Fenway – Longwood – Kenmore Priority Projects

Boston Transportation Department

May 11, 2010

Agenda

- Overall Fenway-Longwood-Kenmore Project Update
- Boston's "Complete Streets" Guidelines
- Audubon Circle Conceptual Design Proposal
  - Functional Design Elements
  - Urban Design Elements
- Community Feedback and Discussion
- Next Steps

Priority Projects

Audubon Circle Project Development Process

- ✓ Transportation Action Plan – *completed 2009*
- 25% Design – *Spring 2010*
- Final Design and Bid Documents – *Winter 2010*
- Construction – *Begin 2011*
- Long Term Maintenance - *Ongoing*

Boston's Complete Streets Guidelines

Vision:

- *Multi-modal*: *Safe, comfortable & accessible for all users*
- *Green: Sustainable materials, storm water management & reduced energy consumption*
- *Smart: efficient & maximize technological advances*

Advisory Committee

Boston's Complete Streets Advisory Committee

- David Black
- Kate Bowditch
- Guy Busa
- Andrea d'Amato
- David Dixon
- Rosanne Foley
- Michael Halle
- Kate Kennen
- John Kelly
- Wendy Landman
- Carlo Ratti
- Jeffrey Rosenblum
- Sanjay Sarma
- Kishore Varanasi

Agency Involvement

City of Boston Agencies

- Boston Transportation Department
- Environment and Energy Services Cabinet
- Boston Public Works Department
- Boston Redevelopment Authority
- Boston Parks and Recreation Department
- Boston Environment Department
- Boston Bikes
- Boston Public Health Commission
- Boston Water and Sewer Commission
- Commission on Affairs of the Elderly
- Mayor's Office of Neighborhood Services
- Management and Information Services Department
- Office of Budget Management

Boston's Complete Streets Guidelines

- Complete Streets are:
  - *Multi-modal*

Boston's Complete Streets Guidelines

- Complete Streets are:
  - *Green:*

Peabody Square Green Street Pilot Demonstration Project

Evaluation of Low Impact Development (LID)
Best Management Practices (BMP) Opportunities

April 2008

Rain Garden

Alternative Names: Vegetated Infiltration Basin, Bioretention, Biofiltration

DESCRIPTION

Rain gardens are landscaped areas that collect and treat stormwater runoff using bioretention. Bioretention systems collect and filter stormwater through layers of mulch, soil and plant root systems, where pollutants such as bacteria, nitrogen, phosphorus, heavy metals, oil and grease are retained, degraded and absorbed. Treated stormwater is then infiltrated into the ground as groundwater or, if infiltration is not appropriate, discharged into a traditional stormwater drainage system. Rain gardens may look similar to a traditional landscaped areas, but they differ in design and function. Rain gardens can be planted with a variety of perennials, grasses, shrubs and small trees, and native plants are typically prefered. Rain gardens are a valuable addition to both residential and commercial sites.

BENEFITS

Overall

- Reduces stormwater runoff volume and flow rate
- Increases groundwater infiltration and recharge
- Provides local flood control
- Treats stormwater runoff
- Improves quality of local surface waterways
- Enhances the beauty of residential or commercial sites
- Provides wildlife habitat
- Reduces soil erosion
- Provides a cost-effective way of treating stormwater as cost/volume runoff treated is lower than many other stormwater best management practices

Pollutant Removal

Pollutant removal can be affected by many factors, such as the types of plantings and maintenance of the rain garden. Properly designed rain gardens can be very effective at eliminating many pollutants that are of concern in the Charles River watershed.

- Total Suspended Solids: 23-81%
- Total Phosphorus: 38-72%
- Nitrate (as N): 8-80%
- Lead: 62-91%
- Zinc: 63-76%
- Copper: 53-65%[4,7]

Volume Attenuation/Flow Reduction

- 100% for small storms
- 90% for large storms when antecedent conditions are dry
- 30-90% when antecedent conditions are wet[5]

MAINTENANCE

Needs and Frequency

Periodically and after rain events:

- Check vegetation and drainage structures
- Remove sediment and debris
- Clean and repair inflow and outflow pipes

As needed:

- Maintain vegetation, more frequent watering and weeding may be required during the first two years
- Replace plants

Cost

Similar to traditional landscaping

INSTALLATION COST

Cost will vary depending on the garden's size and the types of vegetation used, however, professional installation of a rain garden typically costs $10-12/square foot[10]. Residential rain gardens are typically 100 to 300 square feet in size[1].

RECOMMENDED PLANTS FOR NEW ENGLAND RAIN GARDENS[8]:

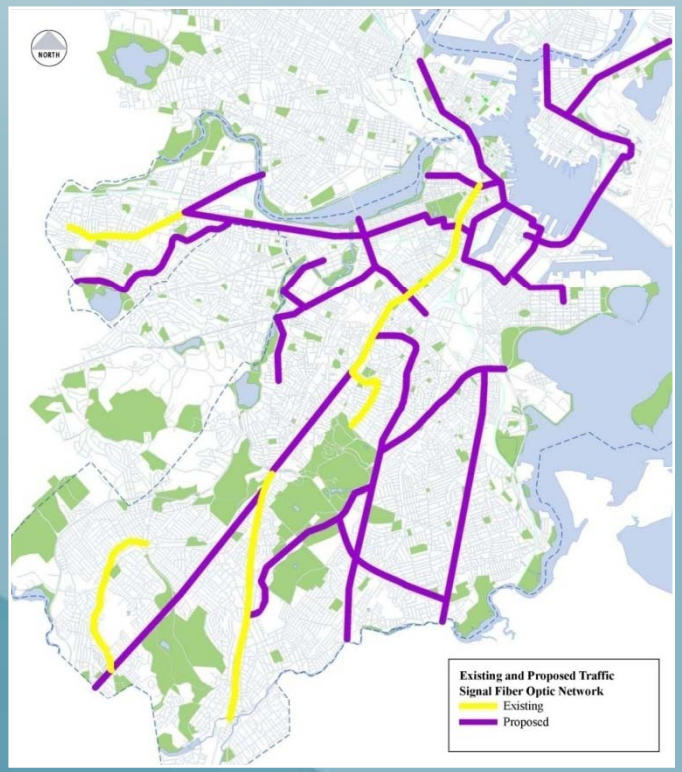
New England Aster
Common Evening-Primrose
Black-Eyed Susan
Switchgrass
Ostrich fern
Summersweet clethra
Red-osier dogwood
Highbush blueberry
Compact inkberry holly

CRWA Charles River Watershed Association
Low Impact Best Management Practices
Information Sheet

April 2008

Boston's Complete Streets Guidelines

- Complete Streets are:
  - *Smart:* BTD'S TRAFFIC MANAGEMENT CENTER



- *New Initiatives:*
  - *Electric Cars*
  - *Bike Share*
  - *In-street sensors*

MARCH 2010 PROGRESS CHART

GUIDELINES OUTLINE Topics Addressed	DRAFT (Key Recommendations)		
	June	Sept	Dec
1. VISION Multimodal, Green and Smart, Great Public Spaces, Accessible to All			
2. STREET TYPES New classification based on context and character			
3. ROADWAY DESIGN (Between the Curbs) Travel Lanes and Widths, Bicycle and Transit facilities			
4. INTERSECTION DESIGN Multimodal performance, Crosswalks, Geometry, Signals			
5. SIDEWALK REALM Zones Widths, Materials, Lighting, Street Furniture, Street Activation			
6. GREENSCAPE Street Trees, Plantings, Bio-swales, Pervious Materials			
7. CURBSIDE MANAGEMENT Loading Zones, Bicycle/Scooter/Motorcycle Parking, Bus Stops, Meters			
8. SMART TECHNOLOGY Cameras, Electric and Hybrid Vehicles, In-Street Sensors, Mobility Hubs			
9. IMPLEMENTATION Exec Order/Ordinance, Agency Jurisdictions & Review, Community Process, PIC			

Audubon Circle Project Objectives

- Increase Safety & Usability for All Modes
- Reduce Vehicular Dominance of Intersection / Improve Pedestrian and Bicycle Conditions
- Enhance Neighborhood Quality of Life Through Design of Public Spaces

Functional Design Elements

- How Audubon Circle will Operate for:
  - Pedestrians
  - Vehicles
  - Bicycles
- Establishes Basic Elements:
  - Curb locations (sidewalks and medians)
  - Number, width, and function of lanes
  - Crosswalk locations and lengths
  - Signal Timing and Phasing
  - Parking and Loading Locations

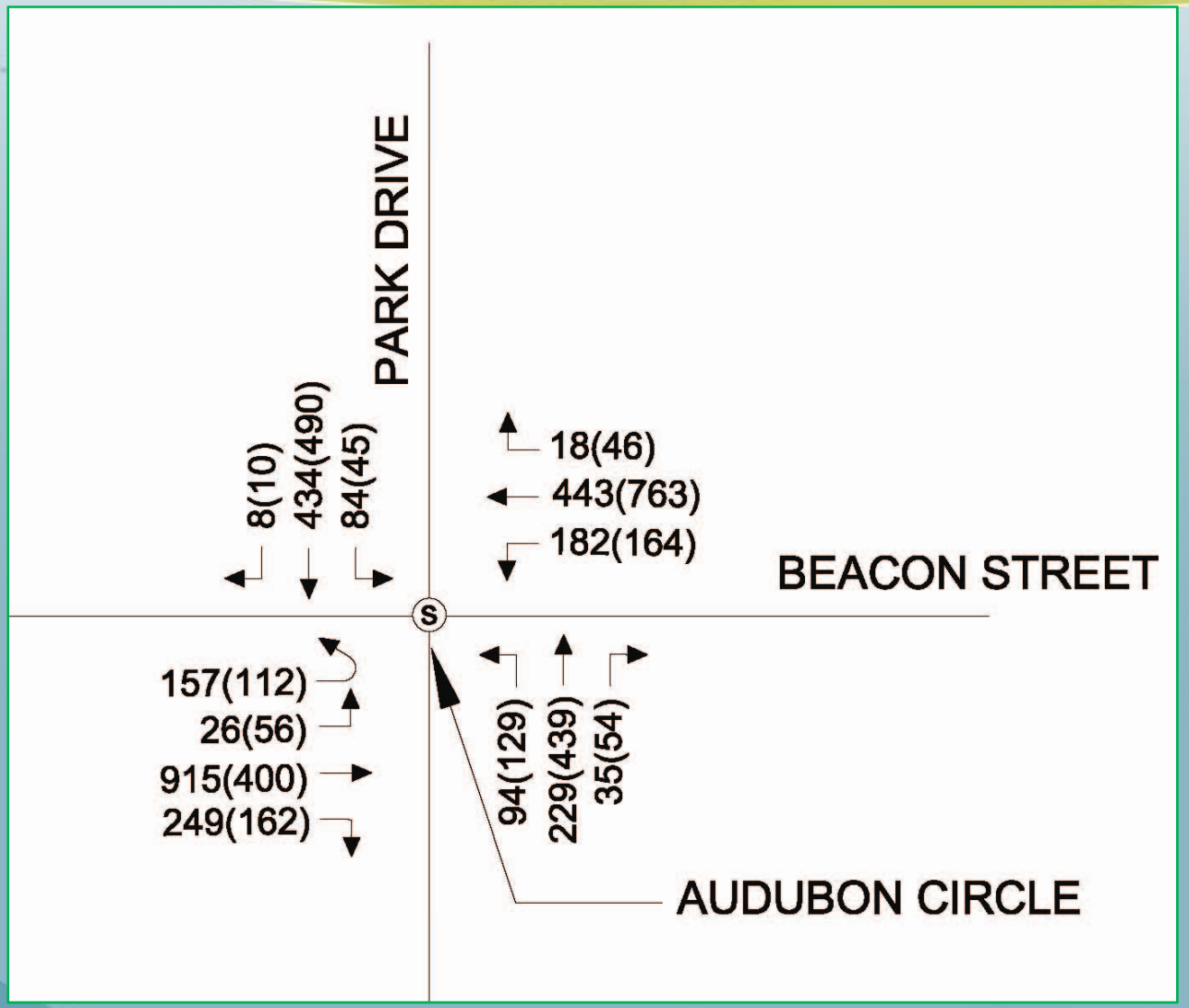
Functional Design Process

- Vehicle / Pedestrian / Bicycle Counts:
  - New Counts Taken February 2010
  - 7 AM – 6 PM Continuous Counts
  - Approx. 2800 Vehicles Per Hour in Peaks (8-9 AM; 4:45-5:45 PM)
  - Approx. 300-325 Bikes/Peds Per Hour in Peaks
- Volumes Escalated 0.5% per year to 2015 for Modeling and Analysis

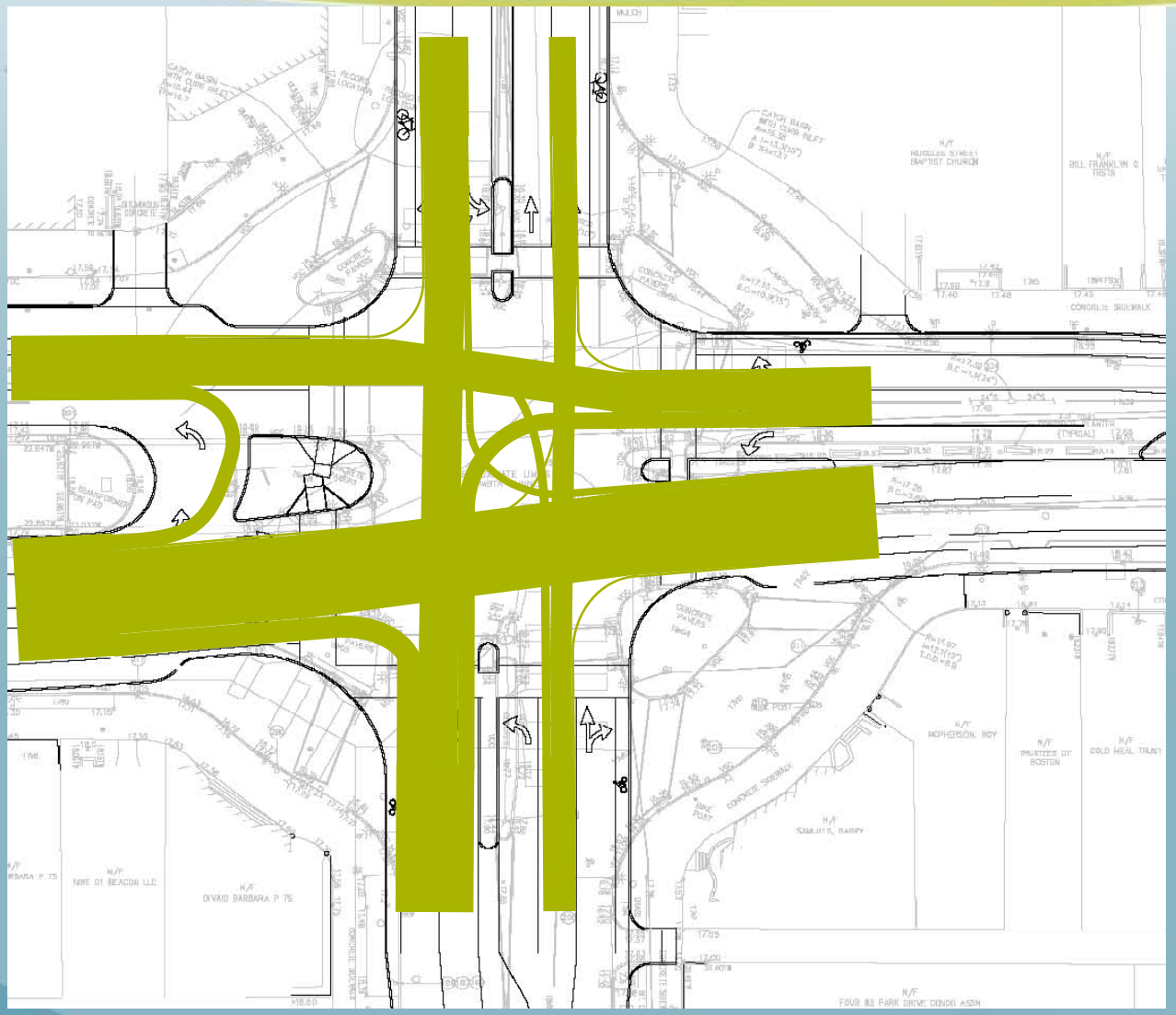
Year 2015 Projected Peak Hour Volumes

XX = AM Peak Hour Volumes

(XX) = PM Peak Hour Volumes



Year 2015 Projected A.M. Peak Hour Volumes



Functional Design Process

- Crash Data:
  - Average 15 reported crashes per year (2006-2009)
  - At least 50% “angle” crashes (34% unknown type)
  - Of angle crashes detailed, > 60% involve turns off of Park Drive, primarily northbound lefts
- Intersection Crash Rate = 1.14 crashes per million entering vehicles
- Boston Metro (former District 4) Crash Rate for signalized intersections = 0.78

