City of Cambridge
Community Development Department

Belmont Street Reconstruction Project

October 15, 2019

Agenda

Welcome and Introduction	5 minutes
Presentation	45 minutes

- **Project Scope and Timeline**
- **Past Utility Work and Future Construction**
- **Approach to Transportation Planning and Design**
- **Existing Conditions**
- **Approach to this project**
- **Exploring Concepts**
- **Belmont/Holworthy intersection**

Clarification Questions	5 minutes
Public Input	35 minutes

Project Scope Recap and Timeline

Project Scope Recap

Street and sidewalk contracts are funded locally and by the state. These contracts are managed by the Department of Public Works. Construction generally includes surface enhancements such as:

- **Paving**
- **Sidewalk and pedestrian ramps**
- **Traffic calming**
- **Street trees**
- **Stormwater management and green infrastructure**
- **Improvements for people who bike and take transit**

Emphasis on accessibility – pedestrian ramps, sidewalks and universal design.

Vision Zero calls for the elimination of fatalities and serious injuries resulting from traffic crashes.

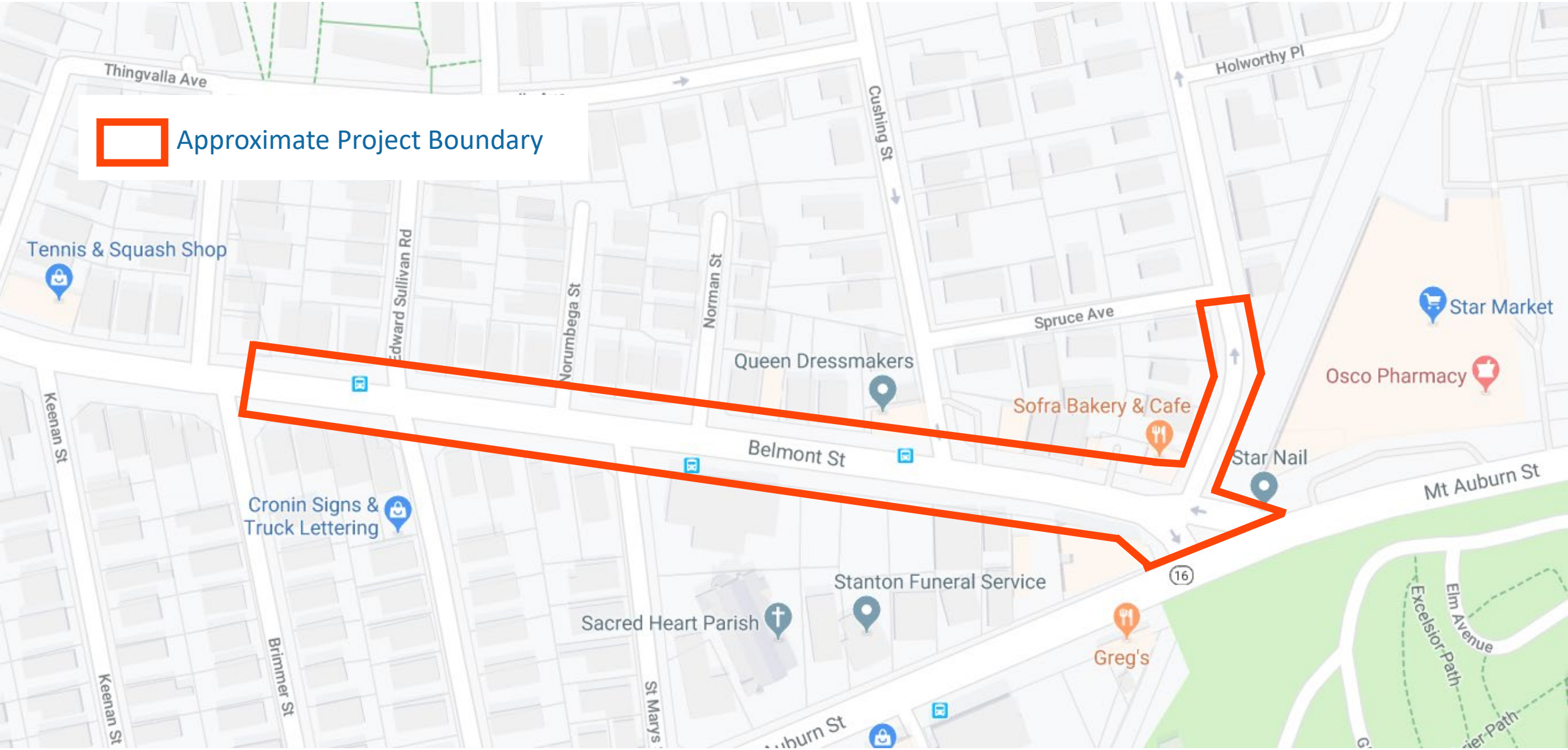
Transit improvements – accessibility of bus stops and transit priority, as feasible.

Network of bike facilities – support people of all ages and abilities to bike safely throughout the city.

Additional street trees and green infrastructure.

Maintain and improve city infrastructure, and coordinate with private utilities to facilitate upgrades.

Interactive construction map available at: www.cambridgema.gov/theworks/constructionmap


Approximate Project Boundary
Thingvalla Ave
Cushing St
Holworthy Pl
Tennis & Squash Shop
Edward Sullivan Rd
Norumbega St
Norman St
Spruce Ave
Star Market
Queen Dressmakers
Osco Pharmacy
Sofra Bakery & Cafe
Keenan St
Belmont St
Star Nail
Mt Auburn St
Cronin Signs & Truck Lettering
Stanton Funeral Service
16
Sacred Heart Parish
Greg's
Brimmer St
St Marys
Elm Avenue
Excelsior Path

Public Process

- **Meeting 1:** May 15, 2019. Department of Public Works introduced the project scope
- **Meeting 2 (TODAY!):** Review existing conditions, introduce “givens” in developing the design, and discuss options/variations that might be possible to improve transportation for everyone using the street
- **Meeting 3:** (winter) Discuss draft design
- **Meeting 4:** (early spring) Final design and pre-Construction Meeting

Current Utility Work and Future Construction

Eversource / Utility Construction

Work in the roadway from late winter through summer 2019 was to replace 1200 linear feet of gas main and 32 associated services in advance of the City's street and sidewalk reconstruction.

- The City worked with abutters to reduce impacts of the construction and discussed additional efforts for the upcoming project
- The City converted unrestricted to time-limited parking and loading
- MBTA catenary wires restricted work hours to 10am to 2:30pm.

Additional future construction work will include:

- Cambridge Water Main/Service Replacement
- Watertown – Water Service Upgrades

Upcoming City Construction

The City is committed to working with residents and businesses throughout the construction process. Construction Coordination includes the following:

- **Project Manager and Community Relations Manager assigned to every project to manage contractor as well coordinated construction activities and community notifications.**
- **Project web page maintained by DPW Community Relations Manager**
- **Join email list by visiting project web page**
- **Standard Work Hours: Mon – Fri 7 am – 4 pm**
- **Maintain safe and effective traffic management plans to assist people walking, biking, taking transit and driving through project area.**

Approach to Transportation Planning and Design

Transportation is about moving PEOPLE

- People in a city like Cambridge often have choices; and are not typically restricted to one mode.
- People choose to walk, bike, take transit, or drive depending on weather, details of their day, preferences, etc.
- Some people do have mobility restrictions or other life factors that make walking and biking a much more difficult choice.
- The city has policies to reduce drive alone trips in favor of sustainable, active modes (public transit, walking, biking) for reasons related to health, climate, accessibility, and equity.
- ***This means that we must strive to make walking, biking, AND taking public transit as comfortable and convenient as possible.***
- The challenge is how best to offer a robust sustainable transportation system that makes walking, biking AND public transit feasible, competitive, and safe to get around in constrained right of ways.

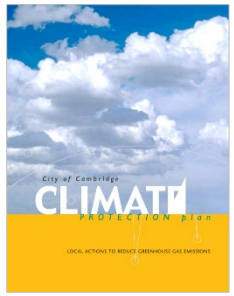
Policies

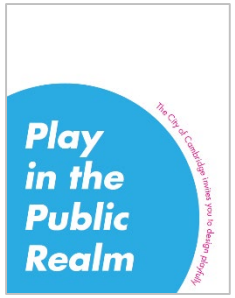
Some key foundational transportation policies include:

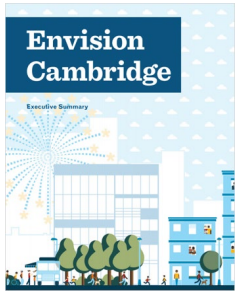
- **1992 Cambridge Vehicle Trip Reduction Ordinance: Established programs to encourage alternatives to single occupancy vehicle trips**
- **1993, 2007 Cambridge Growth Policy: Emphasizes sustainable modes of transportation (walking, biking, and using transit) and low-emission vehicles**
- **2016 Cambridge Complete Streets policy: Complete Streets are designed and operated to enable safe access for all users – regardless of age, ability, or mode of transportation.**
- **2016 Cambridge Vision Zero policy: Calls for the elimination of fatalities and serious injuries resulting from traffic crashes, and emphasizes that they can and should be prevented.**

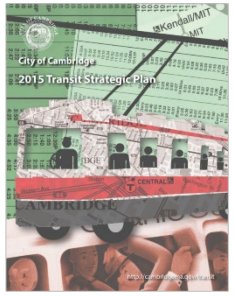
VISION ZERO CAMBRIDGE

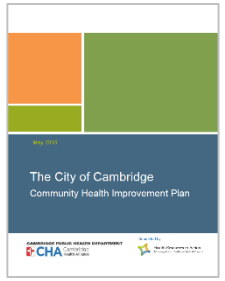
Many policies and plans are the foundation for our work



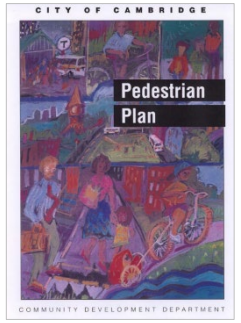








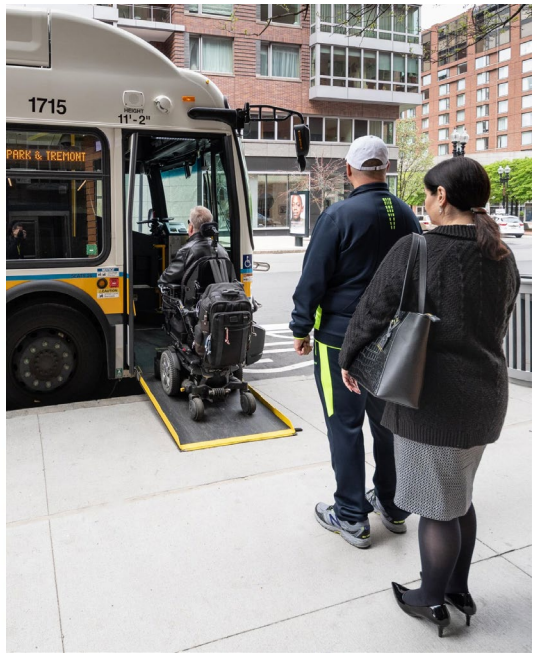
New Mobility Blueprint



Who are we designing for?

