalks
- Corners
  - Curb radii
  - Curb ramps
- Curb ramps

Lane Designations
Capacity/Safety

Accommodate
Turning Vehicles

Length of Crossing
Visibility

Accommodate
MBTA Route 64
Routing/Turns

Geometric configuration informs signal timing
Intersection Safety Considerations

Driver Yielding Rates and Travel Speeds at Crossings

- Percent Yield vs. Speed (MPH)

Graph showing the relationship between percent yield and speed at intersections.
Traffic Calming

- Pinch Point
- Chicane
- Pedestrian Crossing Island
- Raised Side-Street Crossing
- Signal Progression (Signals timed to match the target speed)
- Constrained Sight Lines
- On-Street Parking
- Street Trees
Goals of the Exercise

• Build a common understanding of the opportunities, constraints, and challenges involved in street design.

• Examine and think about how the group decides between different elements that could be included in a constrained cross-section.
Basic Directions

• Help us design **Main Street**, a fictional **one-way** street that is **50 feet wide**.

• Each group of 3 to 5 people must agree on one design.

• Pieces must fit inside the right-of-way on the map without overlapping with each other or adjacent buildings.

• Discuss options with your group.

• You have 25 minutes to complete.
Consider Different Perspectives/Needs

- Business owner
- School children
- Visitor/customer
- Resident
- People with mobility challenges
- Adjacent activities
  - Land use
  - Public transportation
  - Connections/desire lines
Things you must include

- Sidewalk on both sides of the street
- A separated bicycle lane (at-grade with buffer or raised)
- Vehicle travel lane(s) for one-way travel
- Each group of 3 to 5 people must agree on one design
Step One: Mobility

- Sidewalks (with street trees included)
  - 8’ wide (current)
  - 10’ wide (widened)
- Bus Lanes (11’ wide)

- Bike Lanes
  - At-Grade w/Buffer (8’ wide minimum)
  - Raised/Grade-separated (6’ wide minimum)
- Vehicle lanes (10.5’ wide)
- Crosswalk (10’ wide)
Step 2: Curbside

- Curb Extensions (7’ wide)
  - Planted
  - Paved
- Buffer (4’ wide)
  - Planted
  - Painted
  - Paved
- Loading/Parking/Storage (7’ wide minimum)
  - Could be for commercial/loading, pick up/drop off, 15-minute, metered, residential or?

Note that curbside can also be used for:

- Bicycle facilities
- Additional sidewalk
- Bus / travel lanes
Step 3: Street Furniture (not to scale)

- Bench
- Bike racks
  - Single
  - Multiple
- Blue Bikes Docking Station
- Bus Shelter
- Café Seating
  - Narrow
  - Wide
- Planters
  - Narrow
  - Wide
Design Goals

- Safe
- Inclusive
- Human Scale
- Ecological
- Multimodal
- Activated
- Resilient

Western Avenue
Discussion

• What transportation modes did you include?
• What makes this street configuration ideal?
• What are this street configuration's pros and cons?
Next Steps
Pre-Construction Questionnaire

• To be published soon (watch your email)
• Will become the “Before” survey for the River Street Reconstruction
• When Post-Construction survey is complete, the two will help the City measure the project’s success
• Please help us distribute to your neighbors!
Upcoming Meetings and Events

• Carl Barron Plaza Design Charrette
  • Design Charrette 1: Saturday, September 14, 11am-2pm
  • Outdoor Engagement: Saturday, September 14, 3-6pm (Carl Barron Plaza)
  • Design Charrette 2: Tuesday, September 17, 6pm-9pm

• **Working Group #6 Meeting**: Tuesday, September 24, 6-8pm at Manning Apartments
  • Concept plans - Memorial Drive to Franklin Street
  • Surface and subsurface project goals
River Street Reconstruction

The River Street Reconstruction project will upgrade the sanitary sewer, stormwater and water subsurface infrastructure while developing a new surface design for River Street, the bus terminal area at River and Magazine Streets near Central Square, and Carl Barron Plaza. The project aims to create a streetscape design that meets the needs of all the various users and in a way that engages the local community, contributes to overall enhancement of the neighborhood, and meets the City’s goals related to infrastructure, transportation, and urban design.

The concurrent design of Carl Barron Plaza, the significant open space at the heart of Central Square will include consideration of public art, fixed and/or unfixed furniture, access, plantings, and landscaping. The design must also consider the complexity of transportation needs related to the bus bays adjacent to the Plaza and people moving through the plaza.

The community outreach and design processes will occur throughout 2019 and into early 2020. Construction is anticipated to begin in Spring 2020.

Click here to sign up for email updates on this project.
Click here to provide general comments and feedback.

Please use this Public Input Map to provide your input on issues and opportunities along River Street and in Carl Barron Plaza.
THANK YOU!

riverstreet@cambridgema.gov