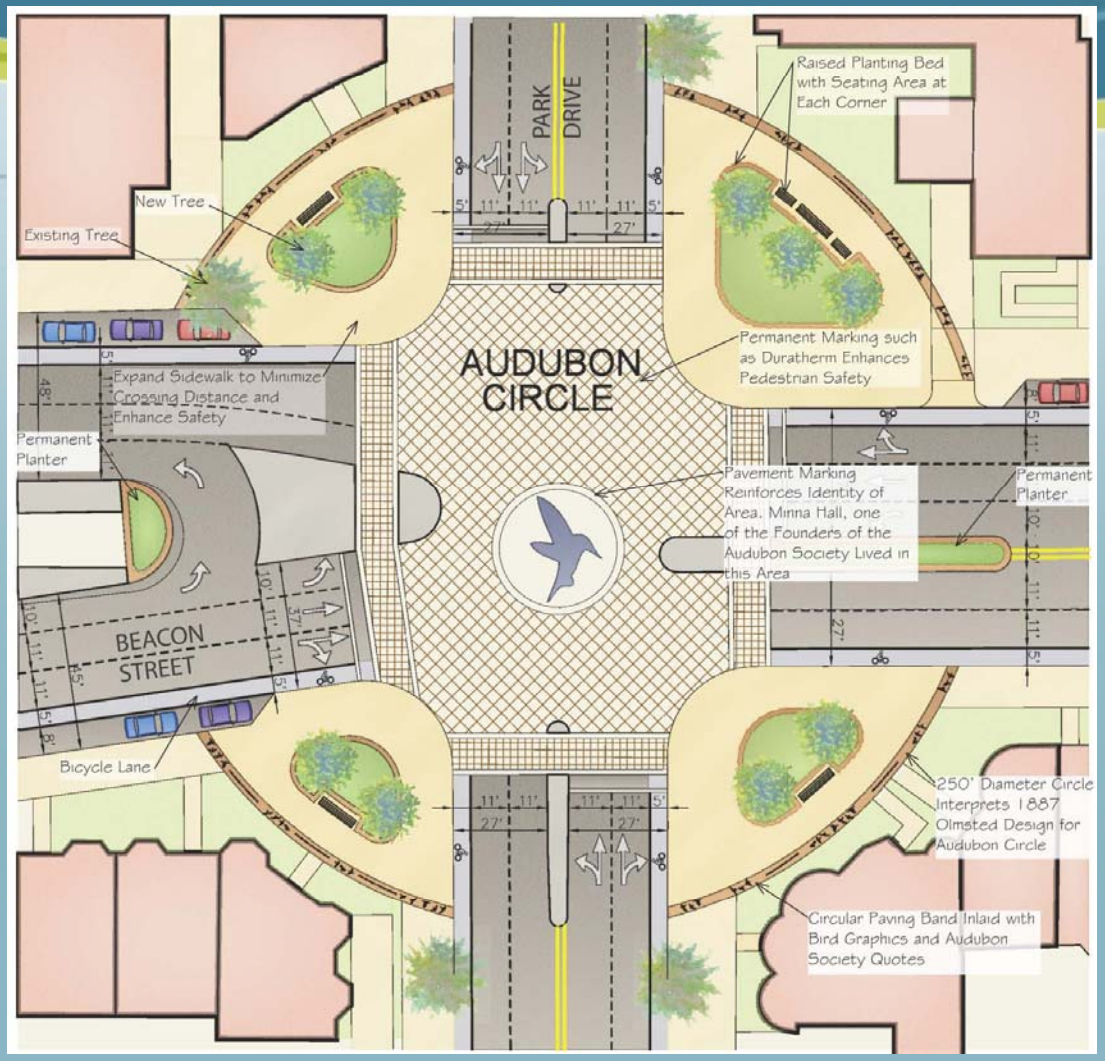
Audubon Circle – Concept from "Action Plan"

Remove Excess Pavement

Add Bicycle Lanes

Simplify Movements

More Direct, and Visible, Crosswalks



Add Urban Design Opportunities

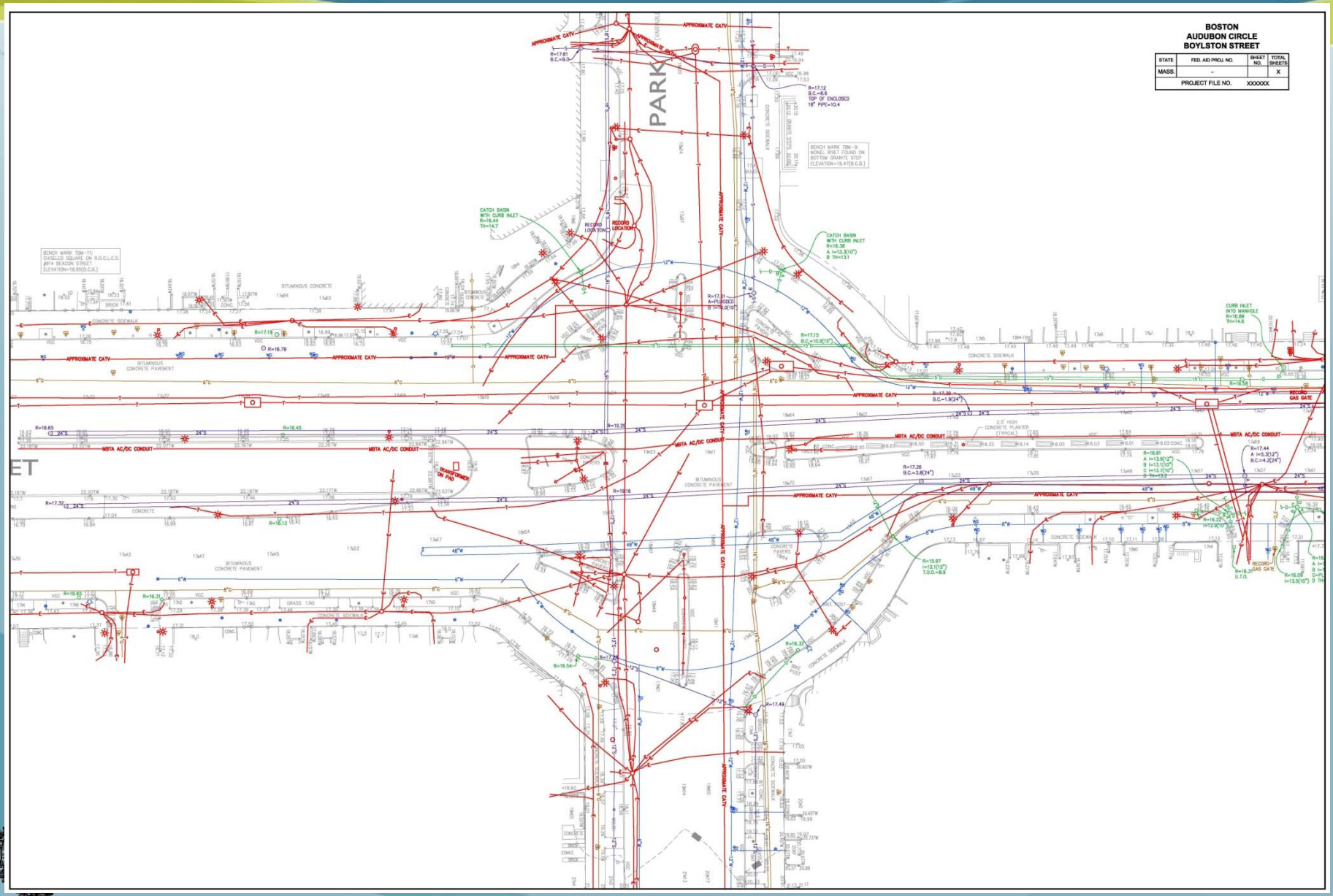
Increase Safety for All Modes

Enhance Neighborhood Feel

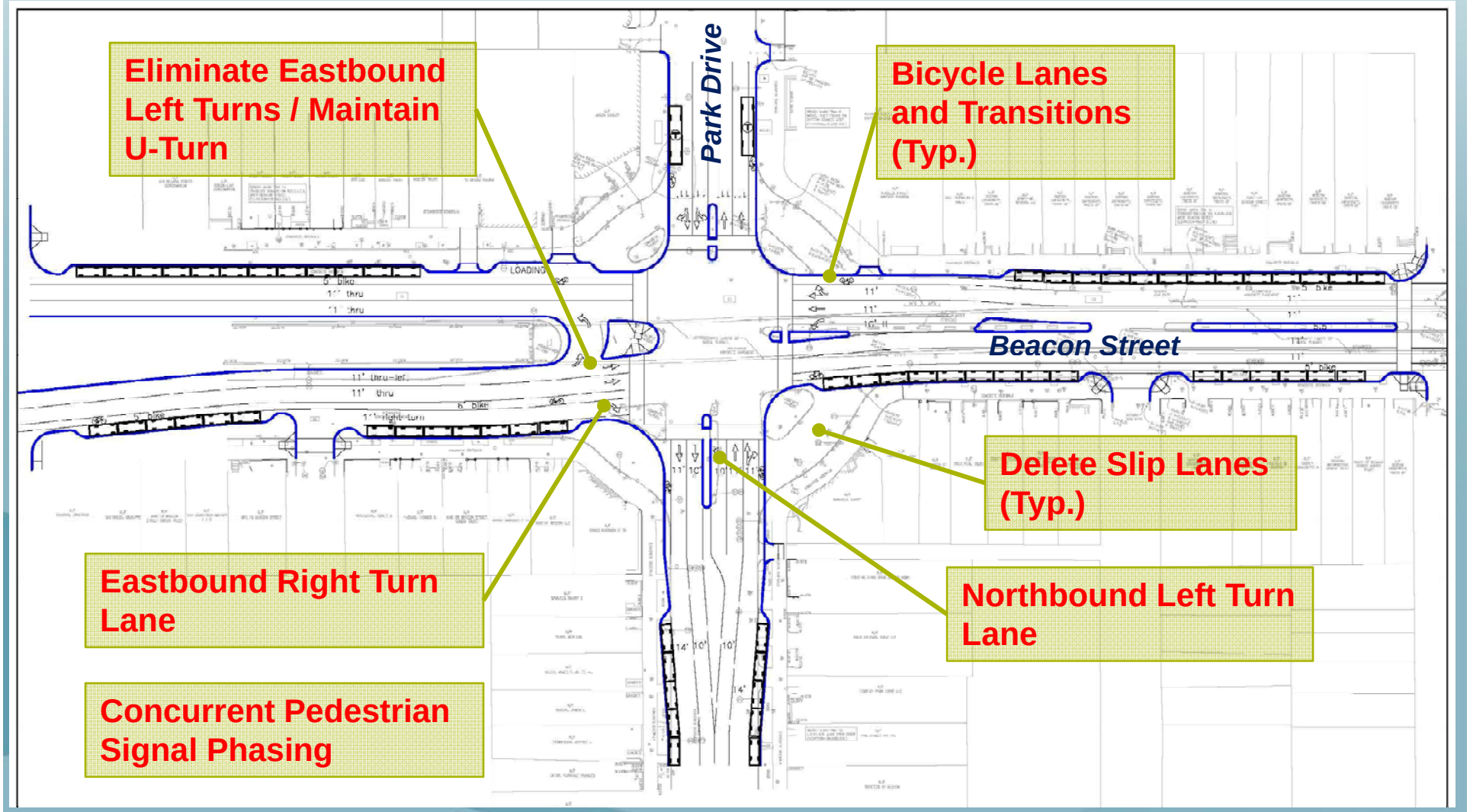
A Balancing Act

- Vehicular / Pedestrian / Bicycle Levels of Service and Delay
- Parking and Loading Needs
- Use of “Non-Roadway” Space
- Environmental Considerations
- Infrastructure Realities and Constraints