We design for people of **ALL ages and abilities** to be able to use all modes, including walking, biking, taking transit, and driving.

This includes the most **vulnerable** people who need a variety of ways to access jobs, recreational activities, goods, groceries, social services, and other people, and who may not have access to a car.



How we think about vehicle congestion and delay

To understand operational challenges for people driving, we consider the volume of cars on a road relative to the capacity, what queueing looks like, and delay, which is measured in terms of “Level of Service”.

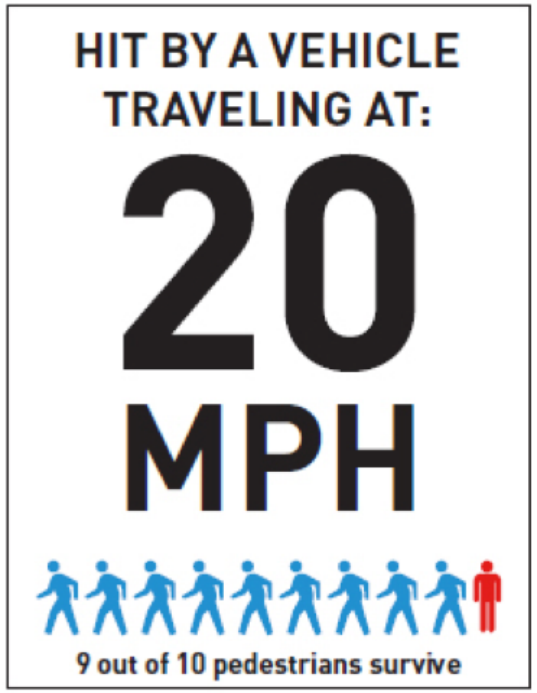
- Level of Service (LOS)
  - A standard measurement, based on vehicle delay and speed, which reflects the relative ease of traffic flow on a scale of A to F
- LOS “A”: free-flow traffic
- LOS “F”: highly congested traffic conditions

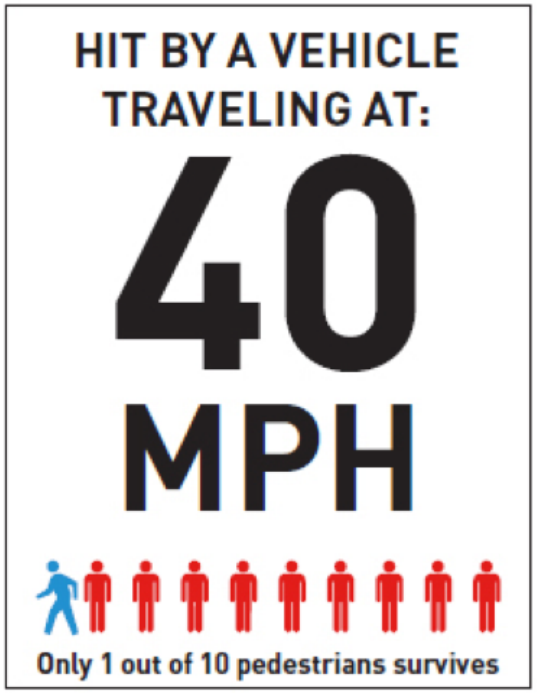
NOTE: LOS D and E are acceptable in an urban area

We aim to move traffic consistently, slowly, and safely, but not eliminate delay.

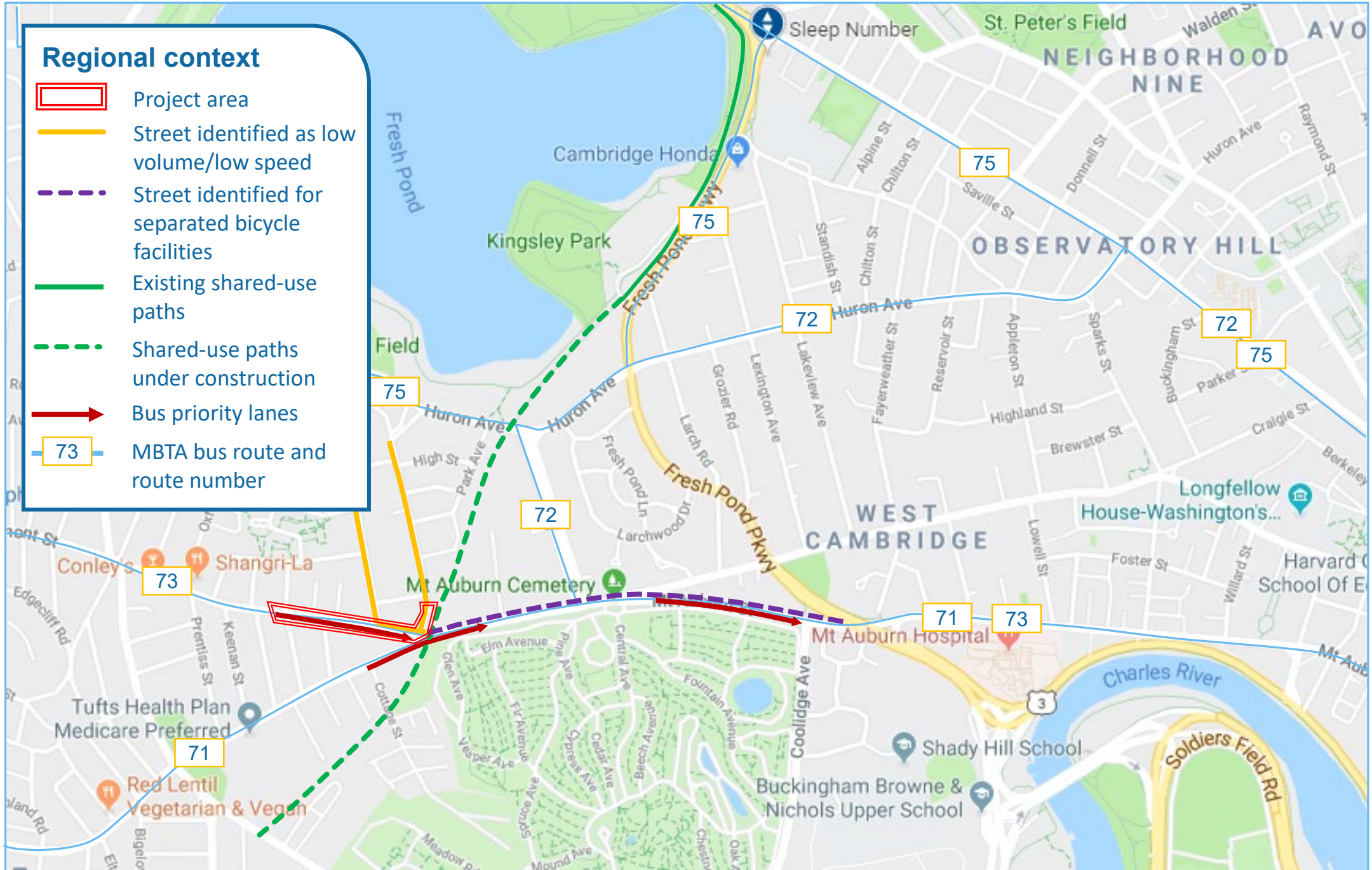
Moving people slowly is moving people safely

Narrowing lanes and reducing the number of general travel lanes discourages speeding. Pedestrians have a much greater chance of surviving a crash if a vehicle is moving at 20mph or less.

