

Willard Street Drainage Improvements Project

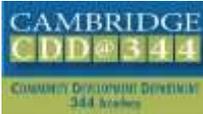
Community Meeting #3

October 19, 2017

Consultants:

HDR Engineering, Inc.
McMahon Associates
Horsley-Witten Group
Halvorson Design Partnership

Project Team



Project Manager/DPW..... Jerry Friedman, PE
 Traffic Calming Project Manager/CDD..... Juan Avendano



Project Manager..... Roch Larochelle, PE
 Civil & Utility Design..... Travis Lucia, EIT/Todd Undzis, PE



Stormwater Modelling..... Richard Claytor, PE
 Permitting..... Amy Ball, PWS



Community Relations..... Christi Apicella, AICP
 Traffic Analysis..... Erin Fredette, PE



Landscape Architecture &
 Streetscape..... Cynthia Smith, FASLA

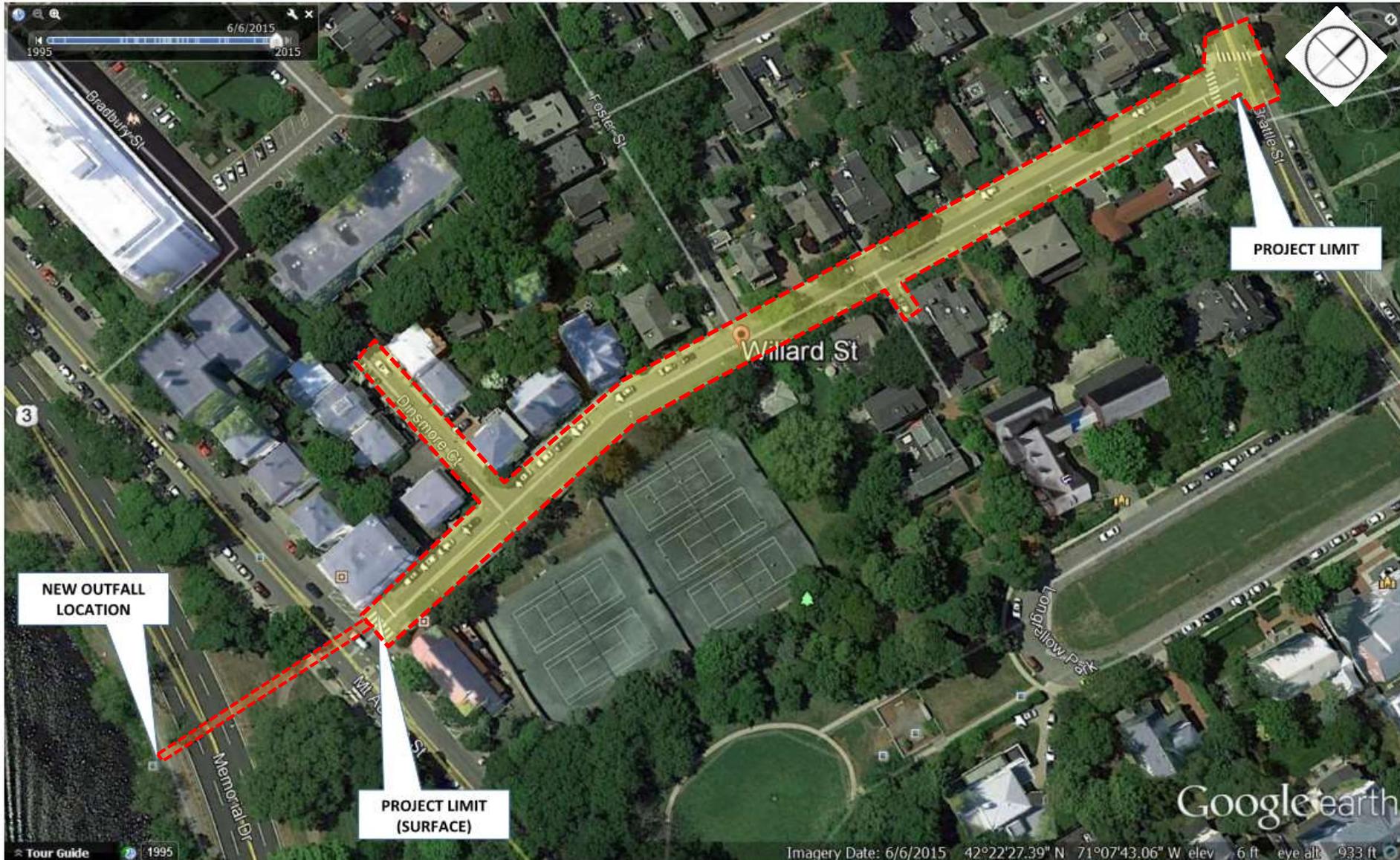


Geotechnical Investigations.... Ileen Gladstone, LSP, PE

Tonight's Agenda

- Project Location & Background
- Reason for Project/Goals & Objectives
- What We've Done So Far
- Watershed & Stormwater Overview
 - Treatment Requirements
 - Selected Treatment Details & Effectiveness
- What We Heard at Public Meetings #1 & #2
- Design Solutions Evaluation
 - An Overview
 - Preferred Alternative Selection
- Streetscape and Landscape Plans
- Schedule & Next Steps
- Questions