Existing Utilities

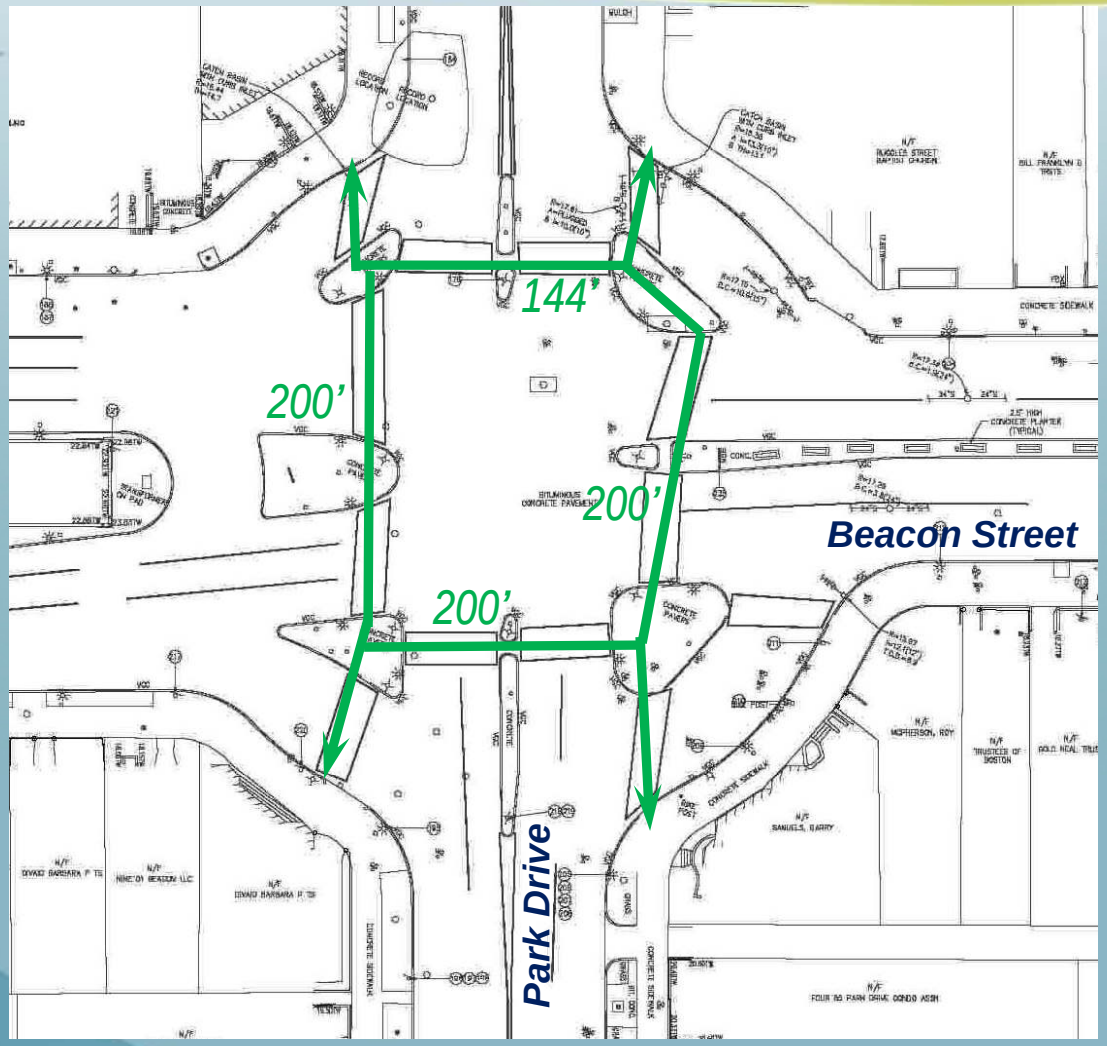


Engineered Conceptual Design



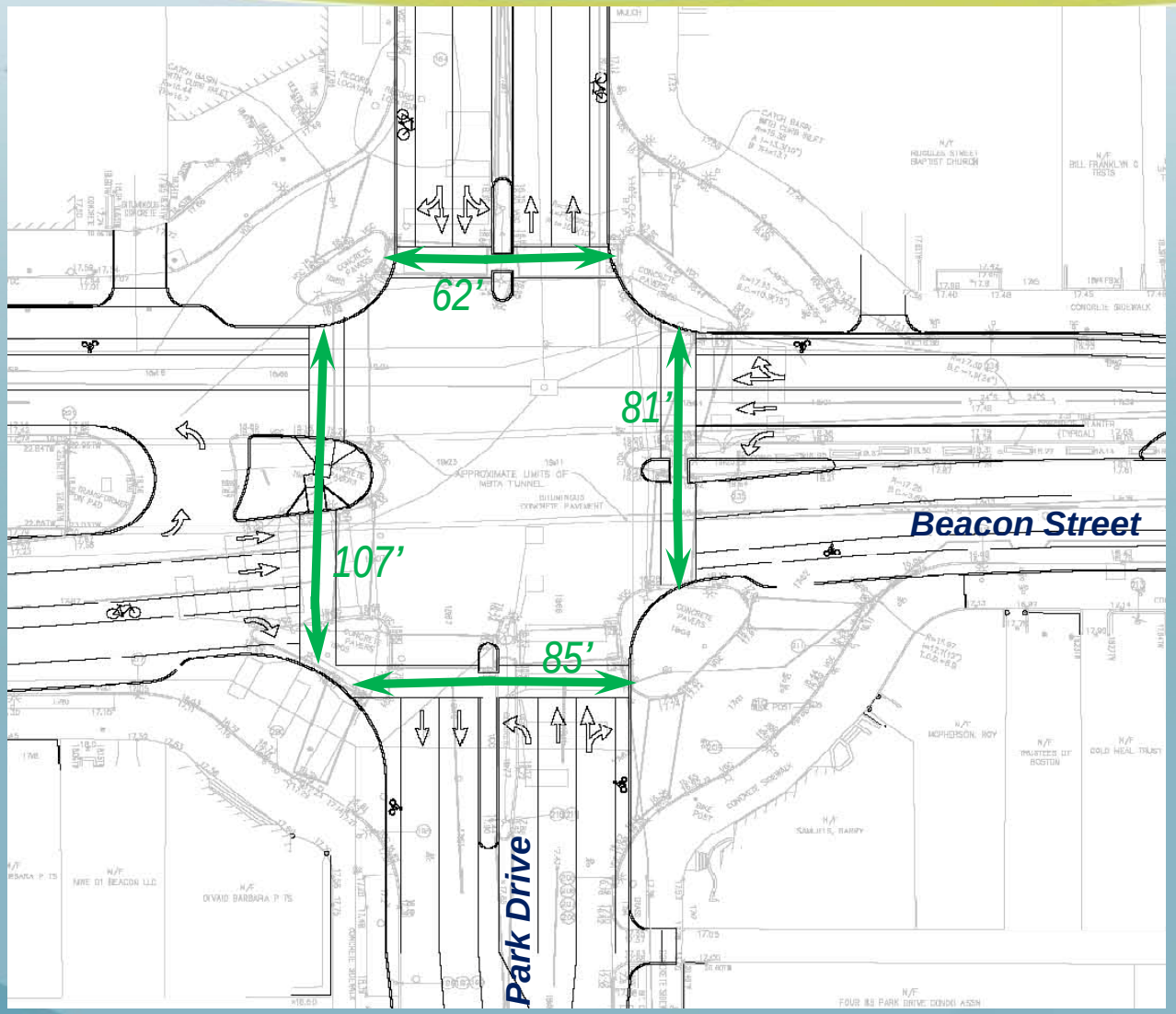
Crossing Lengths – Existing

Note: Distances shown are "arrow to arrow"



Crossing Lengths - Proposed

Note: Distances shown are "arrow to arrow"



Pedestrian Signal Phasing Options

- Exclusive Pedestrian Phase:
  - All vehicular traffic is stopped
  - Pedestrians in all crosswalks can proceed

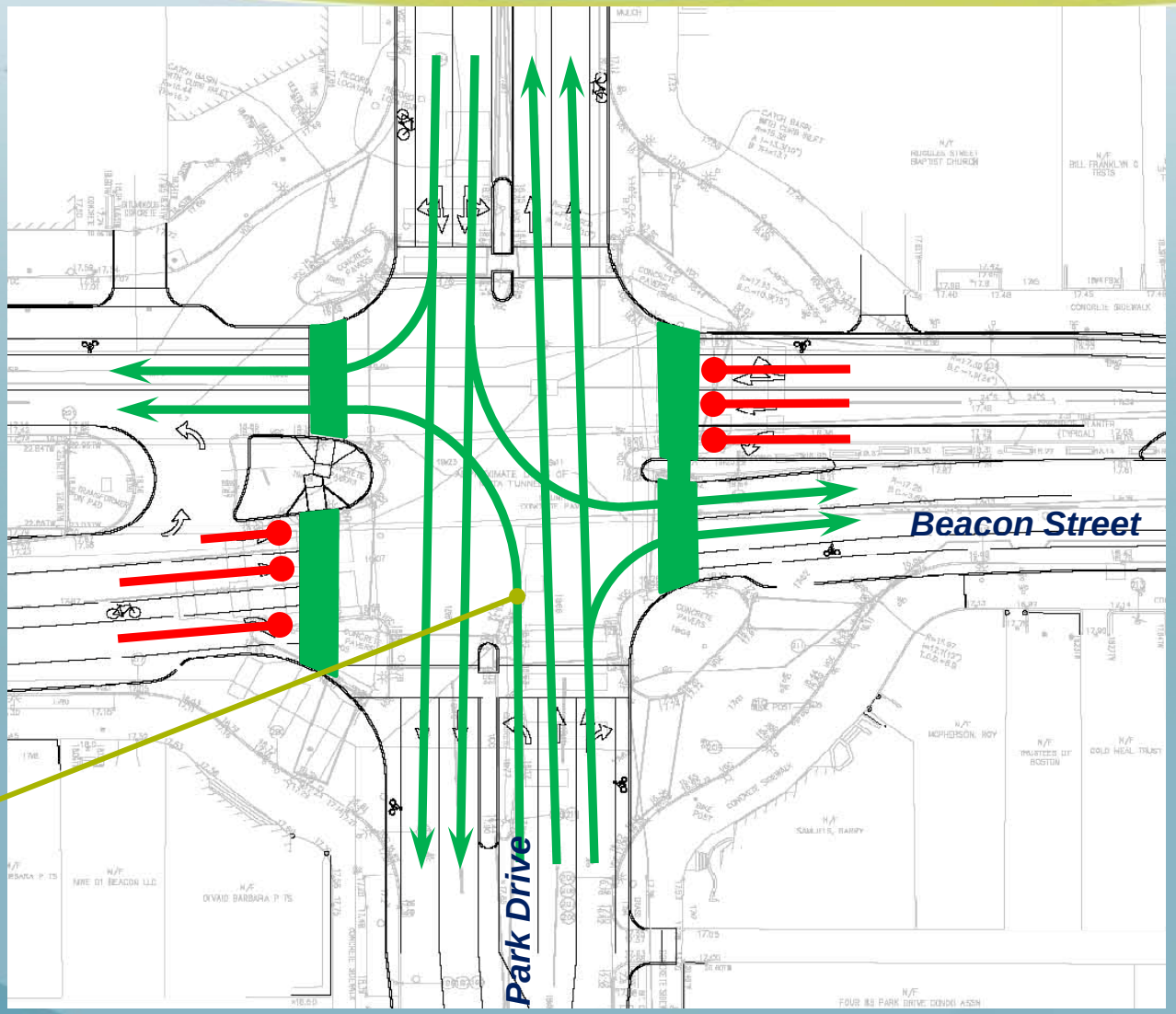
- Concurrent Pedestrian Phase
  - Some pedestrian crossings occur concurrently with vehicle movements
  - Often supplemented with “Leading Pedestrian Interval” (LPI) which gives pedestrians a head-start

Pedestrian Signal Phasing Options

- Concurrent Pedestrian Phase
  - Allows more time per cycle for all modes (pedestrian, vehicle, bike)
  - Reduces congestion, delays, and vehicle emissions
  - More opportunity for pedestrians to cross – less temptation to cross against the signal when vehicles aren't expecting peds

Signal Phasing and Timing – A.M. Peak

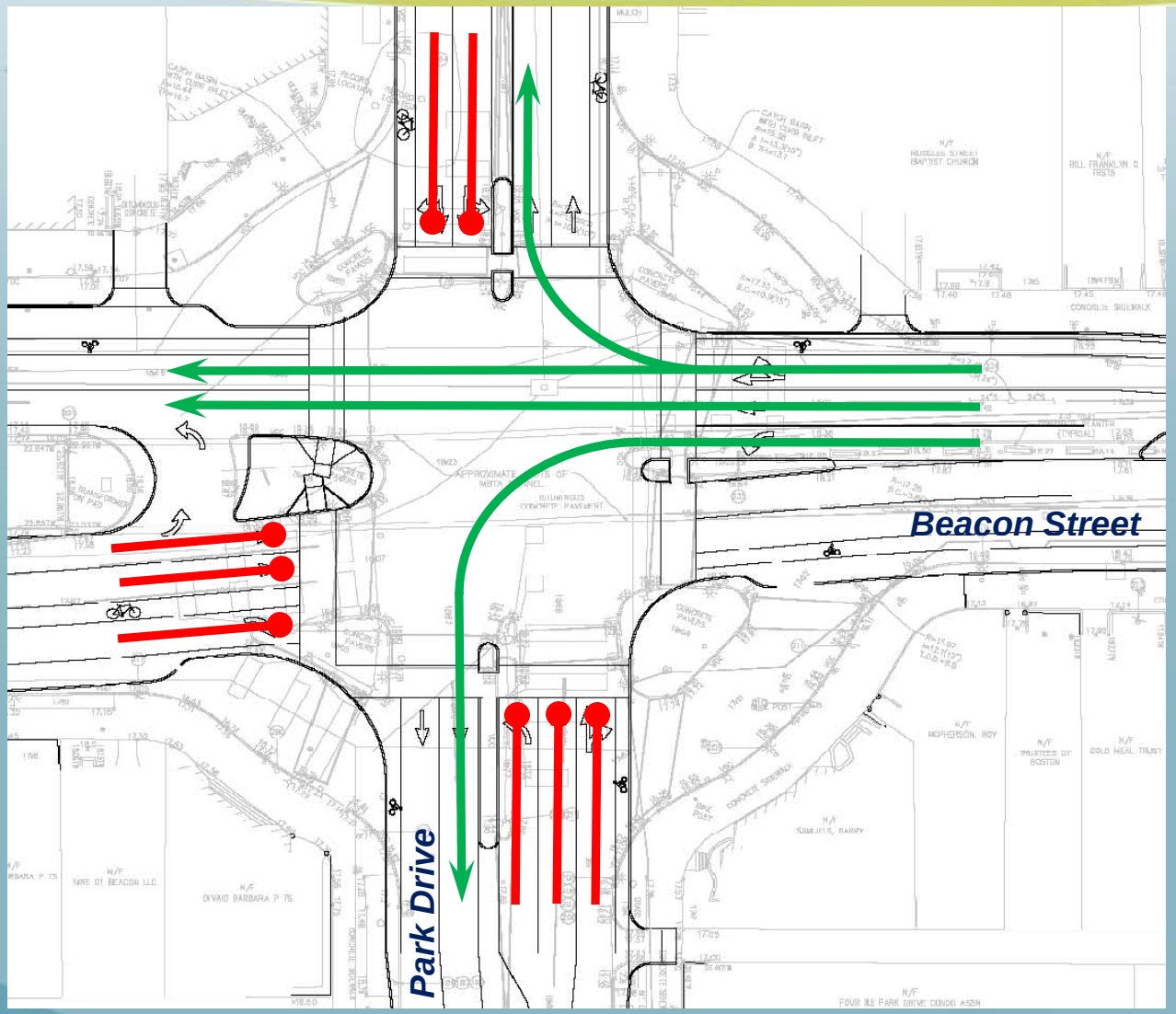
38 Seconds



Note: Park Drive northbound left turns to be stopped when no demand remains (not shown)