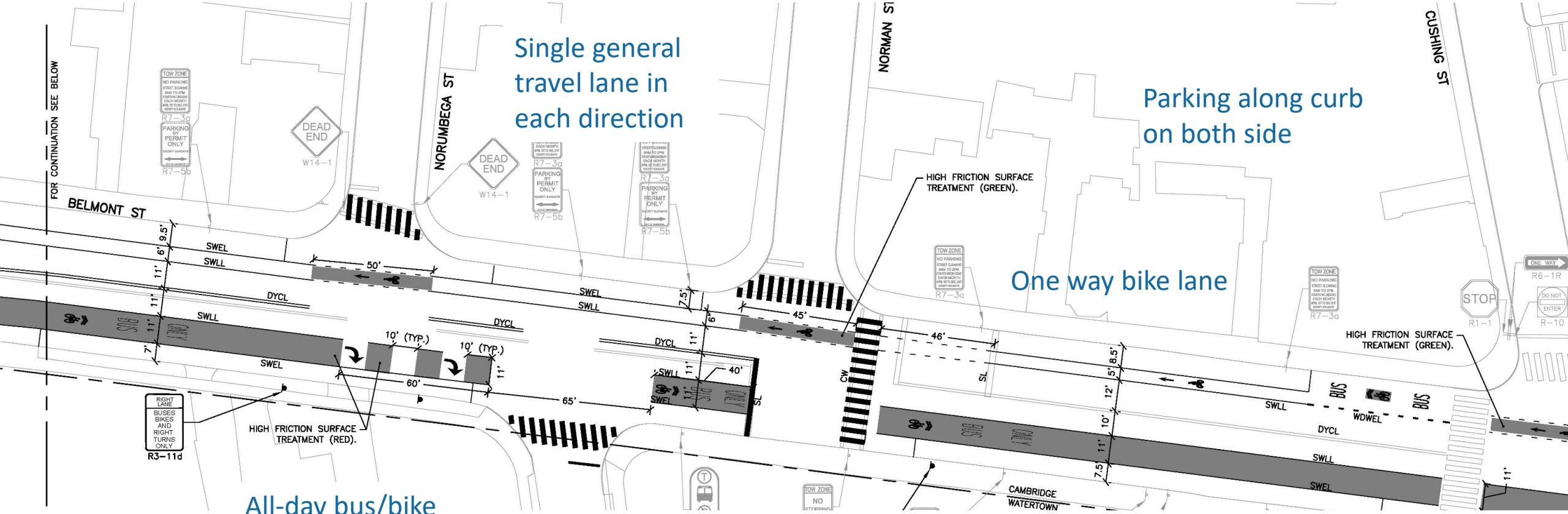




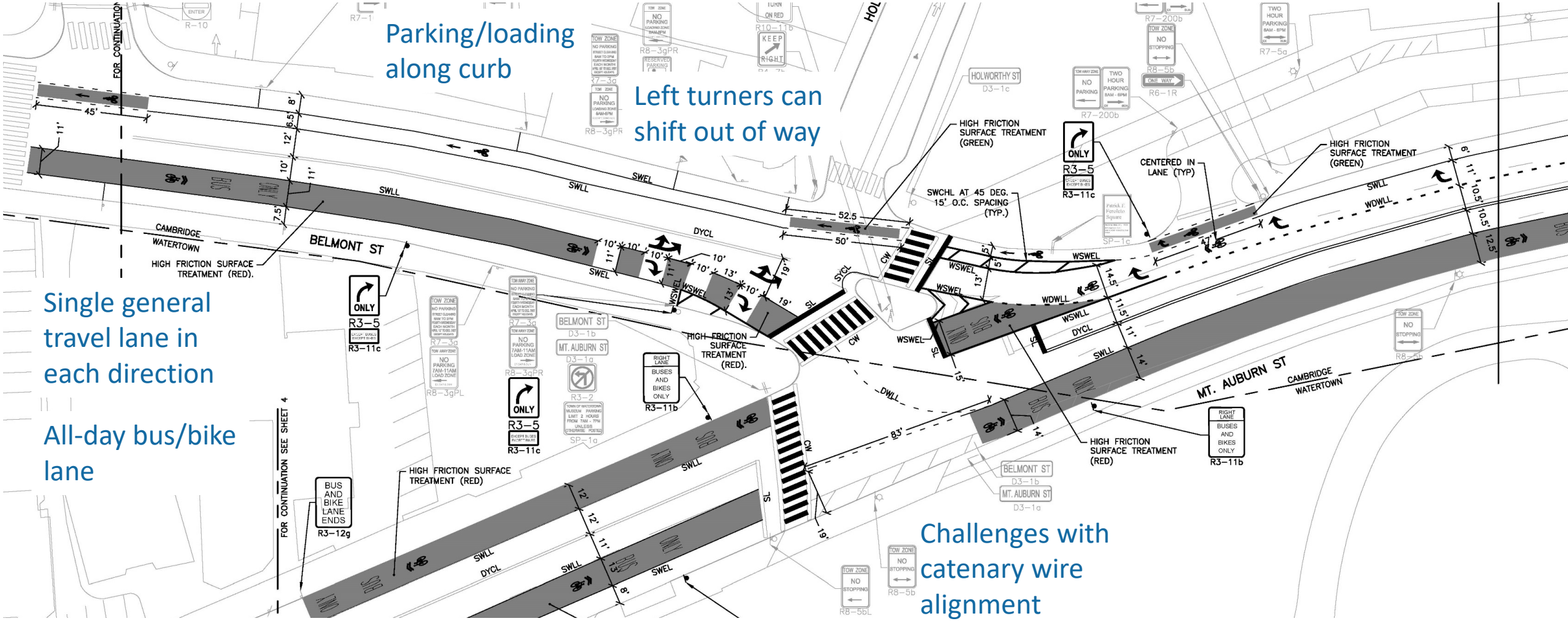
Existing Conditions


Regional context
Project area
Street identified as low volume/low speed
Street identified for separated bicycle facilities
Existing shared-use paths
Shared-use paths under construction
Bus priority lanes
73
MBTA bus route and route number
Sleep Number
St. Peter's Field
NEIGHBORHOOD NINE
Cambridge Honda
Fresh Pond
Kingsley Park
Fresh Pond Pkwy
OBSERVATORY HILL
Huron Ave
Saville St
Donnell St
Alpine St
Chilton St
Standish St
Raymond St
Field
Highland St
Brewster St
Craigie St
Sparks St
Buckingham St
Parker St
Appleton St
Reservoir St
Fayerweather St
Lakeview Ave
Lexington Ave
Grozier Rd
Larch Rd
Fresh Pond Ln
Larchwood Dr
High St
Park Ave
WEST CAMBRIDGE
Longfellow House-Washington's...
Harvard School Of E
Foster St
Lowell St
Willard St
Mt Auburn Cemetery
Mt Auburn Hospital
Conley's
Shangri-La
Tufts Health Plan Medicare Preferred
Red Lentil Vegetarian & Vegan
Edgecliff Rd
Prentiss St
Keenan St
Cottage St
Elm Avenue
Pine Ave
Central Ave
Fountain Avenue
Glen Ave
Fir Avenue
Vesper Ave
Cypress Ave
Cedar Ave
Beech Ave
Spruce Ave
Mound Ave
Coolidge Ave
Shady Hill School
Buckingham Browne & Nichols Upper School
Charles River
Soldiers Field Rd
Mt Aub
75
72
73
71

Belmont Street in Cambridge, TODAY

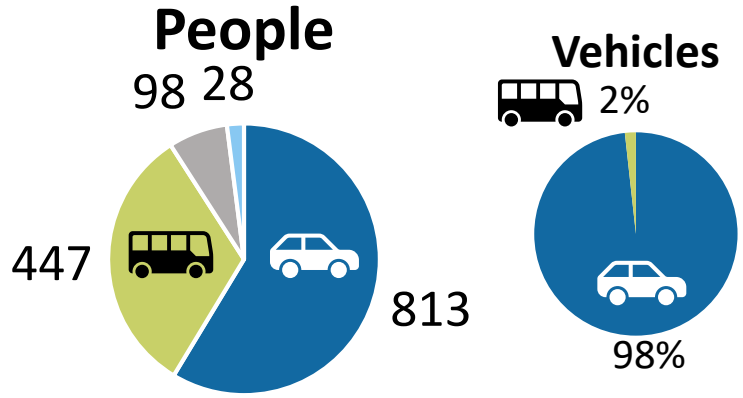


Belmont Street in Cambridge, TODAY

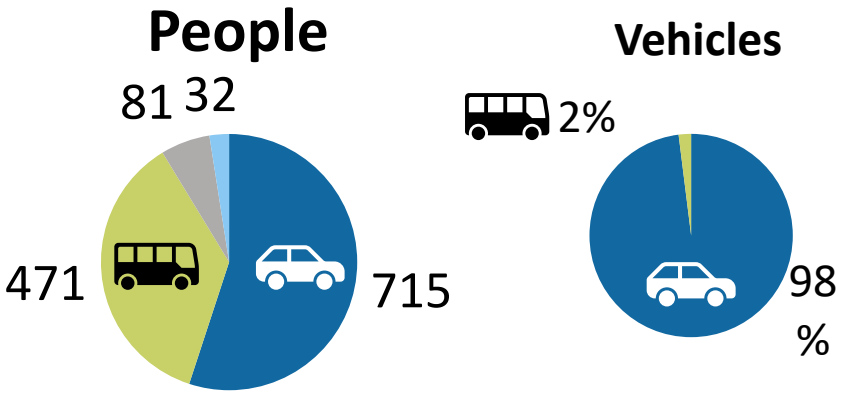


People using Belmont Street

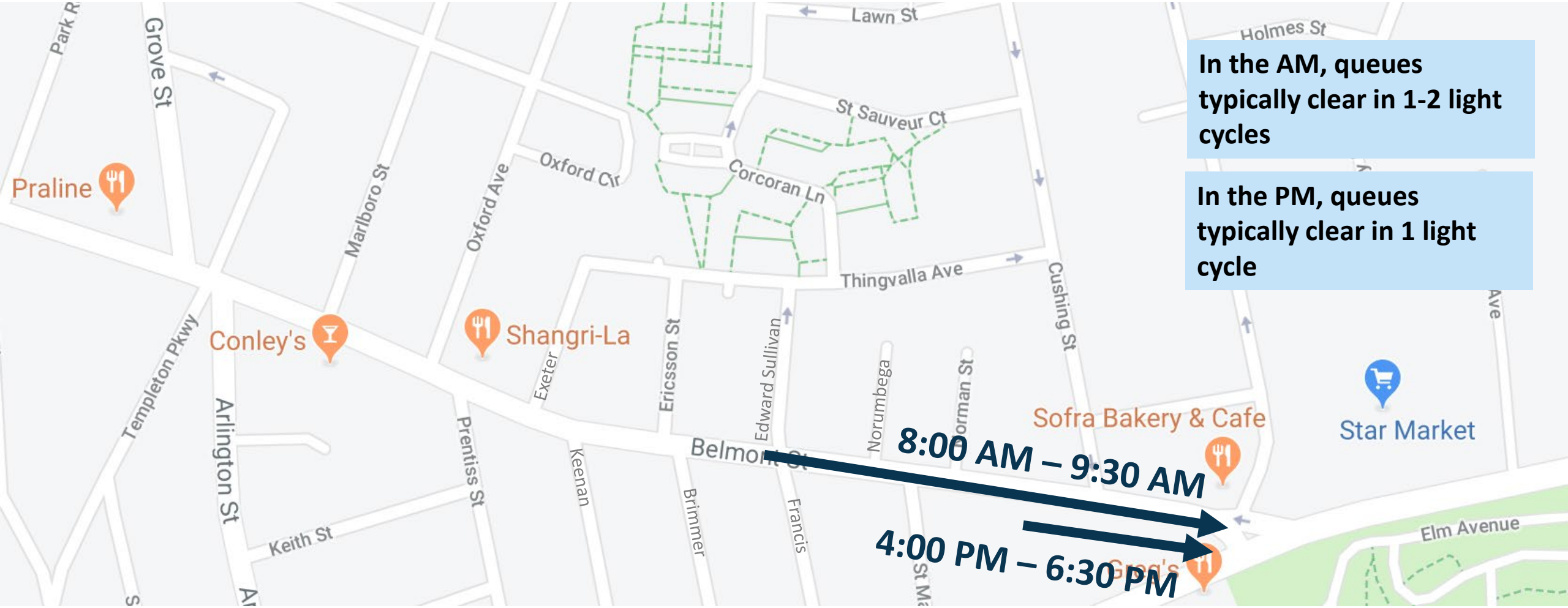
Westbound – 5:00 – 6:00 PM



Eastbound – 7:30 – 8:30 AM



Average vehicle queues eastbound



In the AM, queues typically clear in 1-2 light cycles

In the PM, queues typically clear in 1 light cycle

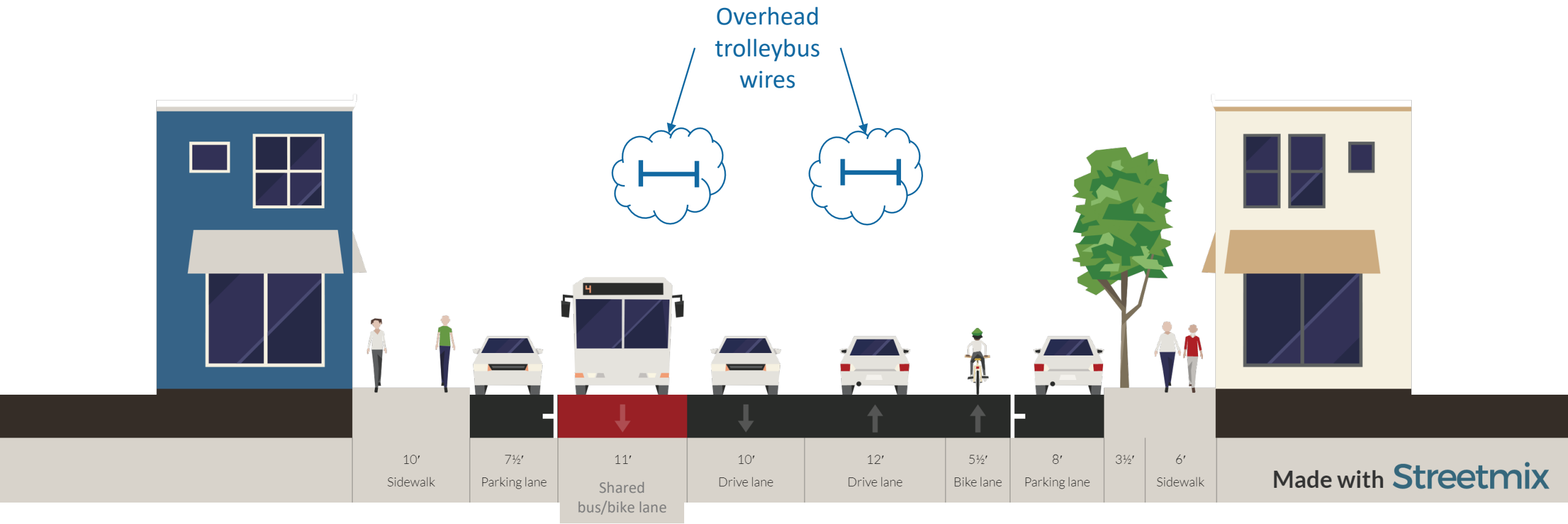
Approach to this Project

Project “Givens”

The following items are starting places from what you should expect to see in the project:

- **The curbs will mostly be put back in place**
  - Small changes may be possible at a bus stop or at the Belmont/Holworthy intersection
  - We need to retain the location of the catenary poles
  - The existence of catenary wires is a significant constraint on moving lanes because of the impact on emergency access

Sample Cross Section – Existing (looking West)



Project “Givens”

The following items are starting places from what you should expect to see in the project:

- **We will meet guidelines for accessibility complying with Americans with Disabilities Act (ADA)**
- **We will introduce design features to improve pedestrian safety and visibility to people driving, including raised side street crossings**
- **We will maintain the bus priority lane in inbound direction**
- **The Watertown Cambridge Greenway will exist so we will likely see a greater demand for people walking, jogging, and biking on Belmont Street and crossing Belmont Street**
- **We will maintain the ability for businesses to load**
- **We will maintain the current number of handicap parking (HP) spots**

Exploring Concepts

What have we heard so far?

Some comments from the community so far:

- **Eversource construction**
- **Difficulty turning out of side streets (Cushing St)**
- **Concerns about the comfort for people biking in the shared bus-bike lane**
- **Requests to consider different operations of the bus lane**

What did we look at?

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- Eversource construction
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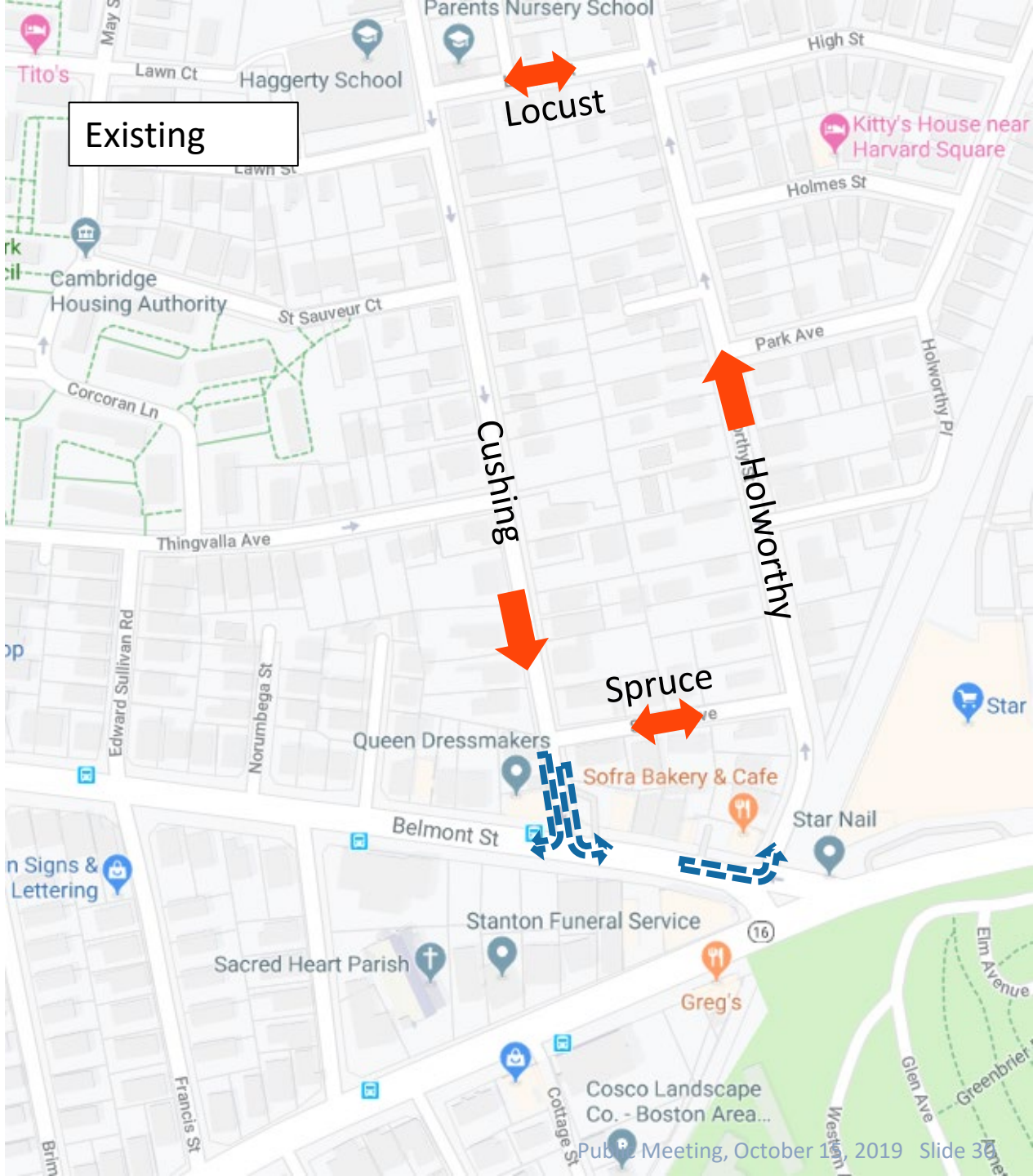
- Requests to consider different operations of the bus lane

What did we look at?

We will work to maintain a similar level of traffic operations compared to today.

To improve to traffic operations, we considered changes to circulation and restricting turns. However, the complication this introduces seems to outweigh the benefits that could be realized

We are able to look at signal timing and creation of gaps in traffic to facilitate turns, and can look again at providing two lanes exiting Cushing (with curb impacts)



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Bicycle Level of Comfort (BLC)

1 = most comfortable
5 = least comfortable

Comfort level for people biking

Survey respondents rated the changes on Belmont Street and Mt. Auburn Street before and after the implementation of the shared bus-bike lane on a scale of 1-5 (5 being best)

Design and function

Average	Before	After	Change
Overall	2.7	3.5	+0.8
Walking	2.9	3.7	+0.8
Biking	2.3	4.1	+1.8

Comfort

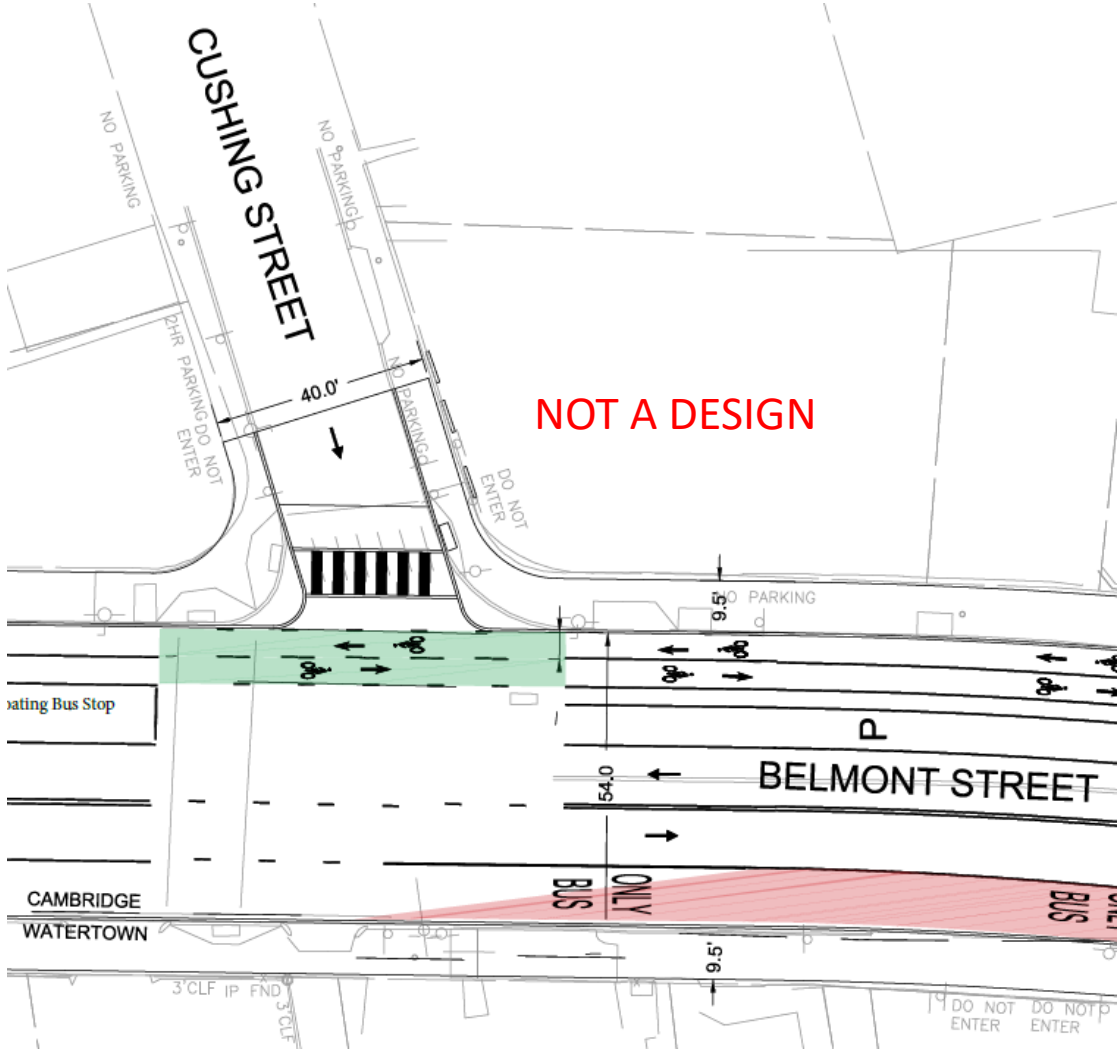
Before	After	Change
3.3	3.5	+0.2
3.7	3.8	+0.1
2.4	3.6	+1.2

When you compare before and after, survey respondents who bike responded positively, BUT, does this design is not considered an “all ages and abilities” facility and does not necessarily encourage new trips by bicycle.

What did we look at?

We looked at providing a two-way bicycle facility on one side of the roadway to minimize curb impacts and maximize comfort of path connections, but:

- This design creates “unexpected conflicts” (people biking westbound on the north side of the roadway)
- There are destinations on both sides of the street that a two-way bicycle facility couldn’t serve
- This is a very short section for a design that requires transitions at either end



What did we look at?

We looked at providing a parking separated / raised bicycle lane on each side of the streets, but:

- Along the edge of the curb are trees, catenary poles, etc.
- There is not enough existing sidewalk space to accommodate a raised cycle track without moving the curb
- Catenary wires constrain our ability to move lanes of traffic (if parking were retained, so a street level parking protected facility is also not feasible)

We are considering street level bicycle lanes with buffers in both directions.