Signal Phasing and Timing – A.M. Peak

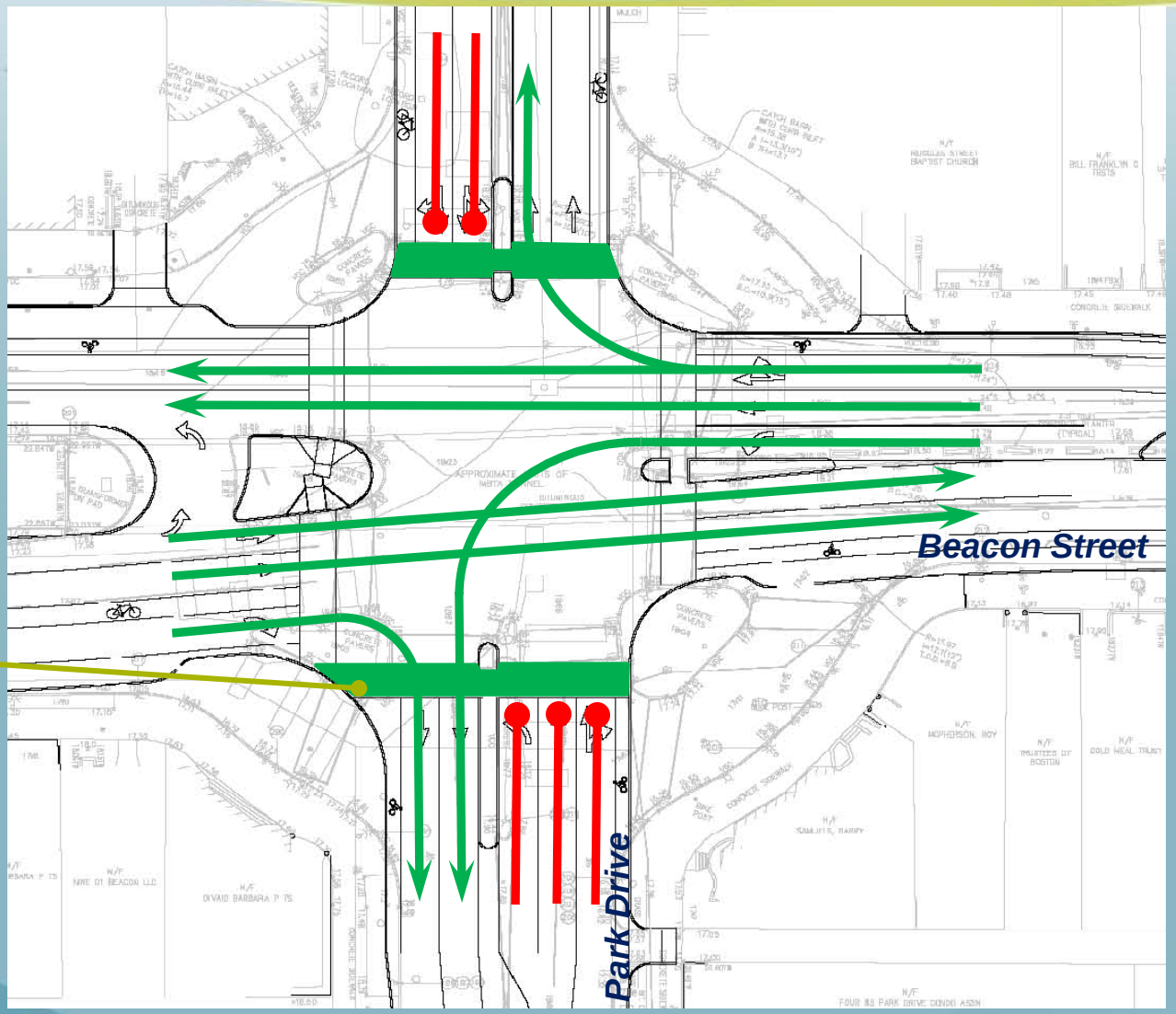
12 Seconds



Signal Phasing and Timing – A.M. Peak

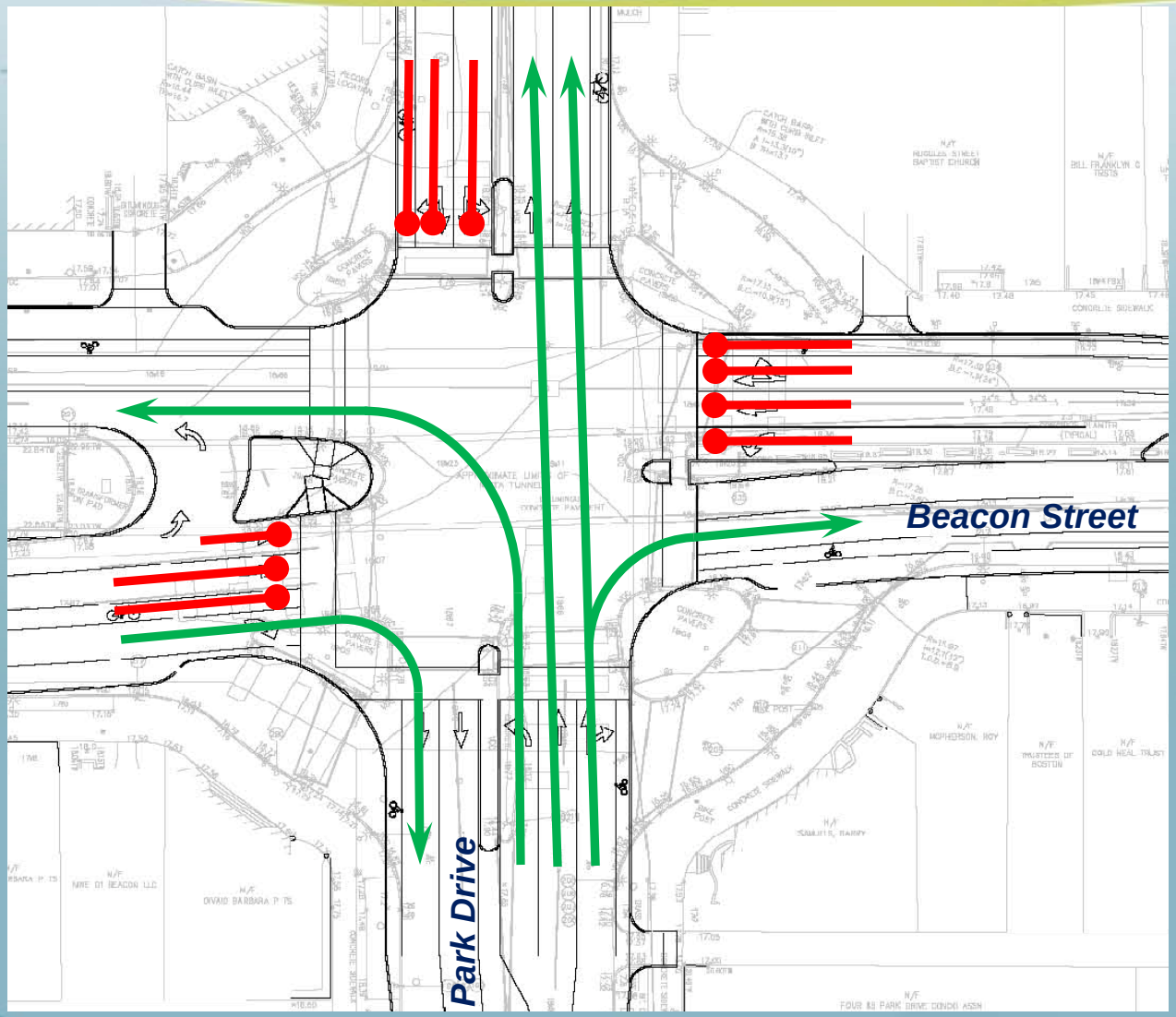
29 Seconds

Note: Park Drive south crosswalk to have "Leading Pedestrian Interval" (not shown)



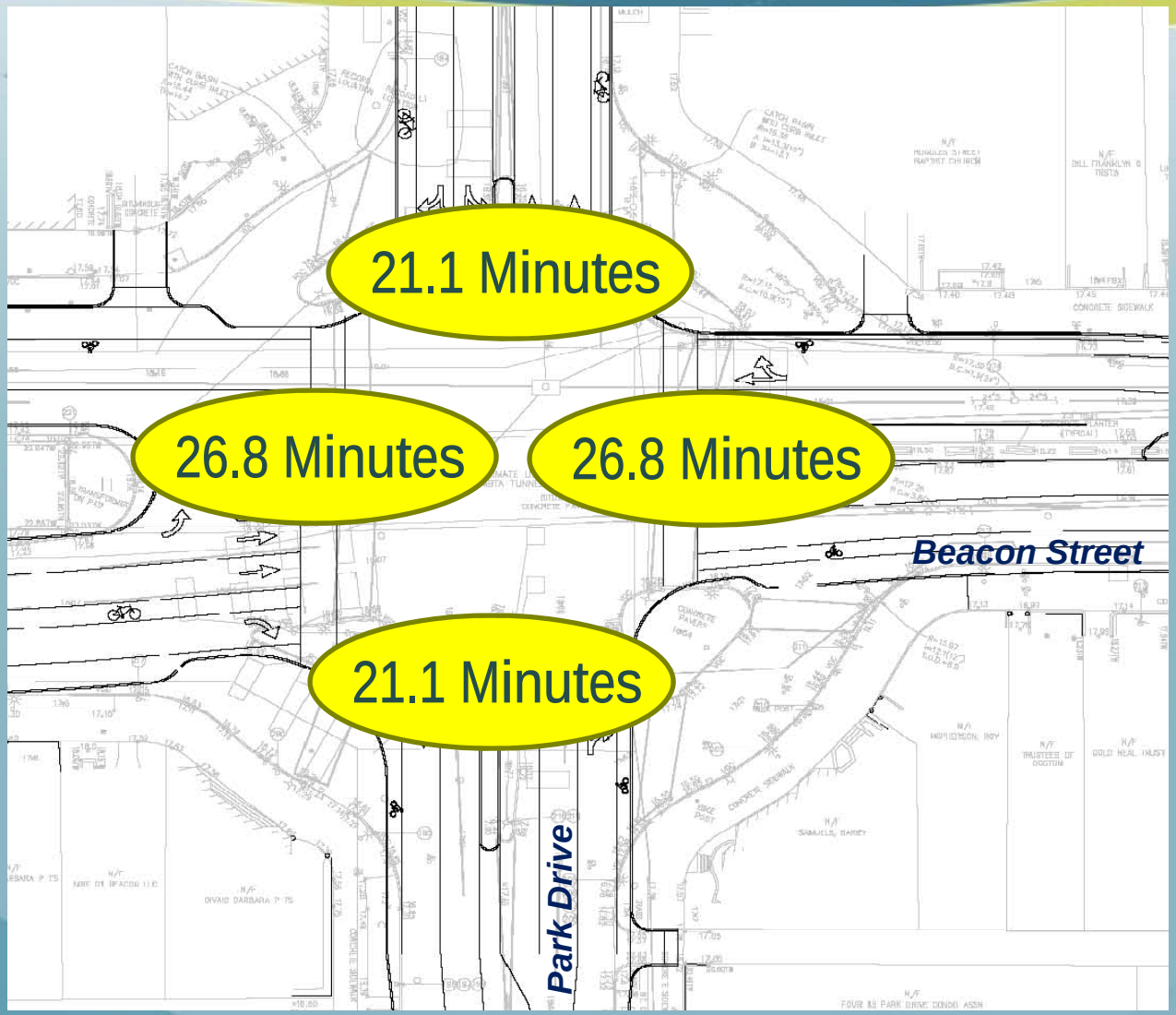
Signal Phasing and Timing – A.M. Peak

6 Seconds



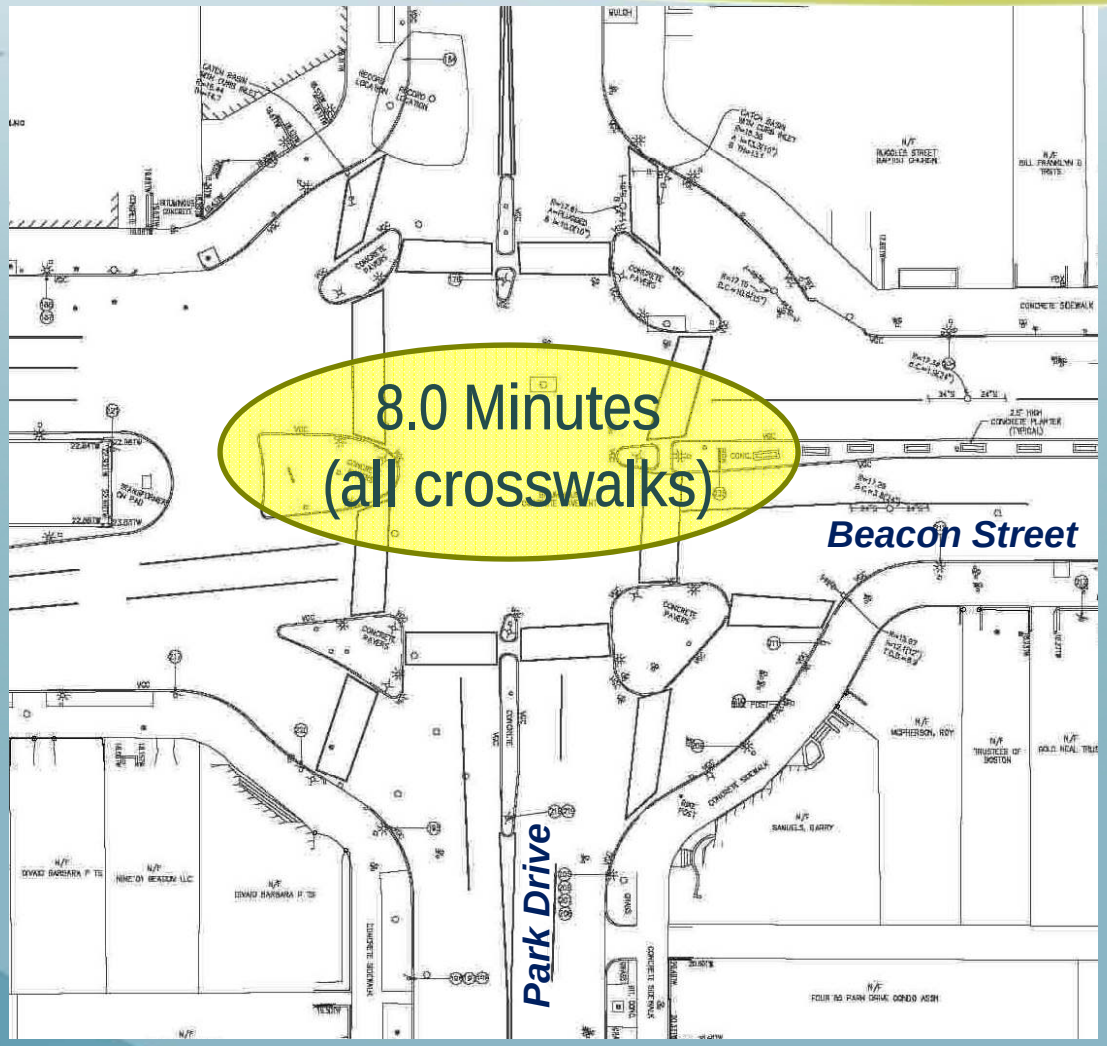
Crosswalk Time Per Hour – Proposed (85-second cycle; Concurrent Pedestrian Phases)

Note: Times shown Include "Walk" and Flashing "Don't Walk" periods



Crosswalk Time Per Hour – Existing (110-second cycle; Exclusive Pedestrian Phase)

Note: Time shown Includes "Walk" and Flashing "Don't Walk" periods



Vehicular Emissions

- More Consistent Vehicular Flow Reduces Vehicular Emissions
- Predict Reduction of 10% per year at Audubon Circle
  - CO_2 reduction of 115 tons per year
  - SO_2 reduction of .94 tons per year
  - NO_x reduction of 0.18 tons per year
  - Particular Matter reduction of .01 tons per year
  - VOC reduction of 0.22 tons per year

Methodology based on USDOT and BTS guidelines

Vehicular Benefits: Operations and Safety

- Delays and queuing will be reduced
- Conflicts between left turners and other vehicles will be reduced
- Speed of northbound left turns will be reduced
- General upgrades to signals, marking and signage will improve safety and operations

Pedestrian and Community Benefits

- More potential crossing time in signal cycle
- Crosswalks are shorter, more direct
- Improved sightlines
- Slower traffic; fewer points of conflict with traffic
- Reduction in Greenhouse Gas Emissions

Bicycle Benefits

- Delineated lanes encourage safe, predictable behavior by all users and reduce conflicts
- Bike lanes consistent with existing and planned network; and facilitate future connectivity
- Design reflects Audubon Circle as key crossroads for cyclist activity (Emerald Necklace/BU Bridge/Brookline/Downtown)

Parking Implications

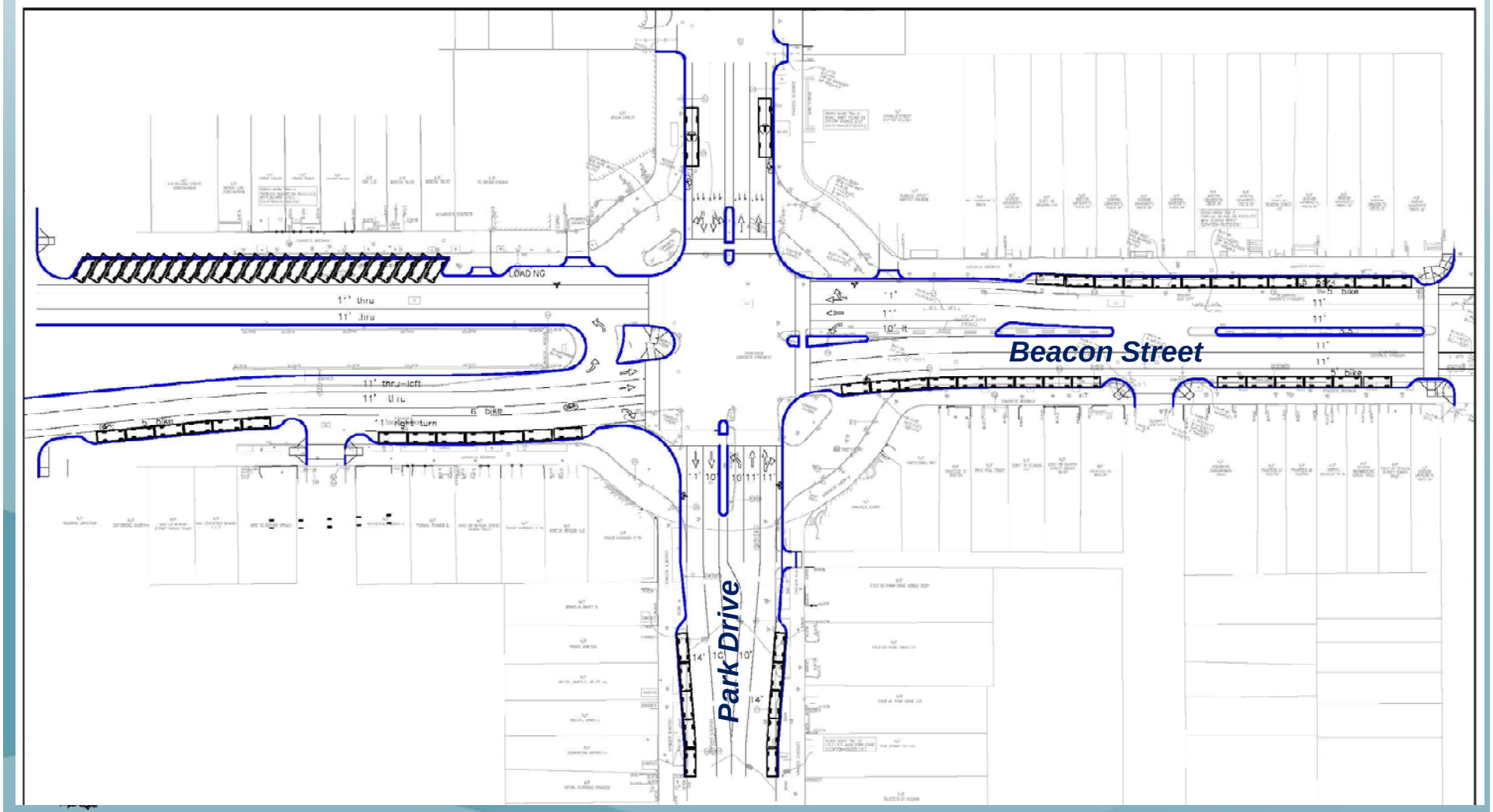
- Parking Inventory Area
  - Beacon Street: St. Mary's to Miner
  - Park Drive: Buswell to Fenway Station Overpass