What did we look at?

Some comments from the community so far:

- Eversource construction
- Difficulty turning out of side streets (Cushing St)
- Concerns about the comfort for people biking in the shared bus-bike lane
- **Requests to consider different operations of the bus lane**

Reminder of Bus Lane Benefits

- **36,000 PERSON hours saved** per year total across entire Mt. Auburn and Belmont Street project, affecting almost half of the people using Belmont Street in the morning rush hour
- The person hours saved were that high even when taking into account any measured impacts to people driving
- We enable the MBTA to provide **more service** because it takes less time to run a bus along the whole route
- We hope to encourage **even more people to take transit**
- People are **more comfortable** when walking, biking, and taking transit

What did we look at?

We have heard some of the following comments about the bus lane:

- **Can the bus lane be peak only?**
- **Can the bus lane be shorter or longer?**
- **Can there be more bus priority in both directions?**
- **What about more visible red, signage, better enforcement?**

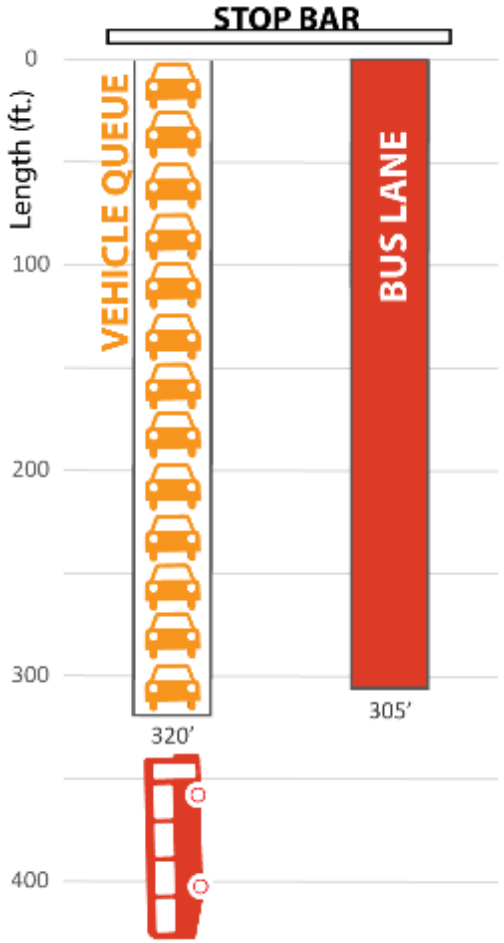
What did we look at?

We have heard some of the following comments about the bus lane:

- **Can the bus lane be peak only?**
  - There isn't a justification for other vehicles needing to use the extra lane in the off-peak, when there is less congestion.
  - The traffic light at Mt. Auburn is timed to let the single lane of traffic clear within a cycle in the off-peak.
  - People biking benefit from using the lane all day
- **Can the bus lane be shorter or longer?**
- **Can there be more bus priority in both directions?**
- **What about more visible red, signage, better enforcement?**

What did we look at?

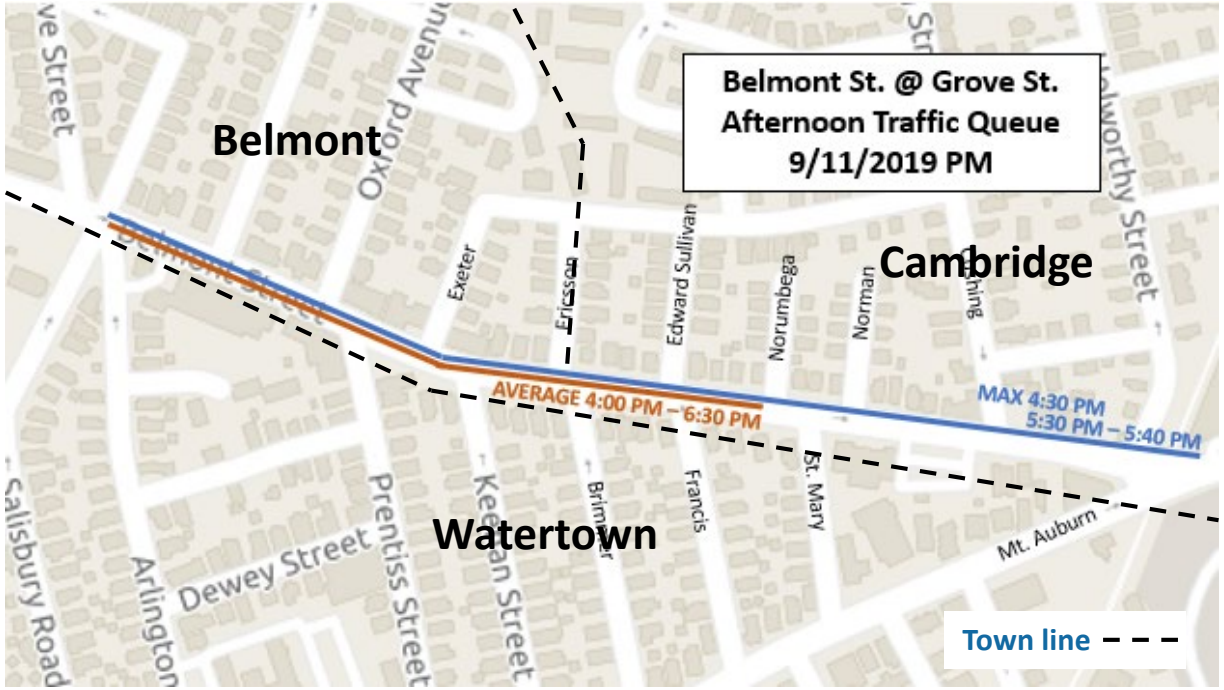
EXAMPLE ONLY – DOES NOT REPRESENT EXISTING CONDITIONS



We have heard some of the following comments about the bus lane:

- **Can the bus lane be peak only?**
- **Can the bus lane be shorter or longer?**
  - We measured the maximum queues in the peak times, and there is a justification for maintaining the length that is there today.
- **Can there be more bus priority in both directions?**
- **What about more visible red, signage, better enforcement?**

What did we look at?



We have heard some of the following comments about the bus lane:

- **Can the bus lane be peak only?**
- **Can the bus lane be shorter or longer?**
- **Can there be more bus priority in both directions?**
  - To do so would result in eliminating curb uses (e.g. parking and loading) and wouldn't provide desired benefit to buses in outbound direction because it would end at the Belmont town line.
- **What about more visible red, signage, better enforcement?**

What did we look at?

We have heard some of the following comments about the bus lane:

- **Can the bus lane be peak only?**
- **Can the bus lane be shorter or longer?**
- **Can there be more bus priority in both directions?**
- **What about more visible red, signage, better enforcement?**
    - More permanent red material will be installed imminently, which helps with compliance. Installation will be on Mount Auburn Street only. Some signage adjustments are being made on Mt. Auburn Street. Additional enforcement requires resources.

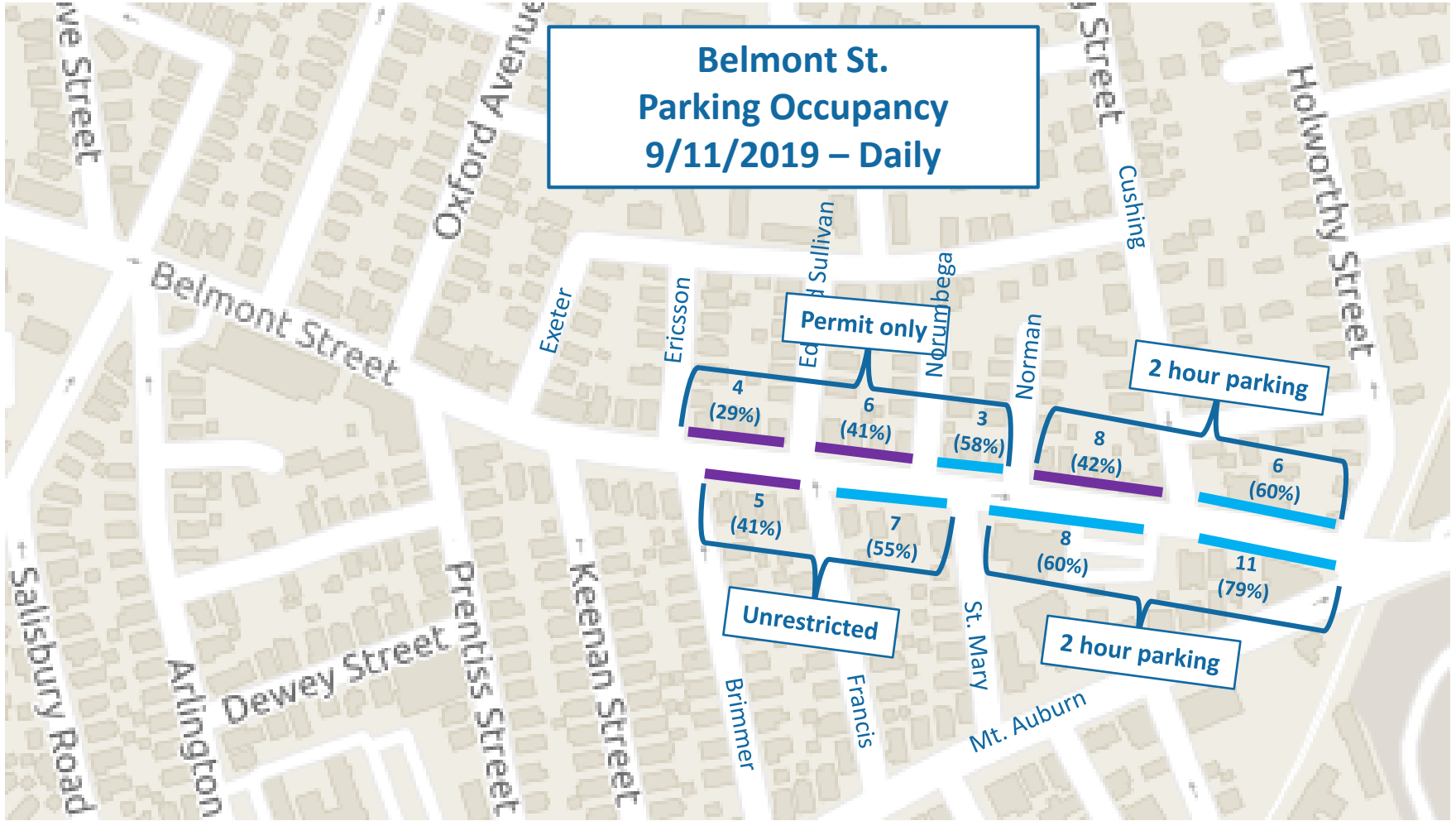
What did we look at?

The storage of vehicles (parking) is not necessarily the best use of curb space in a specific location when there are many needs related to access (to businesses and destinations), and safety (for people walking, biking, taking transit, and driving).

What can we do if we change assumptions about how the curbs are used on Belmont Street?