- Existing: Approx. 97 spaces

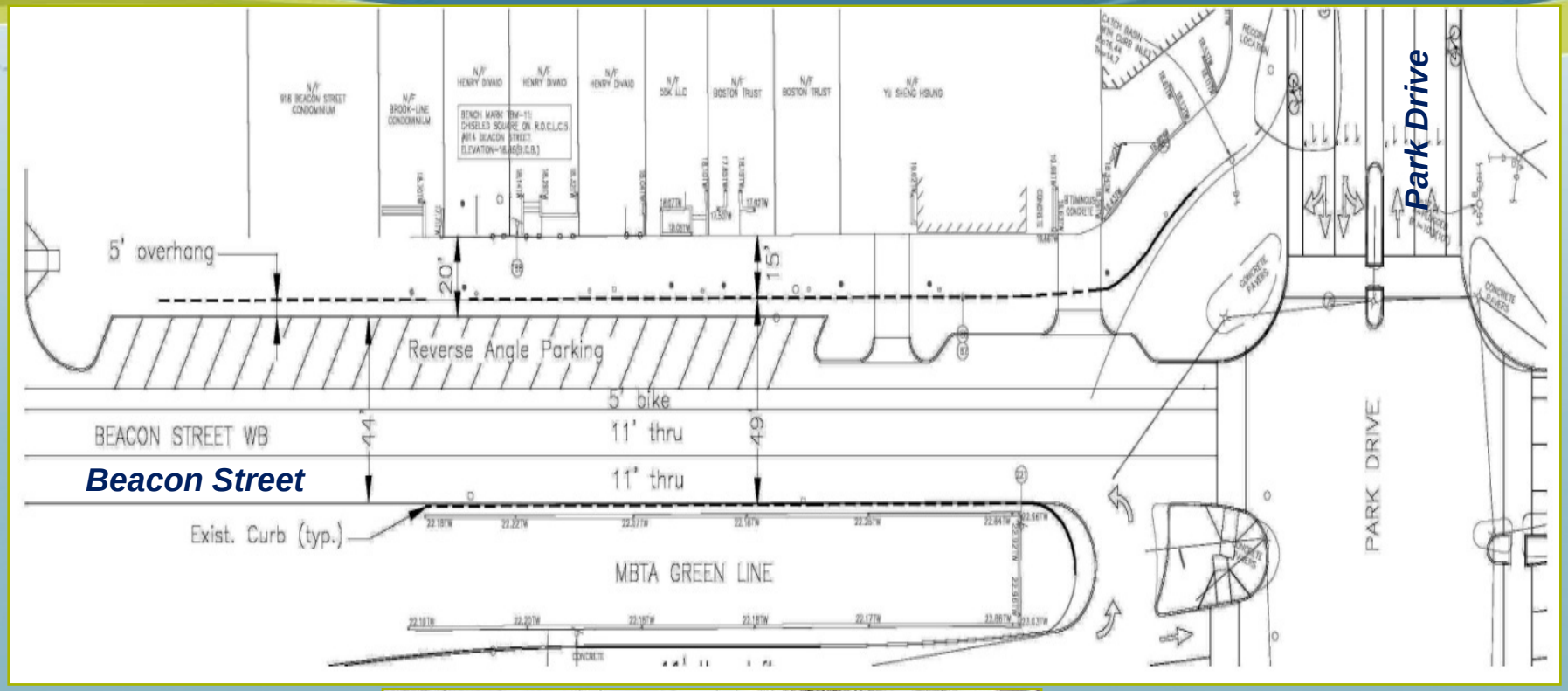
  - 52 Resident
  - 41 Metered
  - 1 Shared Meter/Valet
  - 2 Taxi
  - 1 Loading