- We looked at parking uses to allow us to think about maximizing utility of the curbside space
- Loading and Handicapped Parking spots would be retained

Parking on Belmont Street

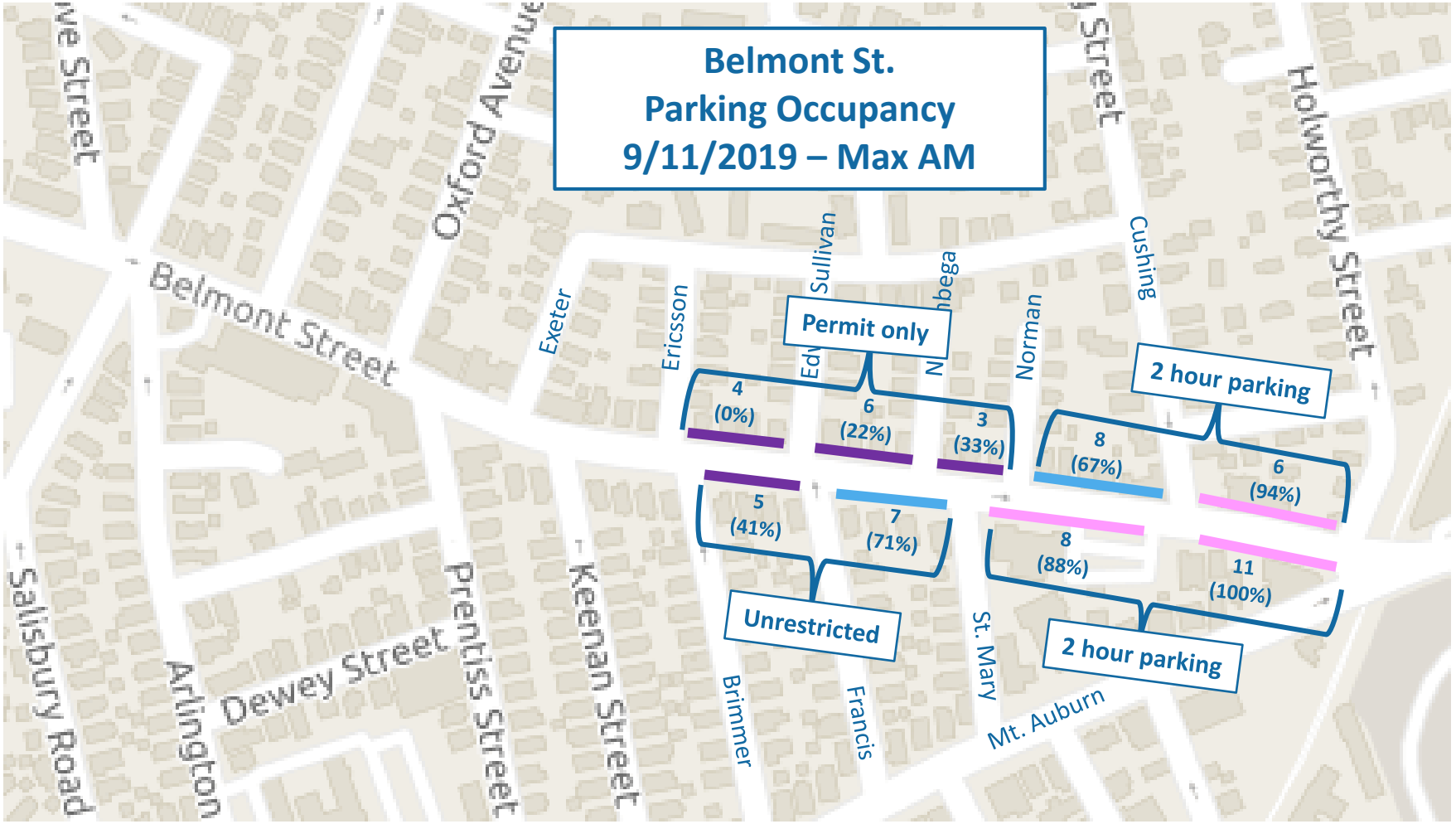


Parking occupancy of 85% is typically considered ideal – the parking is being used with a small number of open spaces to accommodate new-comers

(##%) Available Spaces Average Occupancy 8AM to 9PM

- Above 85%
- 50%-85%
- Below 50%

Parking on Belmont Street

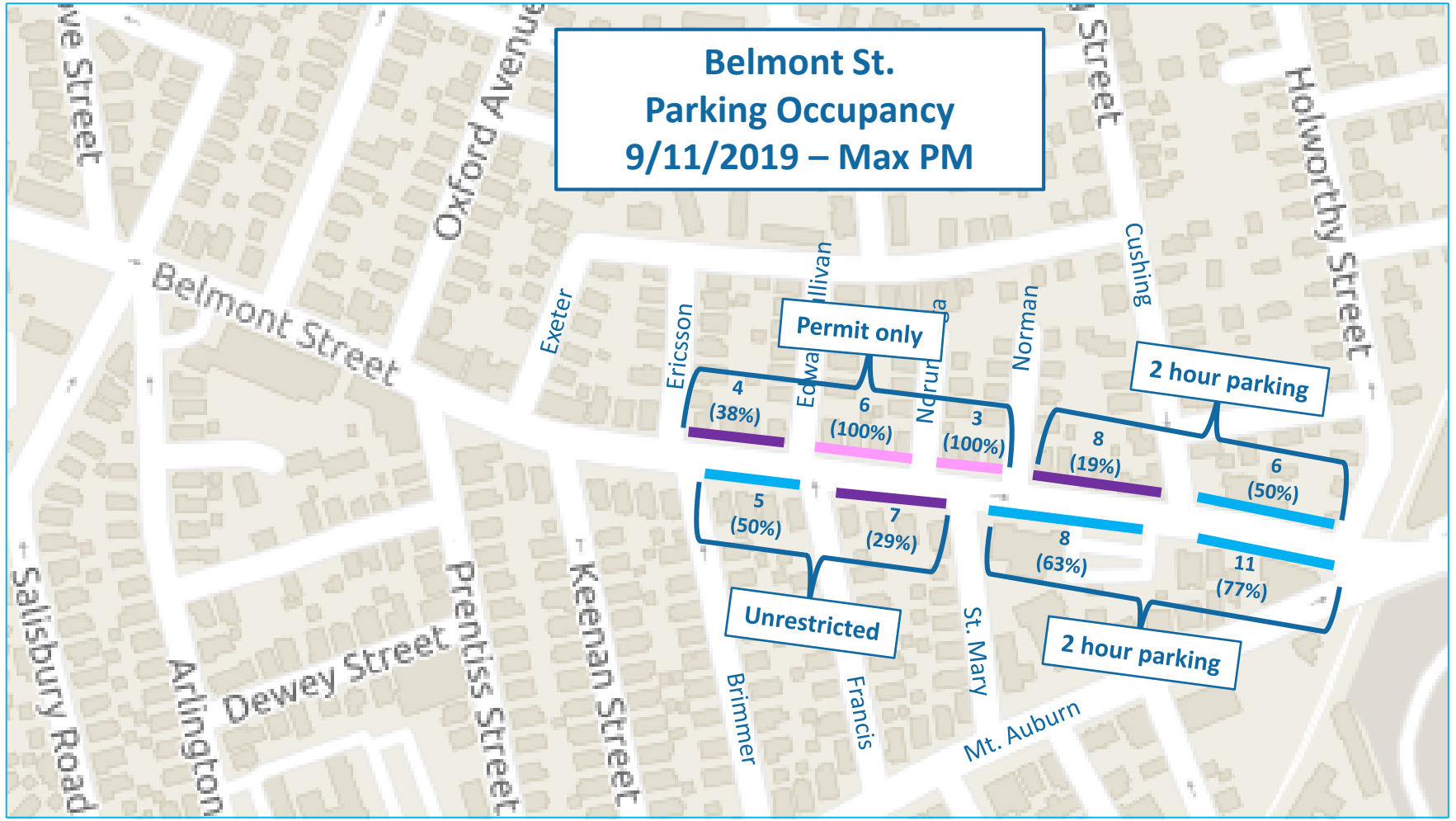


Parking occupancy of 85% is typically considered ideal – the parking is being used with a small number of open spaces to accommodate new-comers

(##%) Available Spaces Occupancy 10:30AM to 11:30AM

- Above 85%
- 50%-85%
- Below 50%

Parking on Belmont Street

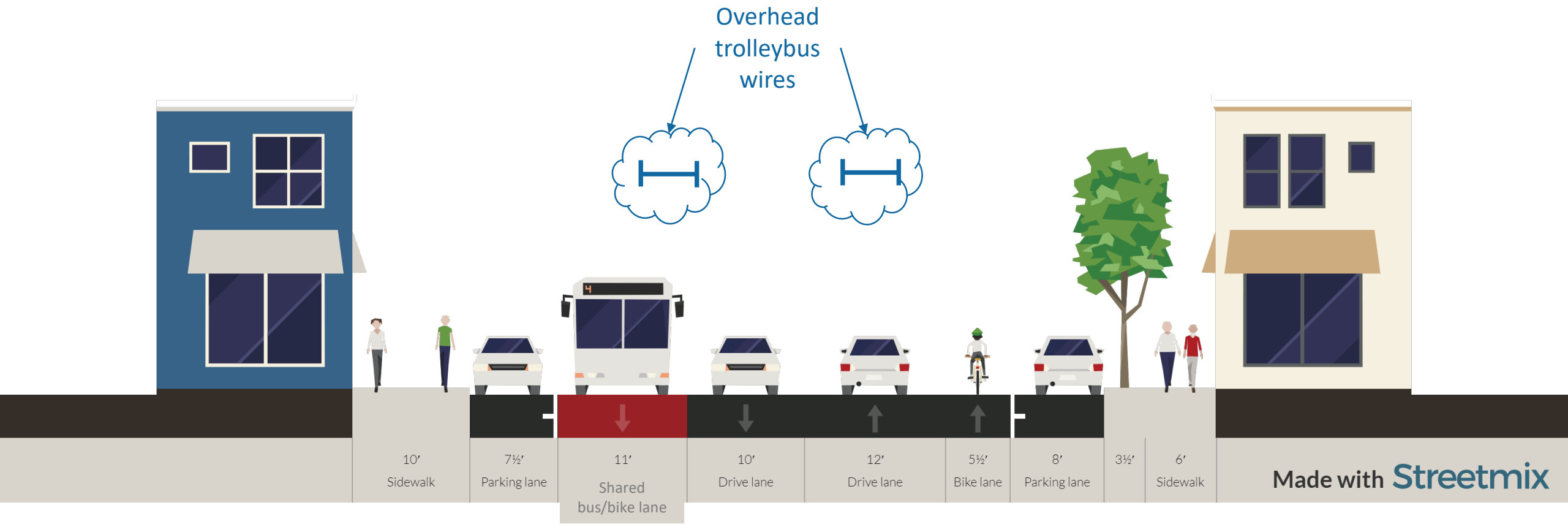


Parking occupancy of 85% is typically considered ideal – the parking is being used with a small number of open spaces to accommodate new-comers