- Proposed: 80 spaces

Reverse Angle Parking Option

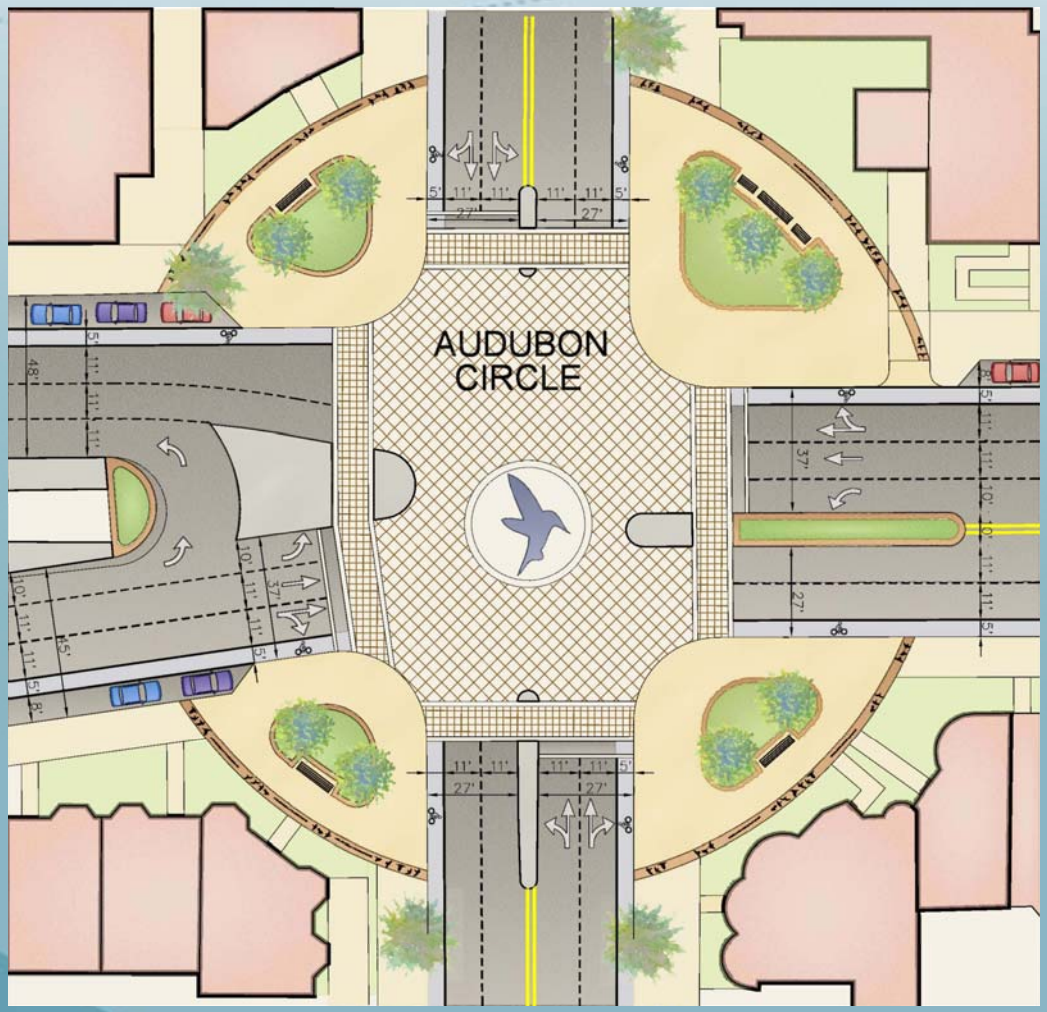


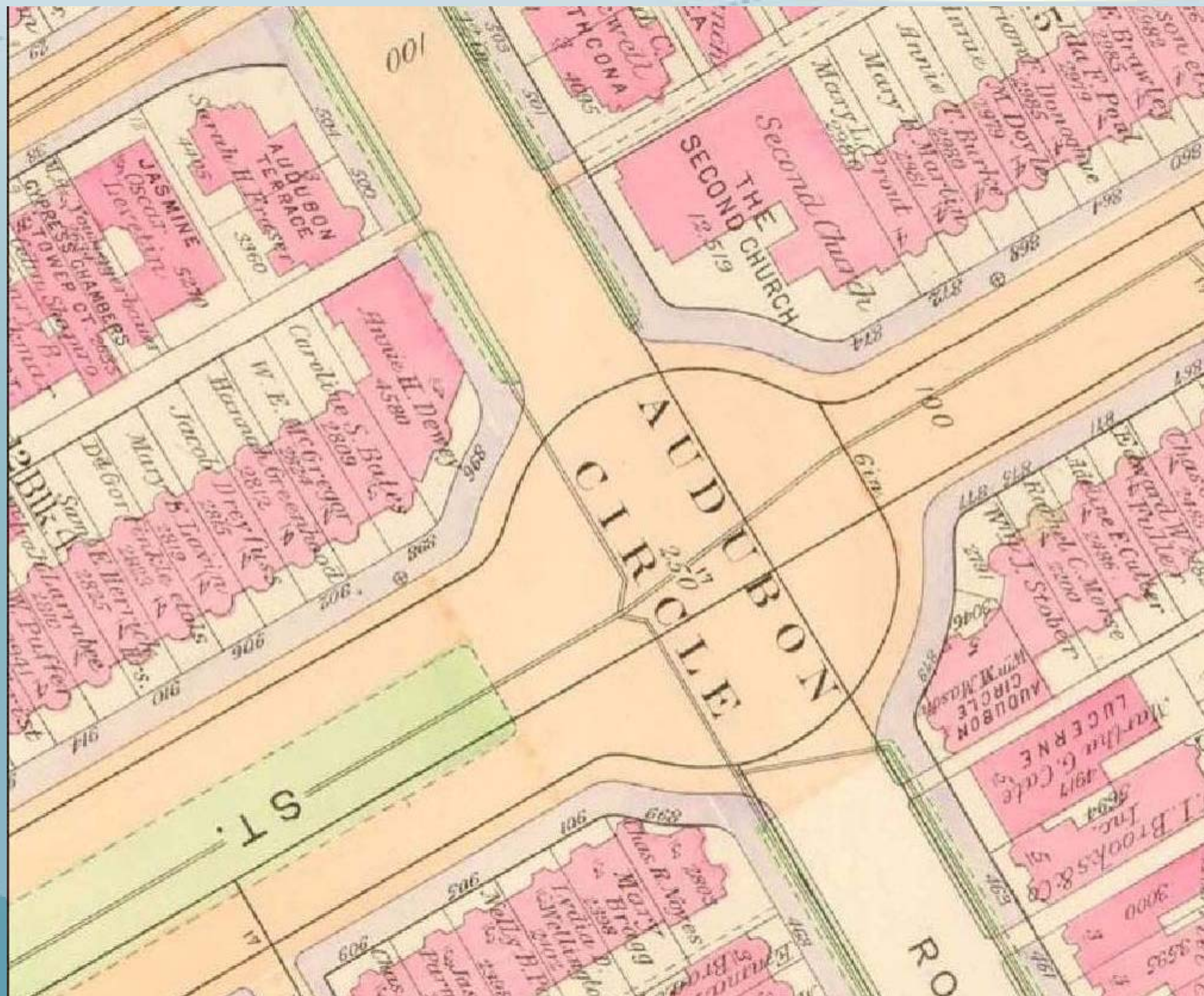
Reverse Angle Parking



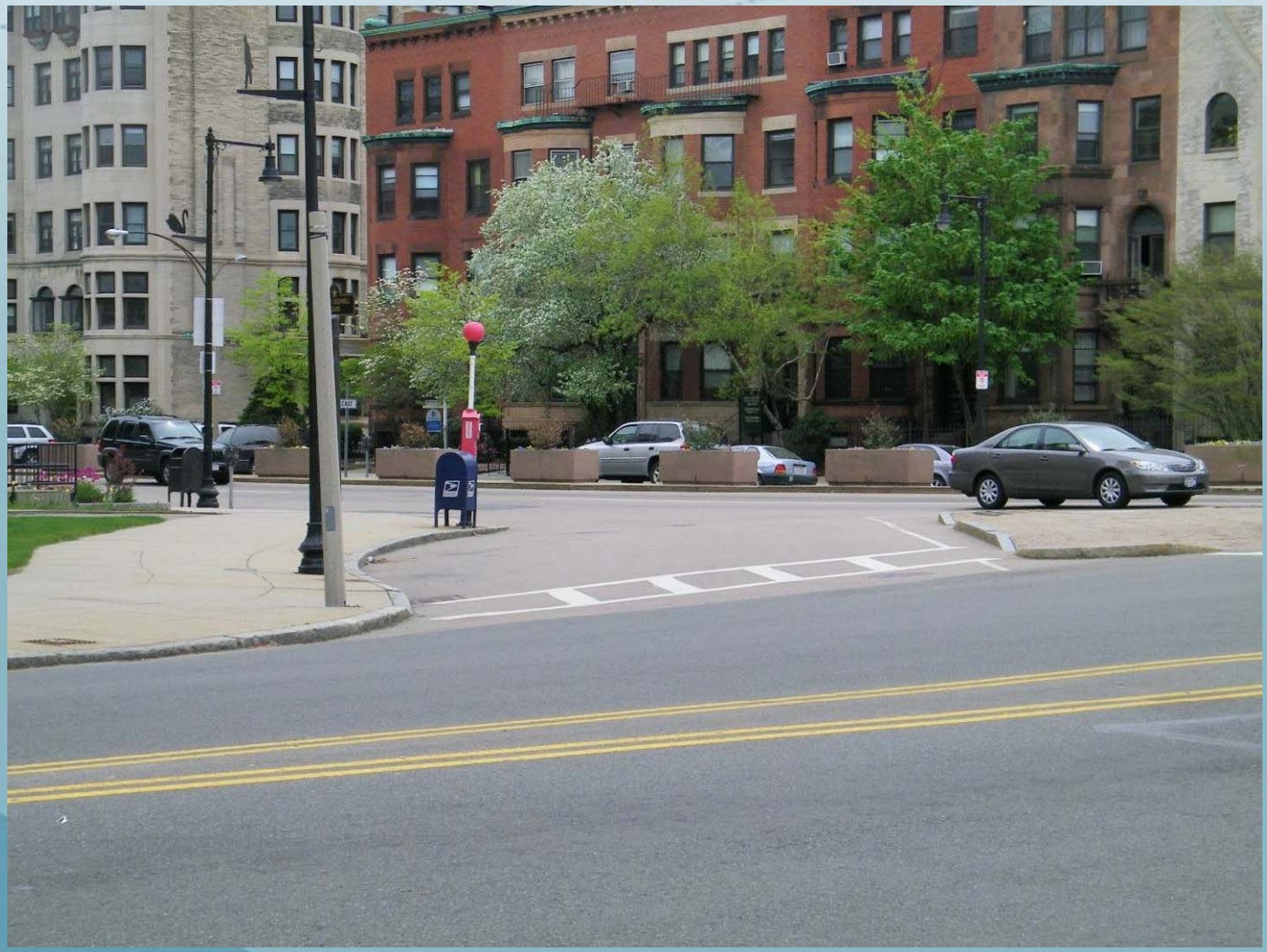
Parking Implications

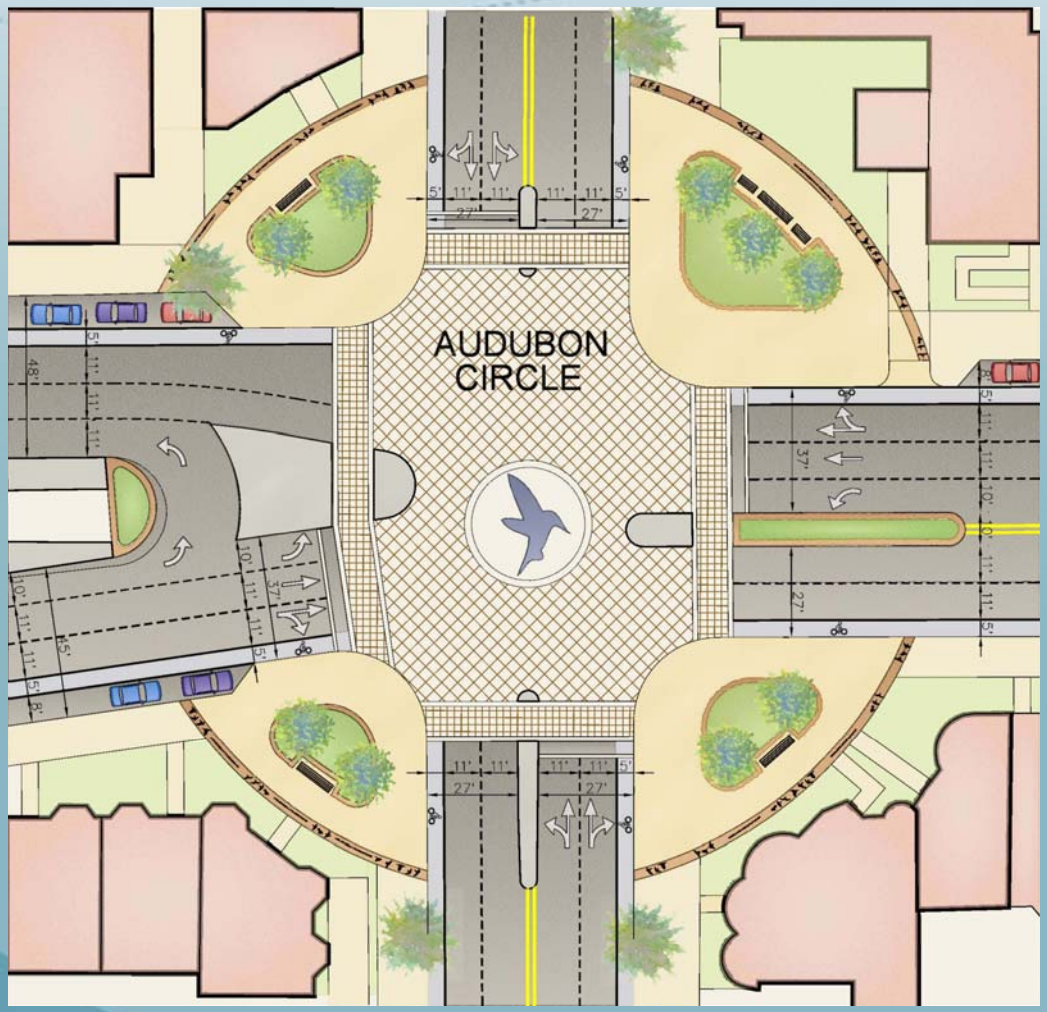
- Parking Inventory Area
  - Beacon Street: St. Mary's to Miner
  - Park Drive: Buswell to Fenway Station Overpass
- Existing: Approx. 97 spaces (various regulations)
- Proposed with Reverse Angle Parking: 90 spaces


AUDUBON
CIRCLE


AUDUBON CIRCLE
THE SECOND CHURCH
Second Church
AUDUBON TERRACE
JASMINE

Fenway-Longwood-Kenmore Priority Projects

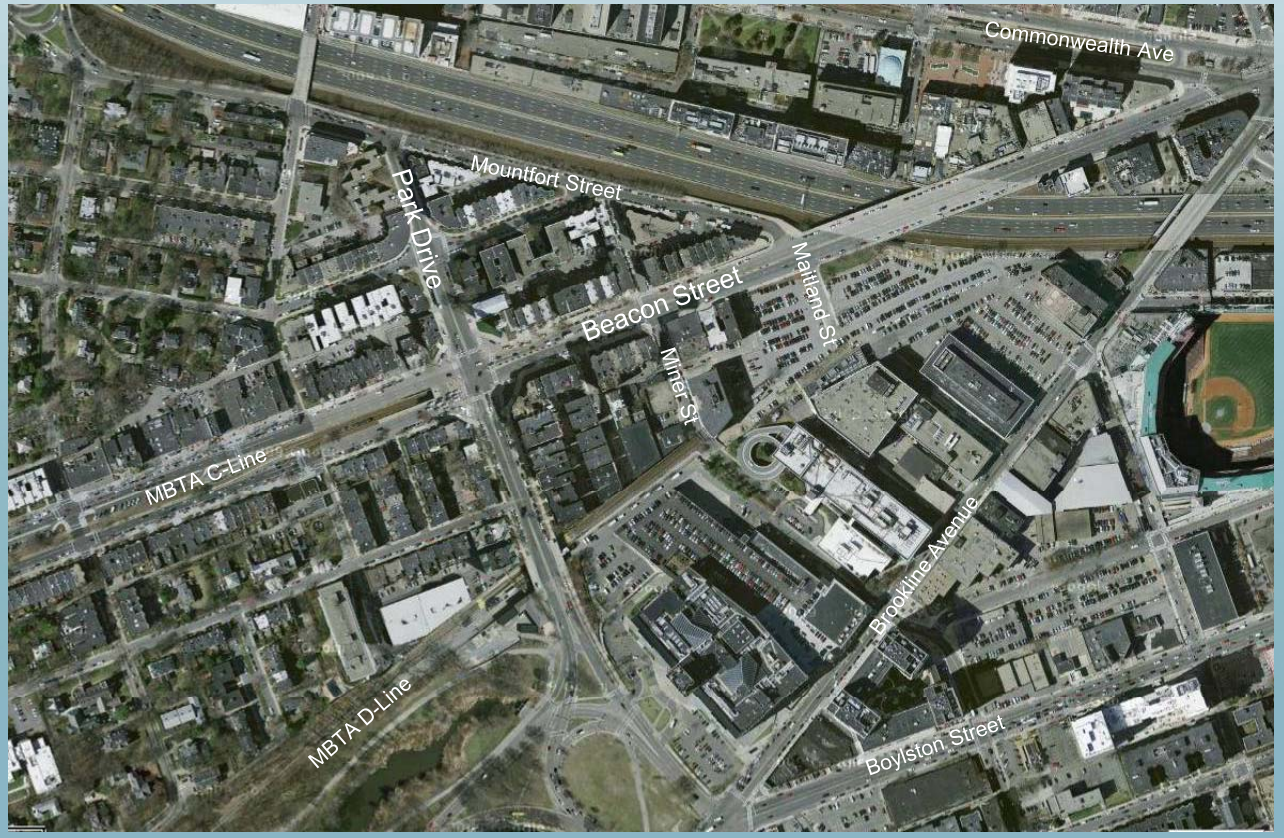



AUDUBON
CIRCLE


WELCOME TO
AUDUBON
SHEERIN


AUDUBON CIRCLE
879
Beacon St.

- Relationship to Beacon Street and Park Drive
- Opportunities to strengthen character/geometry
- Experience of Bicyclists/Drivers/ Pedestrians
- Opportunities for Storm Water Re-use

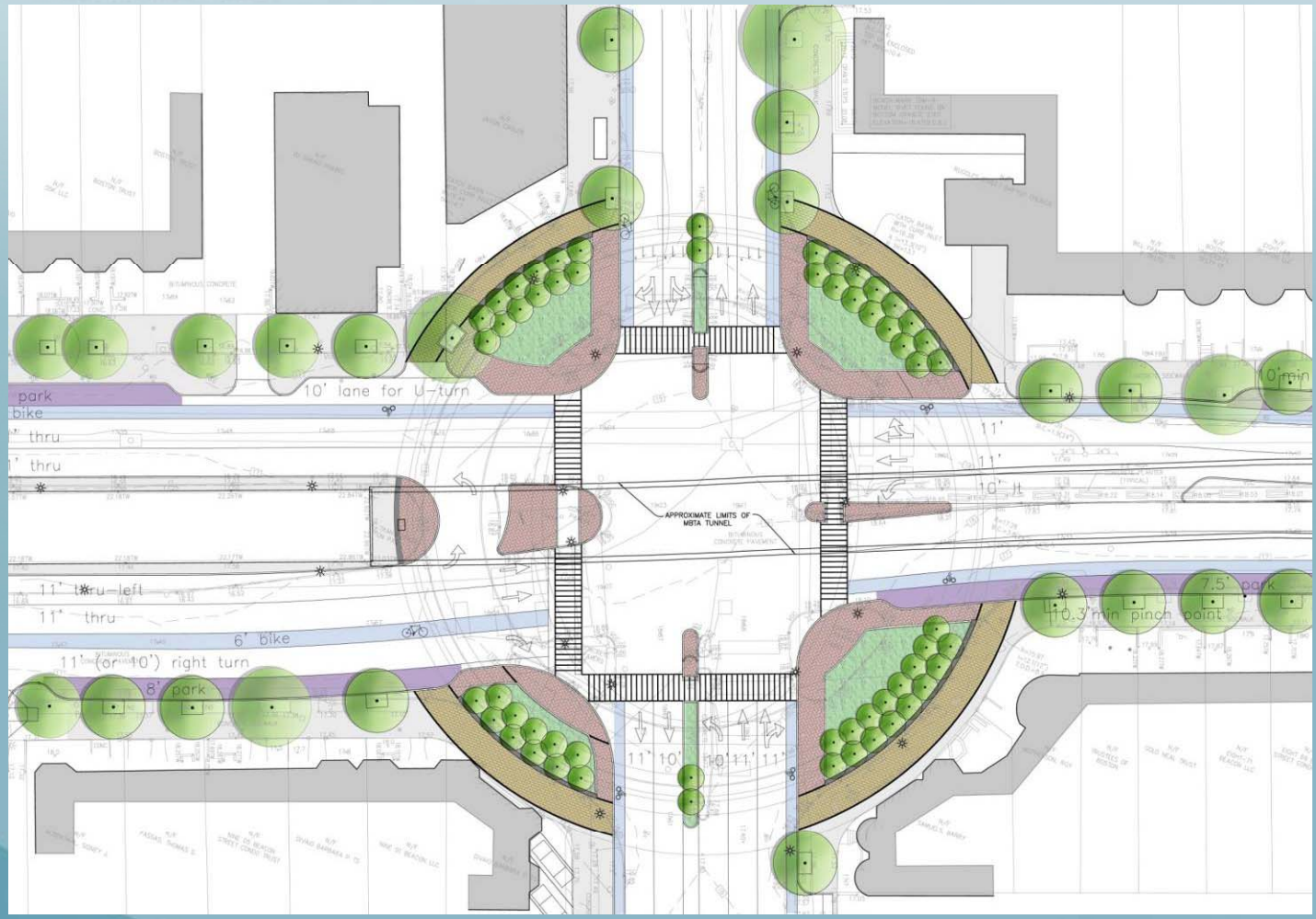


- Circular wall at back edge of planters strengthens geometry

- Wall is reinforced with plantings and planter form

- Planters are large and visible from all approaches

- Back side of wall can display interpretive material

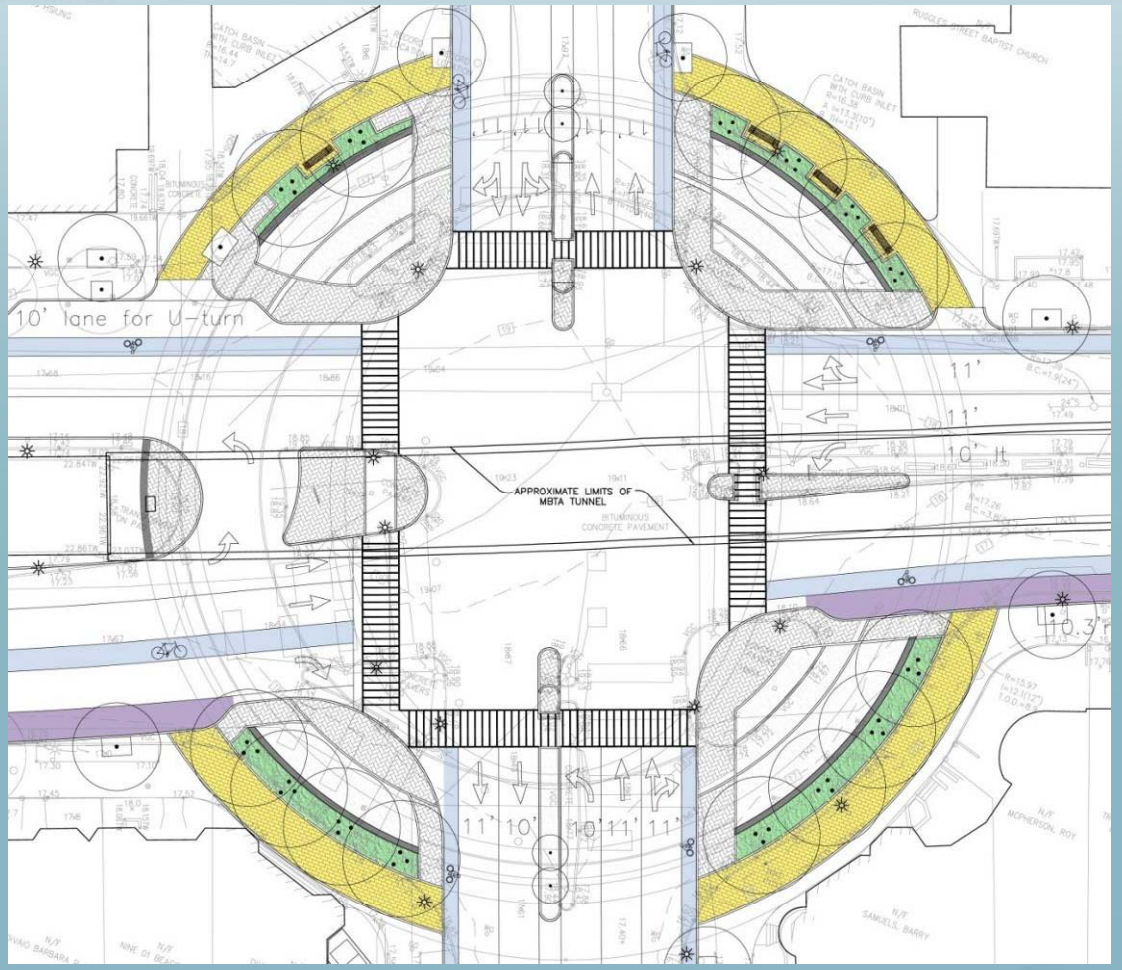


Fenway-Longwood-Kenmore Priority Projects

Fenway-Longwood-Kenmore Priority Projects

- Circular wall moved to allow more usable space at neighborhood side

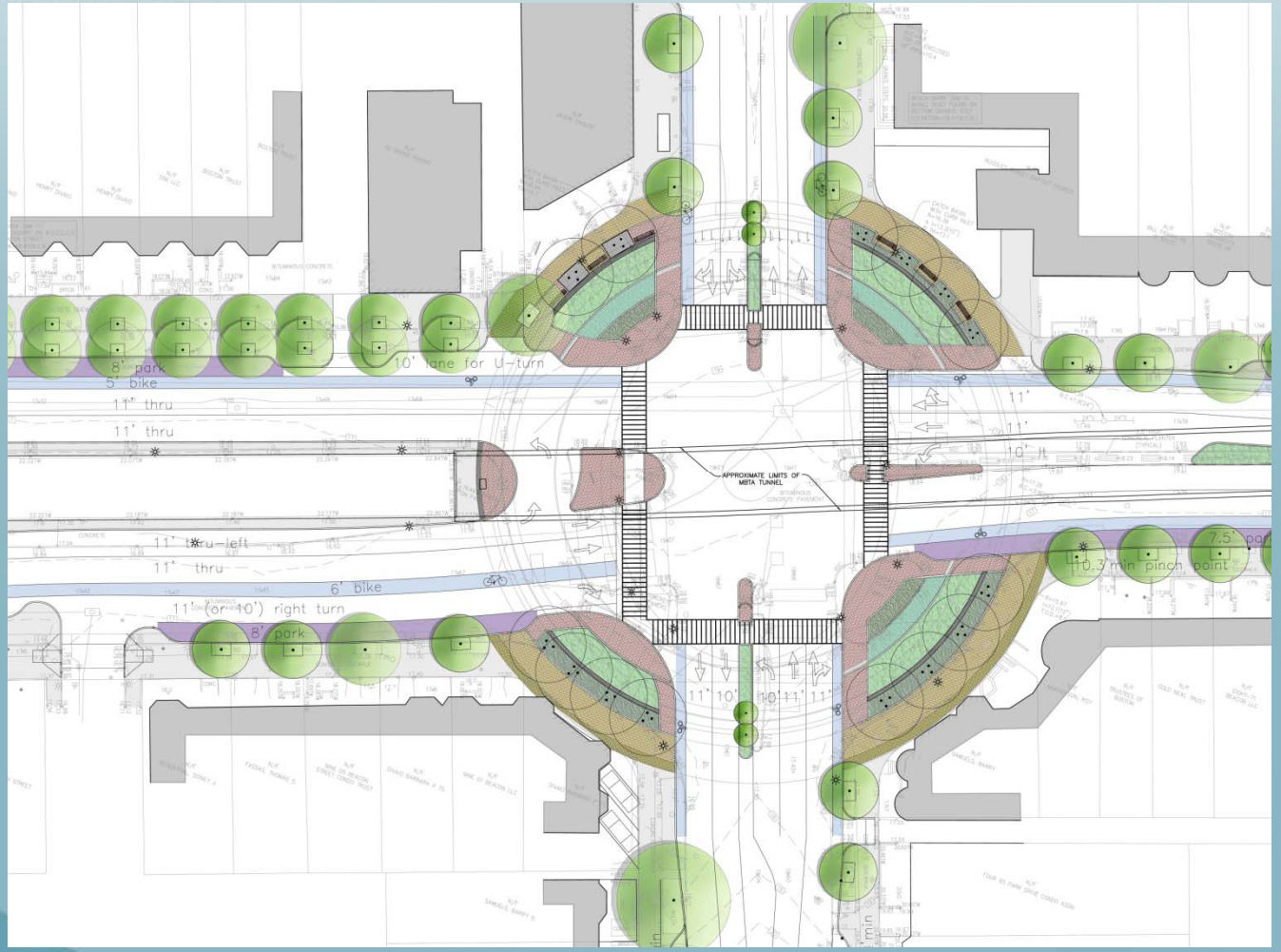
- Allows uniform planter design on intersection side and various uses on neighborhood side