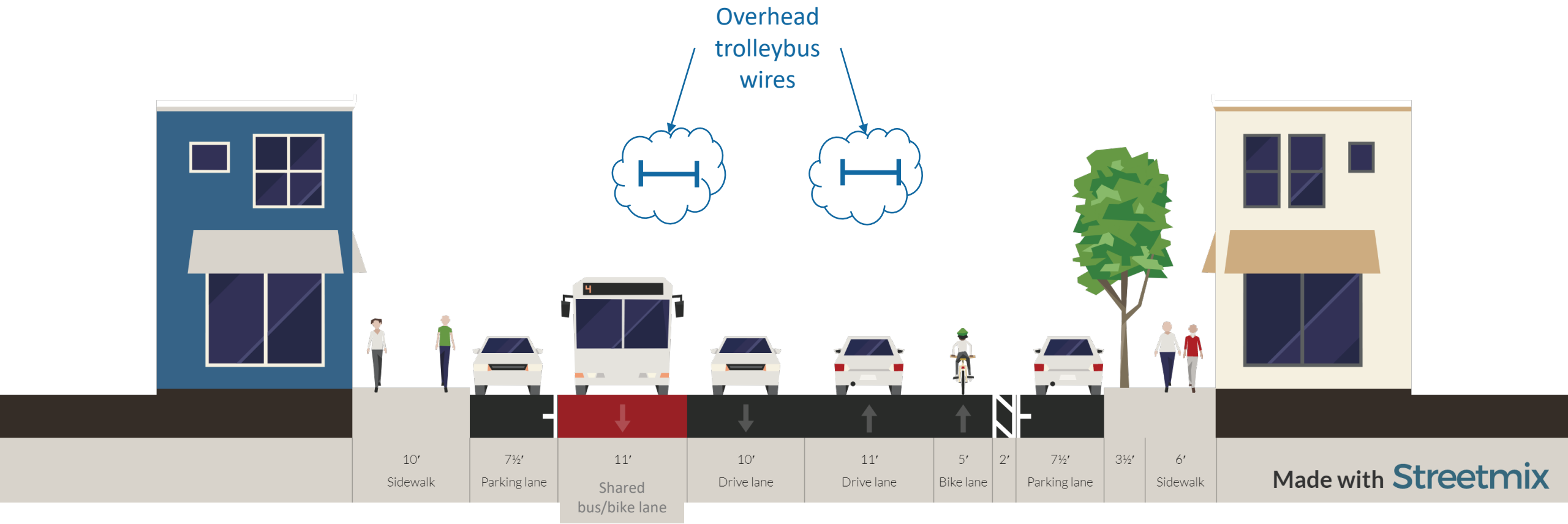
(##%) Available Spaces Occupancy 7:30PM to 8:30PM

- Above 85%
- 50%-85%
- Below 50%

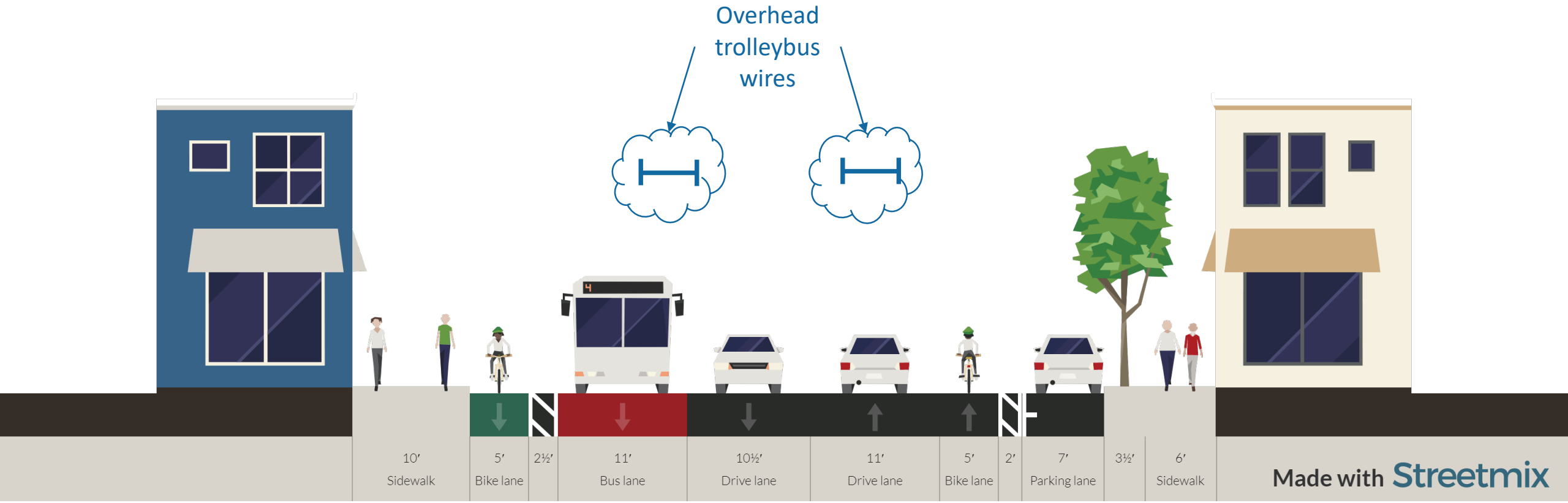
Sample Cross Section – Existing (looking West)



Sample Cross Section with Better Buffer



Sample Cross Section with Curbside Bike Lane

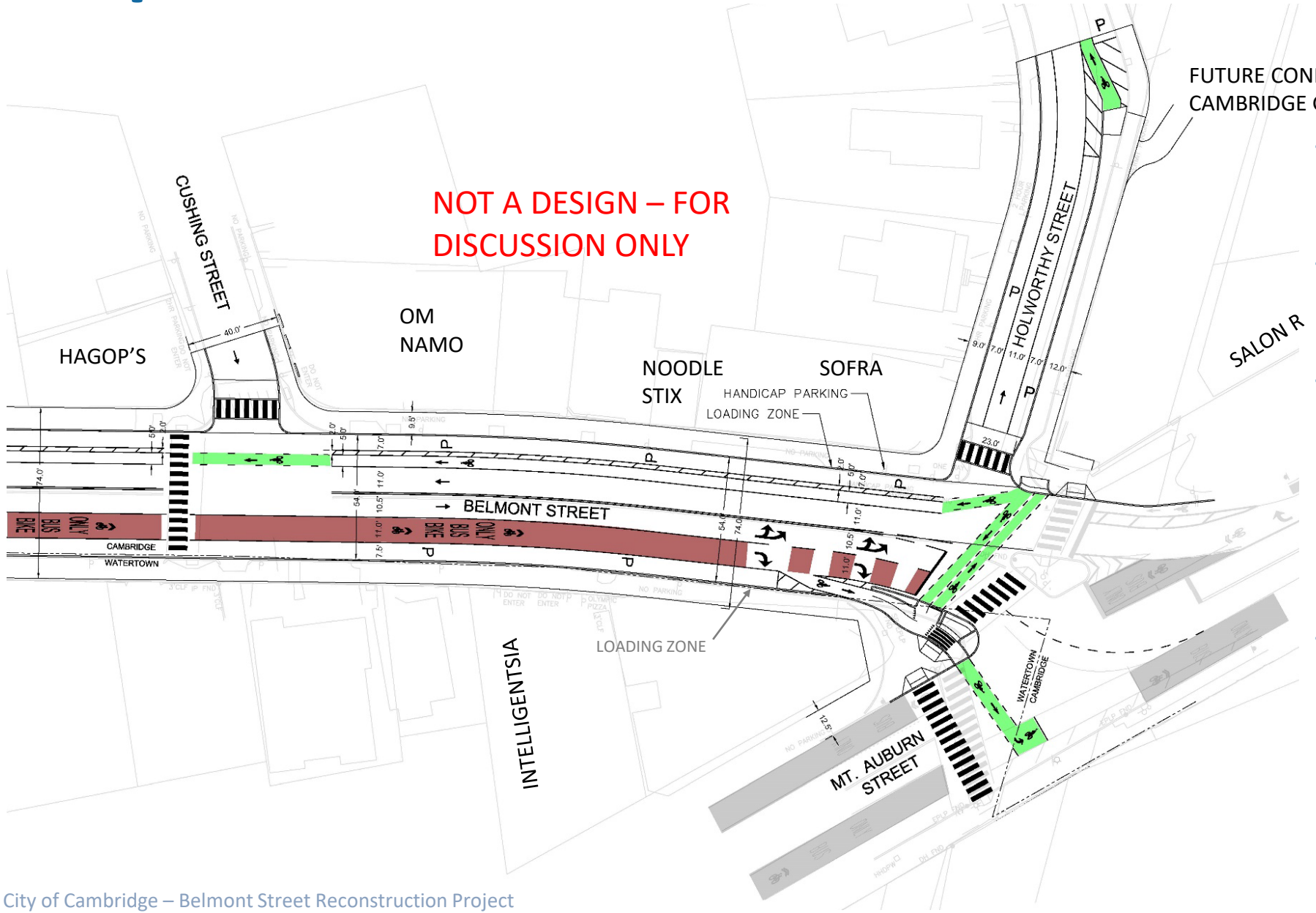


Items to Consider

- What is the best/most efficient/most needed use of curb space in each block or location?
- What are businesses specific loading needs?
- What kinds of parking regulations would best serve the needs of each block and the area in general?
  - Resident
  - Time limited (2-hour to 15-min)
  - Loading (can be used for quick pickup/drop-off)