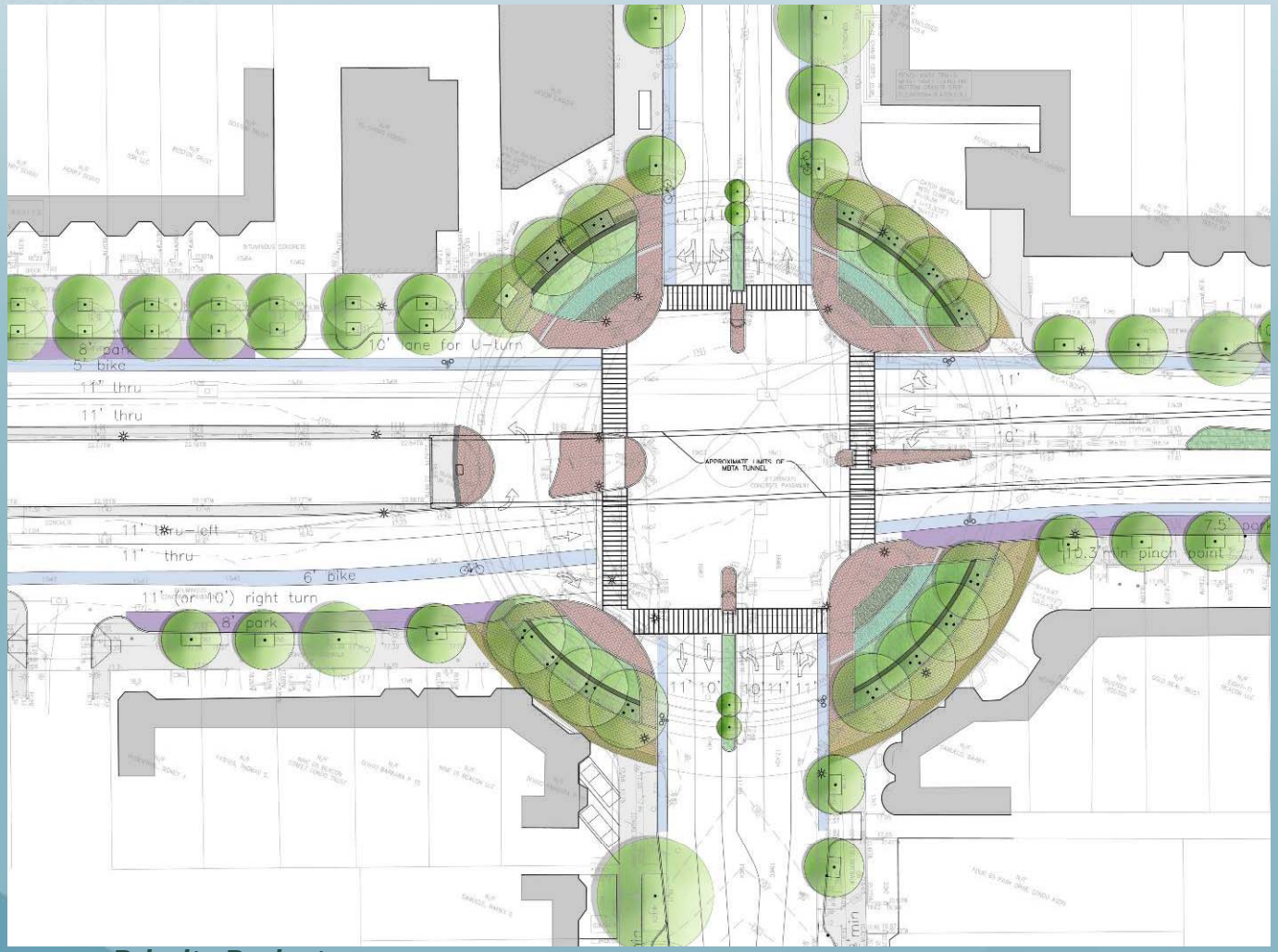
- Pavements follow wall geometry

- Plantings to be developed

- Neighborhood space to be developed



- Maintains circular wall and generous planters
- Provides more space at back side to relate to neighborhood
- Planting provides canopy on neighborhood side



Fenway-Longwood-Kenmore Priority Projects

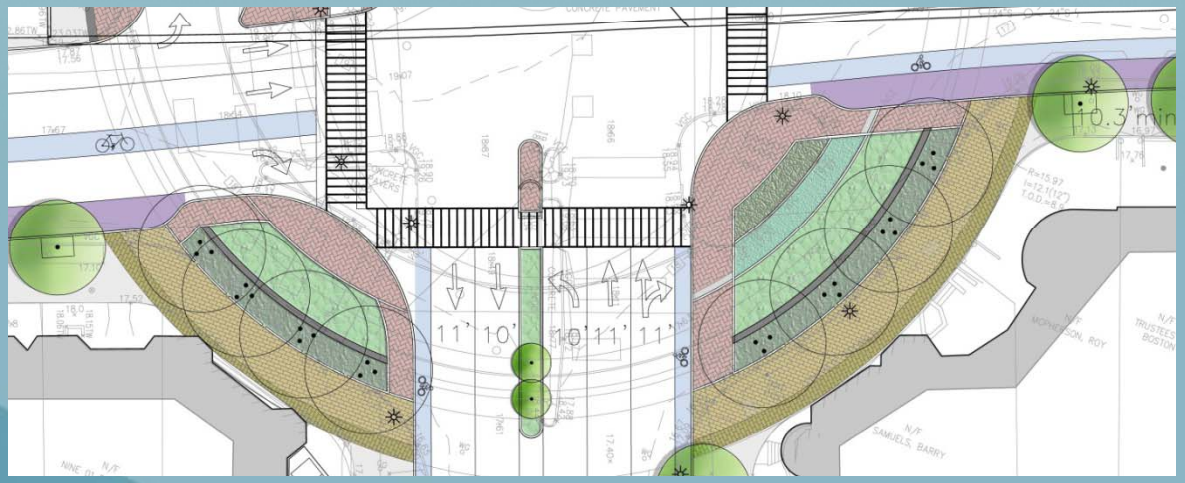
Fenway-Longwood-Kenmore Priority Projects