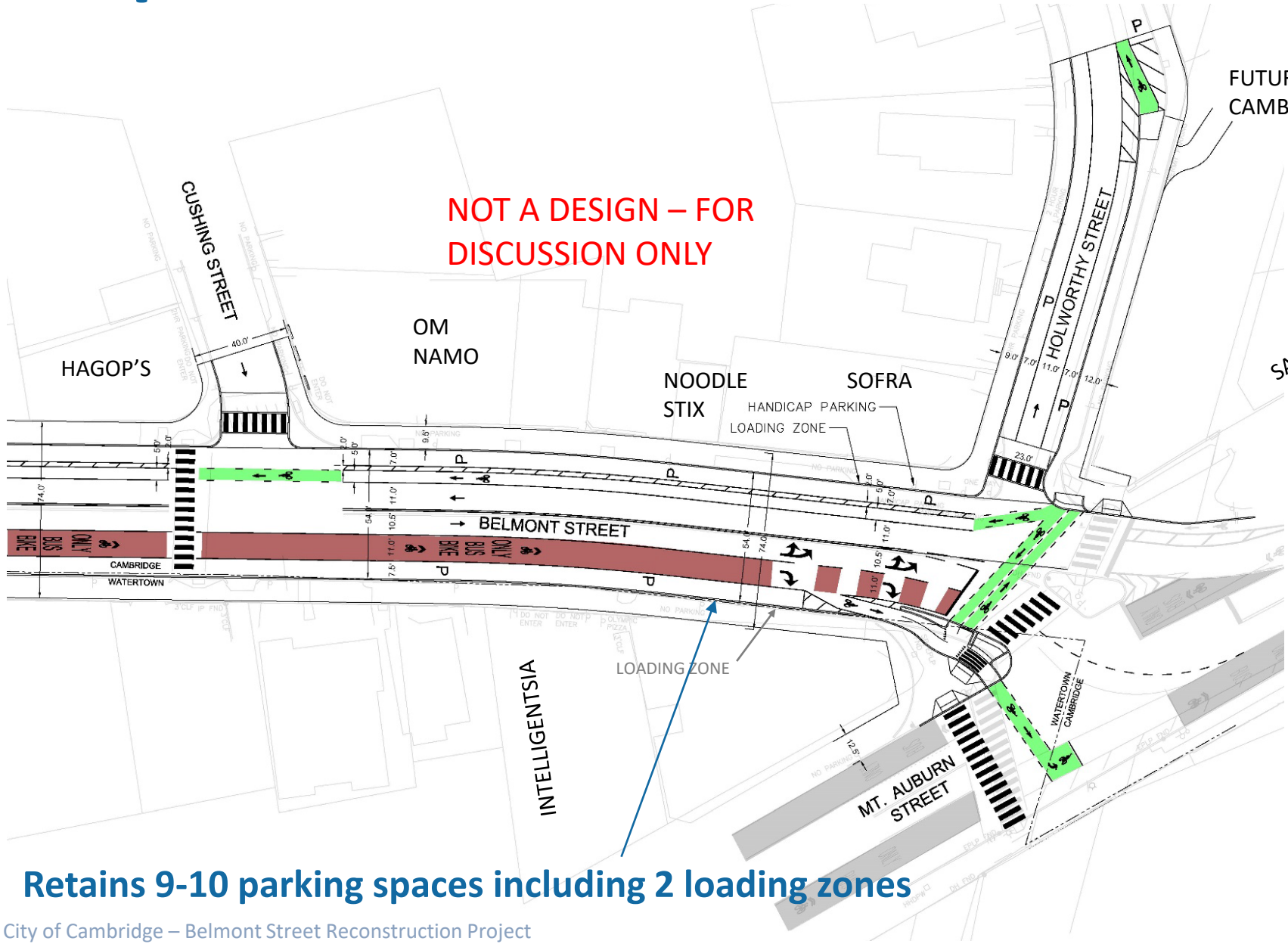
Belmont/Holworthy Intersection

Option with continued shared bus-bike lane



- Same number of lanes for vehicles as today
- All-day shared bus-bike lane as today
- Separated bicycle lane introduced at intersection to allow people to access with two-way crossing to Howlorthy
- Shared-use sidewalk on Holworthy to Watertown-Cambridge (W-C) Greenway

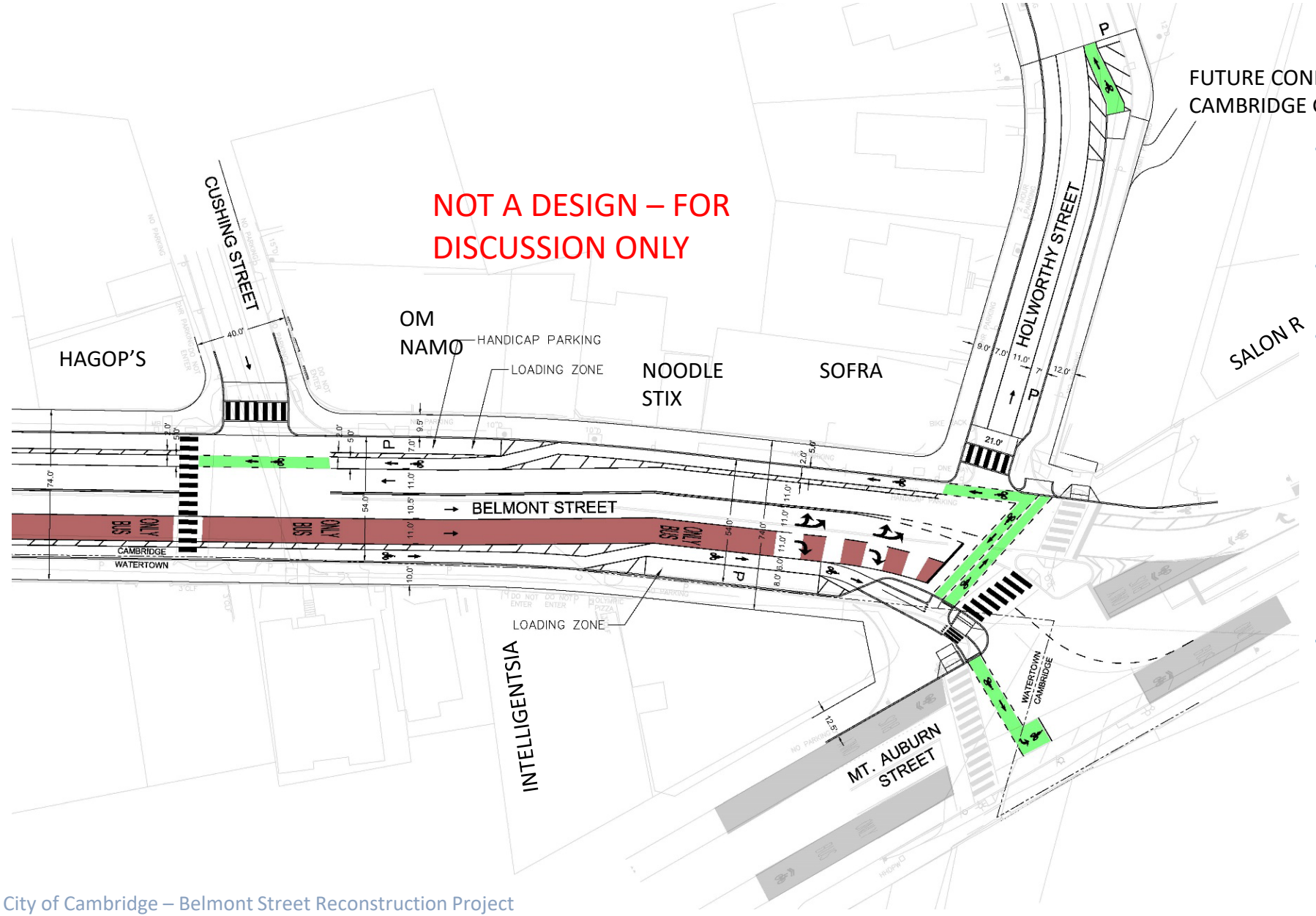
Option with continued shared bus-bike lane



- Modest changes to signal timing expected to accommodate the bicycle crossing
- All north side curb uses retained (including handicap space and loading)
- South side retains 9-10 spaces, including two loading zones. Repurpose 1-2 spaces to accommodate bicycle crossing.
- Creates safe way for people biking to position themselves to enter shared facility on Mt. Auburn

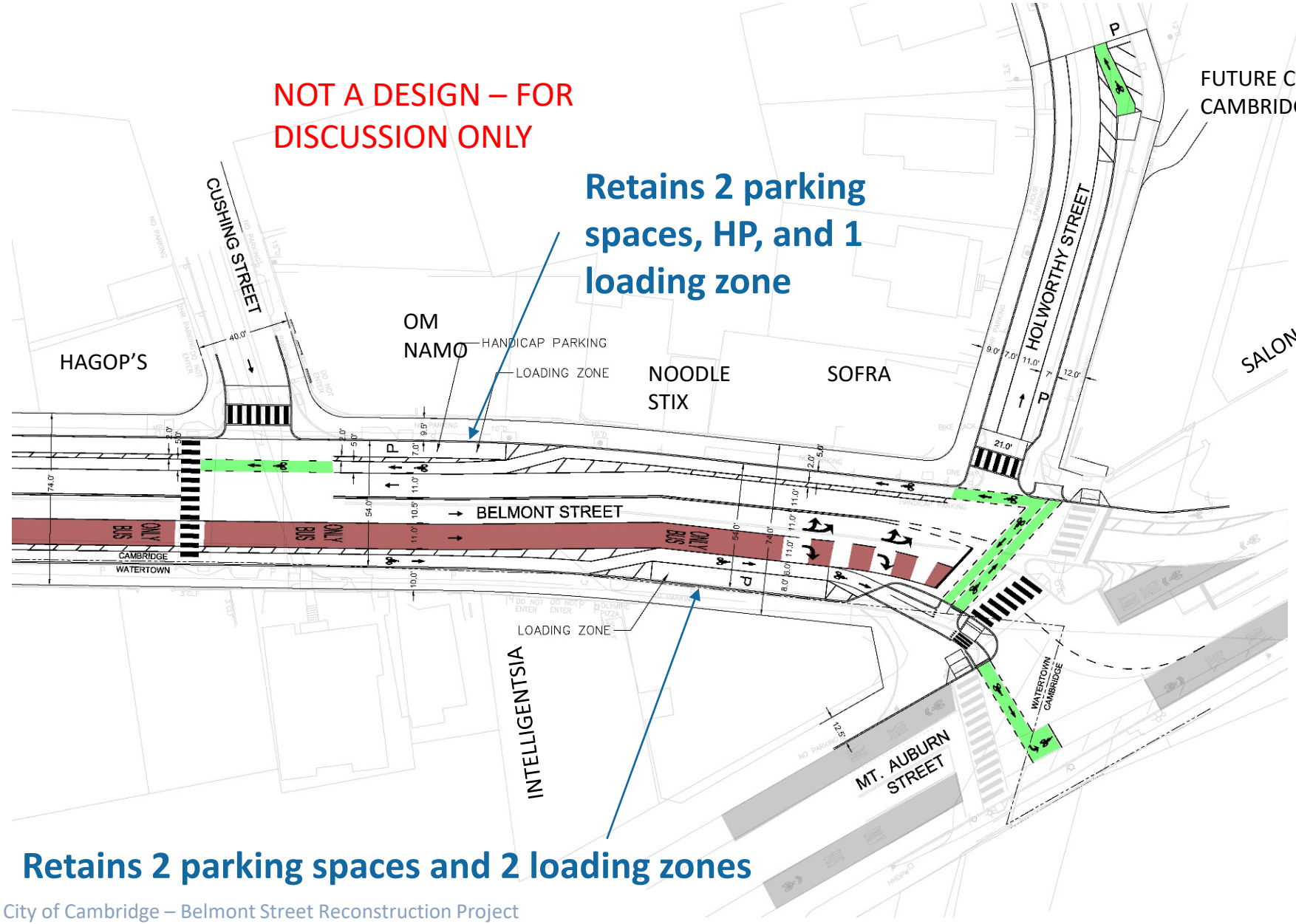
Retains 9-10 parking spaces including 2 loading zones

Option separating people biking



- Same number of lanes for vehicles as today
- All-day bus lane
- Curbside bicycle lane up to Holworthy St., separation at intersection with two-way crossing to shared-use sidewalk on Holworthy to W-C Greenway
- Modest changes to signal timing expected to accommodate the bicycle crossing

Option separating cyclists



- **North Side: Retains 2 parking spaces, and 1 handicap spaces and 1 loading zone are relocated on the same block. 2 parking stalls repurposed.**
- **South Side: Retains 2 parking spaces and 2 loading zones. 7 parking spaces on Belmont St between Cushing and Holworthy repurposed.**
- **Creates safe way for people biking to position themselves to enter shared facility on Mt. Auburn**

Clarification Questions

Input Session!

Questions/comments?
Contact Andy Reker, areker@cambridgema.gov, 617-349-6959

Thank You