Developing the Diagram

Developing the Diagram

Business / Restaurant

Church

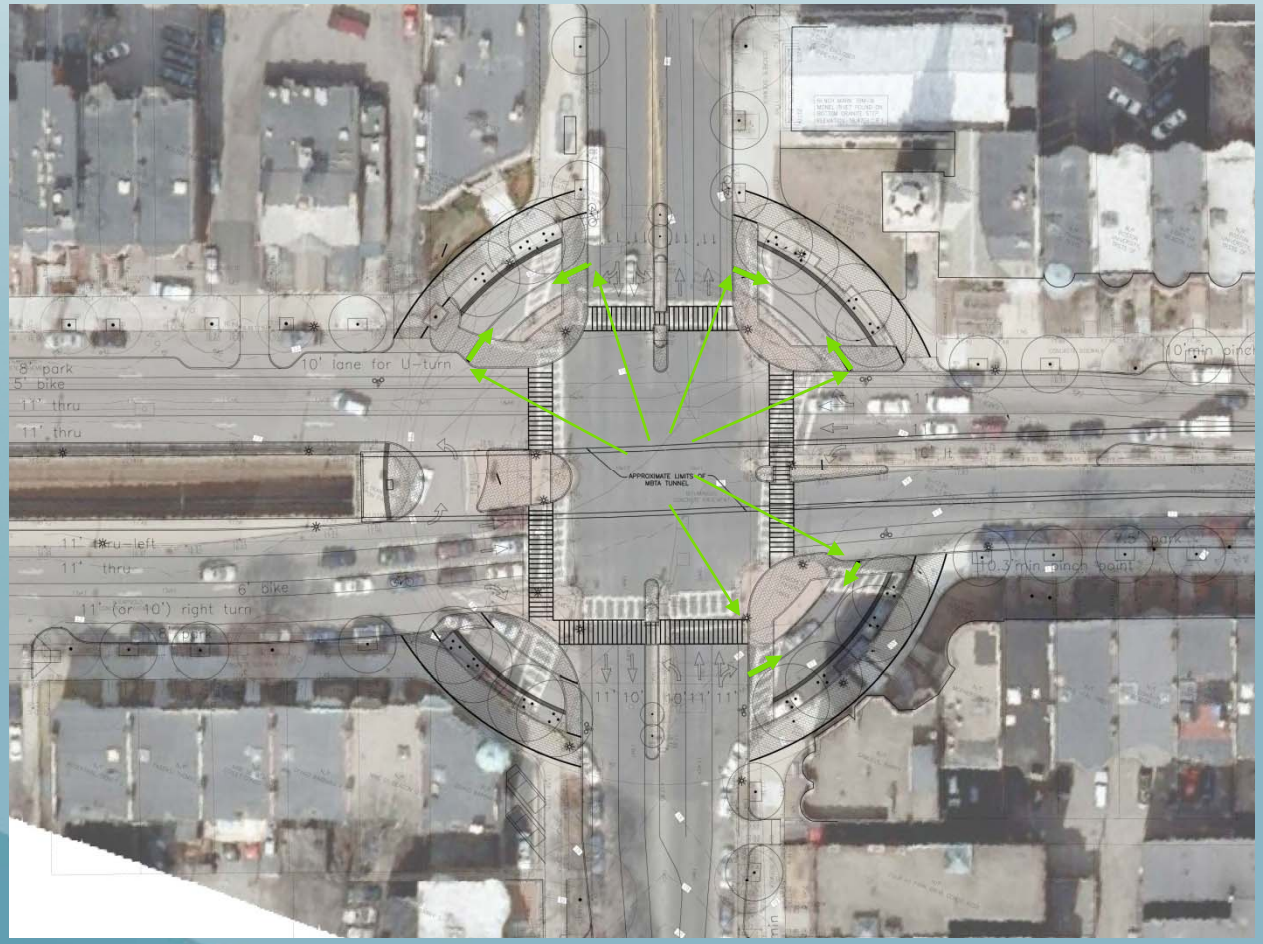


Residential / Business

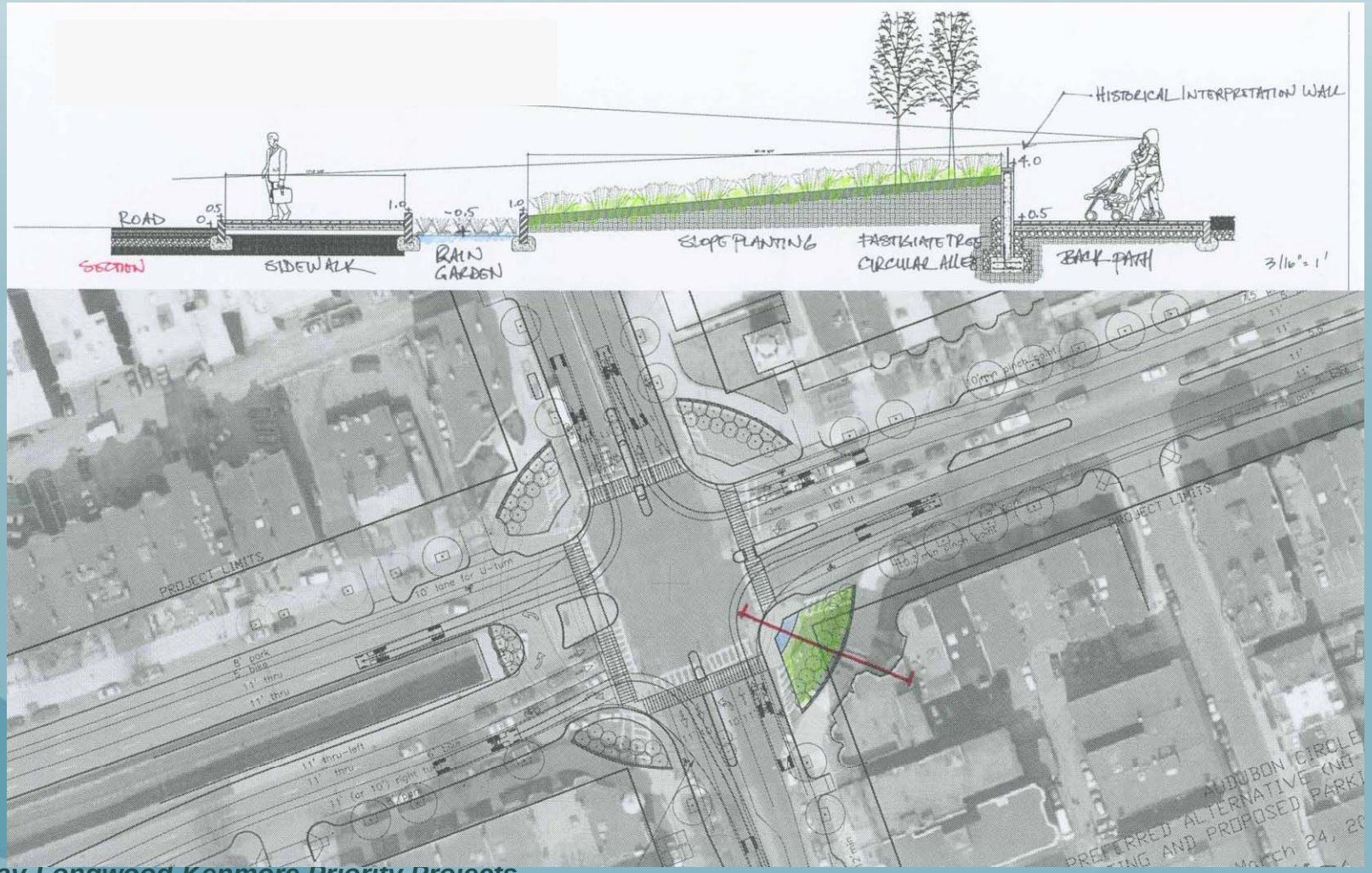
Developing the Diagram

Business/Restaurant

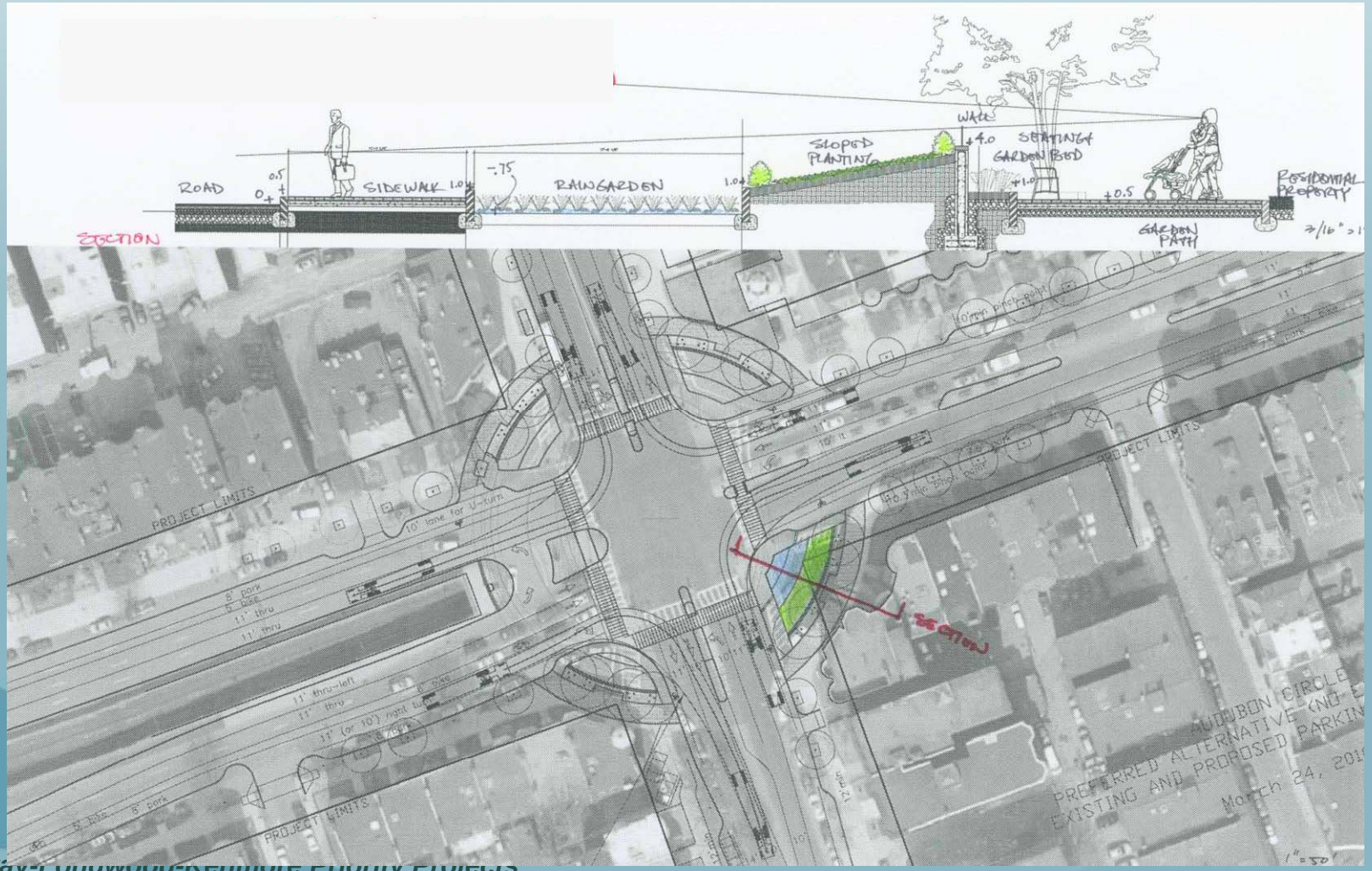
Collecting Storm-water in Rain Gardens



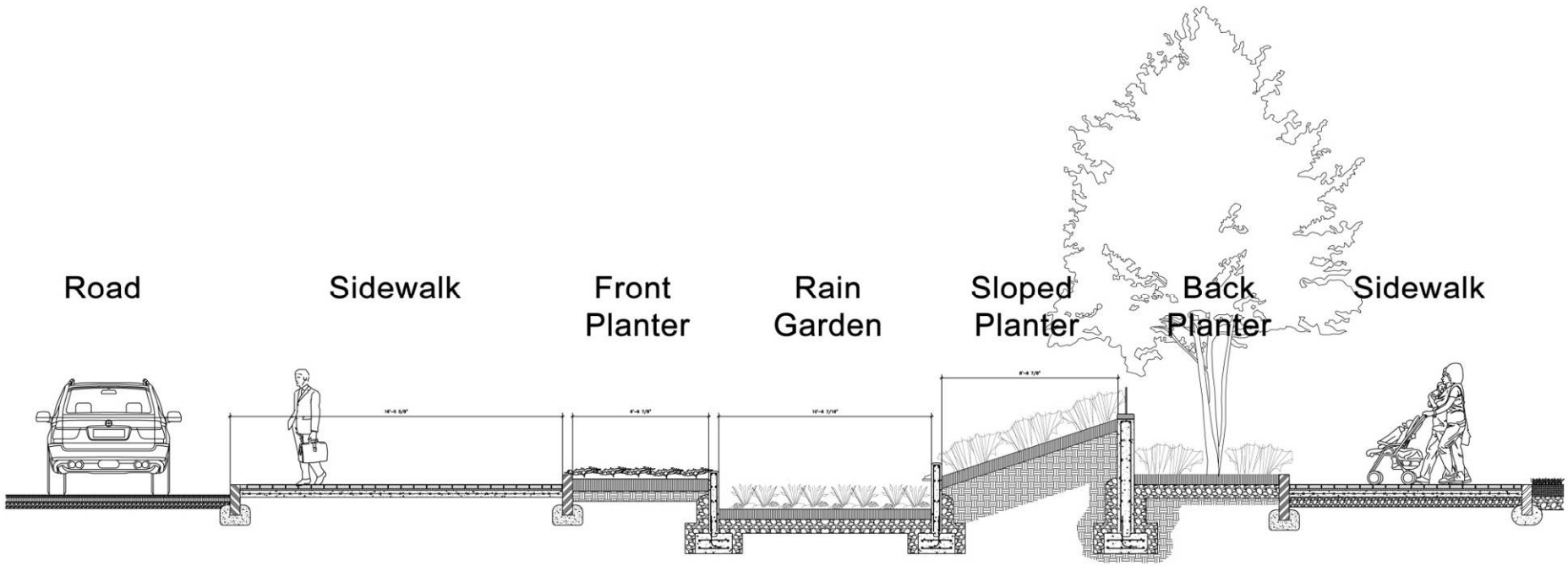
Traffic Side: Large sloped planter, small rain garden



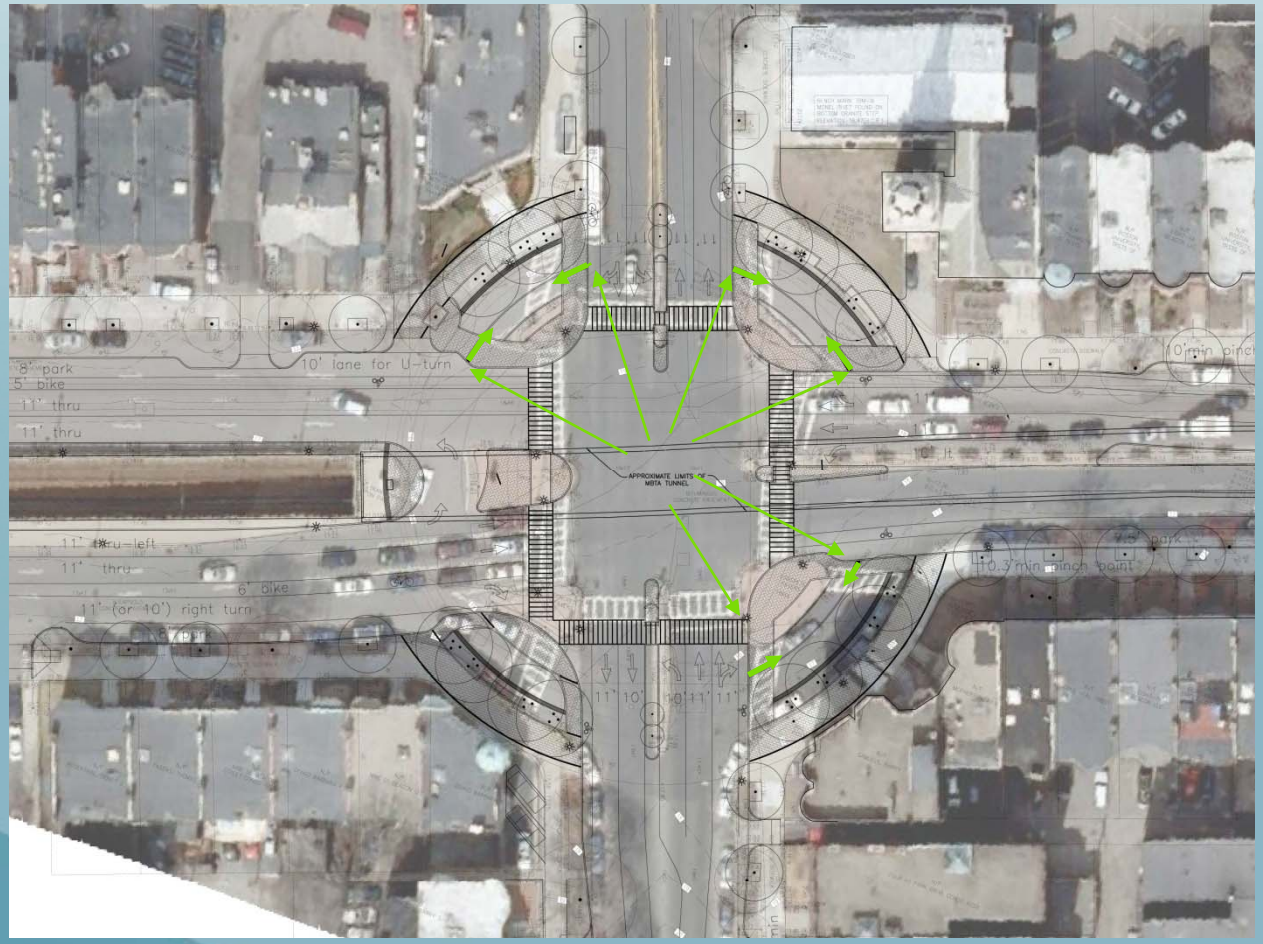
Traffic Side: Large rain garden, small sloped planting

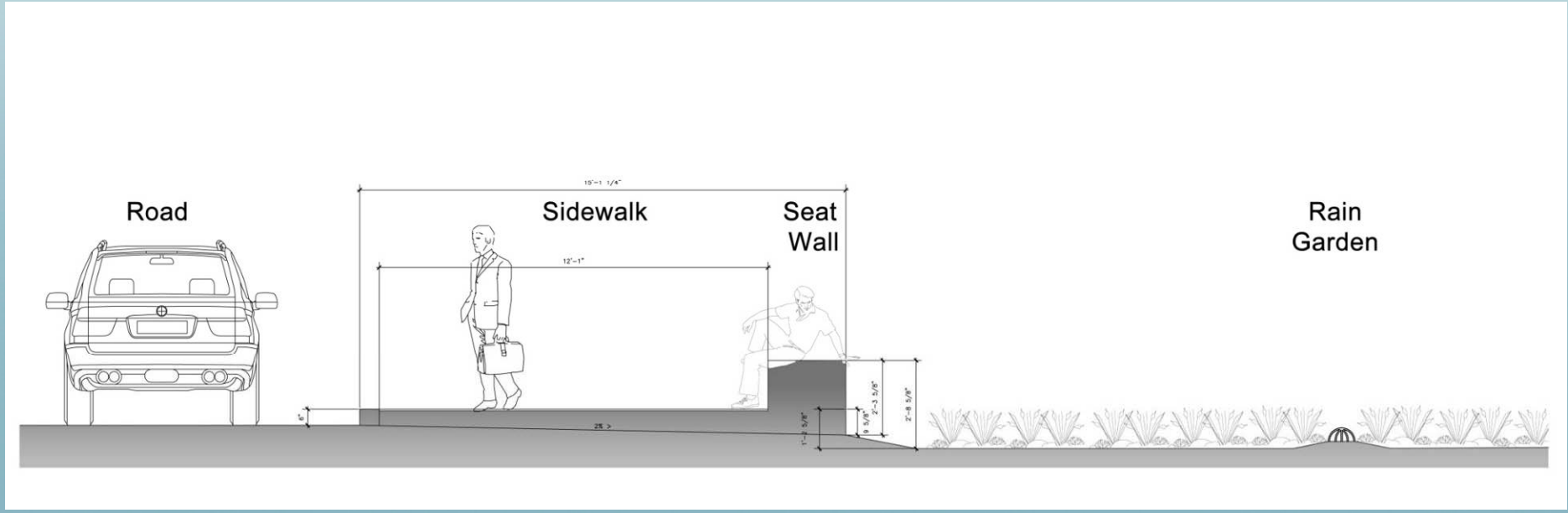


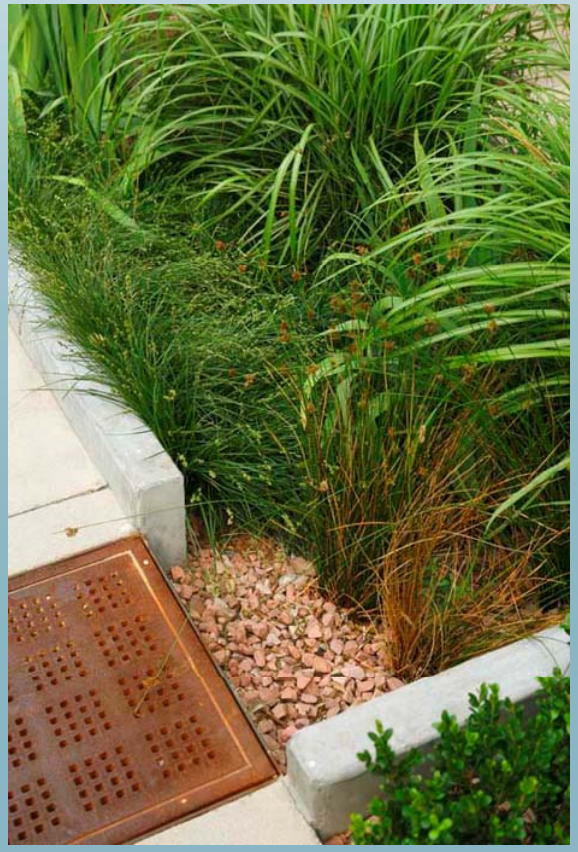
Traffic Side: Buffer planting, mid-size rain garden, mid-size slope planting

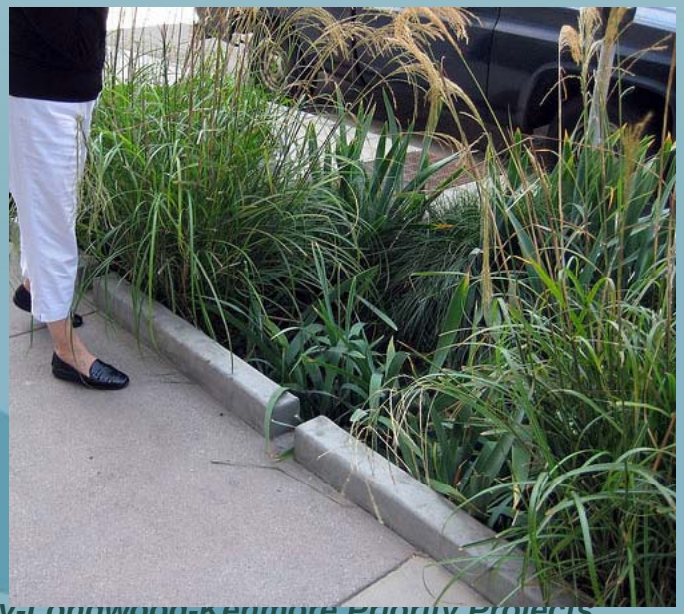

Road
Sidewalk
Front Planter
Rain Garden
Sloped Planter
Back Planter
Sidewalk

Collecting Storm-water in Rain Gardens




Road
Sidewalk
Seat
Wall
Rain
Garden





Questions / Comments / Discussion

Fenway-Longwood-Kenmore Priority Projects