Project Location & Background

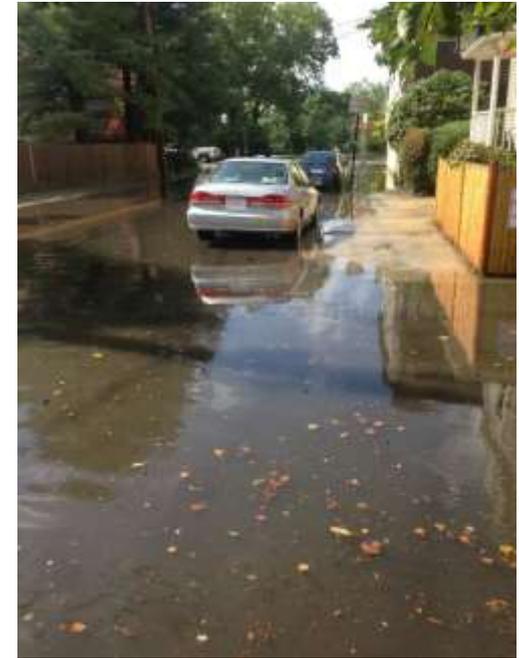


Reasons for Project

1. Stormwater

Reduce periodic flooding in Willard Street neighborhood

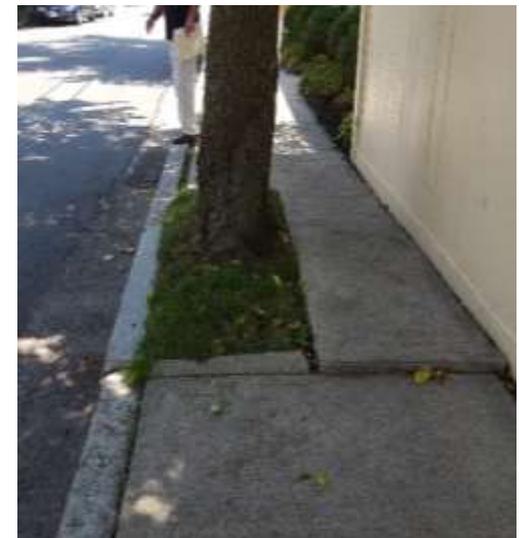
- Insufficient hydraulic capacity
- Aging stormwater infrastructure
- Nuisance flooding during significant storm events.



2. Surface Conditions

Improve Transportation and Streetscape Conditions

- Narrow, inaccessible sidewalks
- No designated bicycle accommodations
- “Missing” Crosswalks
- Deteriorated Hardscape/landscape



Goals & Objectives

1. Reduce Flooding

- Stormwater Improvements
- Provide Additional Water Quality Treatment Opportunities
- Sewer Separation/New Sewer Line
- Restore Outfall to Charles River (across Memorial Drive)

2. Utility Upgrades

- New Water Main (Willard & Dinsmore)
- New Gas Main (by Eversource)..... *{now underway}*
- Possible Additional Roadway Lighting (at crosswalks)

3. Surface Improvements

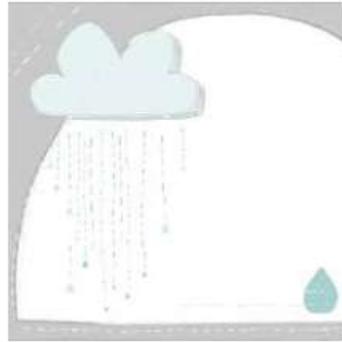
- Sidewalk Condition/ADA Compliance
- Bicycle Accommodations*
- Traffic Calming
- Landscape Upgrades

**On Cambridge Bicycle Network Plan: Reduce Speed & Volume.*

What We've Done So Far

- *Field Survey*..... Complete (Nov. '16)
- *Sewer/Storm Drain Video Inspection*..... Complete (Jan. '17)
- *Community Meeting #1*..... Held Mar. 30 2017
- *Additional Traffic Data Analysis*..... Complete (Apr. '17)
- *Development of Conceptual Solutions*..... Complete (June '17)
- *Community Meeting #2*..... Held Jun. 15 2017
- *Refine Preferred Alternative*..... Complete (Oct. '17)
- *Drainage Analysis & Design*..... Underway (Nov. '17)
- *Permitting Coordination*..... Ongoing Efforts
(DCR, ACOE, EPA, DEP, MWRA, ConCom)
- *Gas Line Replacement/Relocation*..... Ongoing Efforts
- *Community Meeting #3*..... October 19, 2017

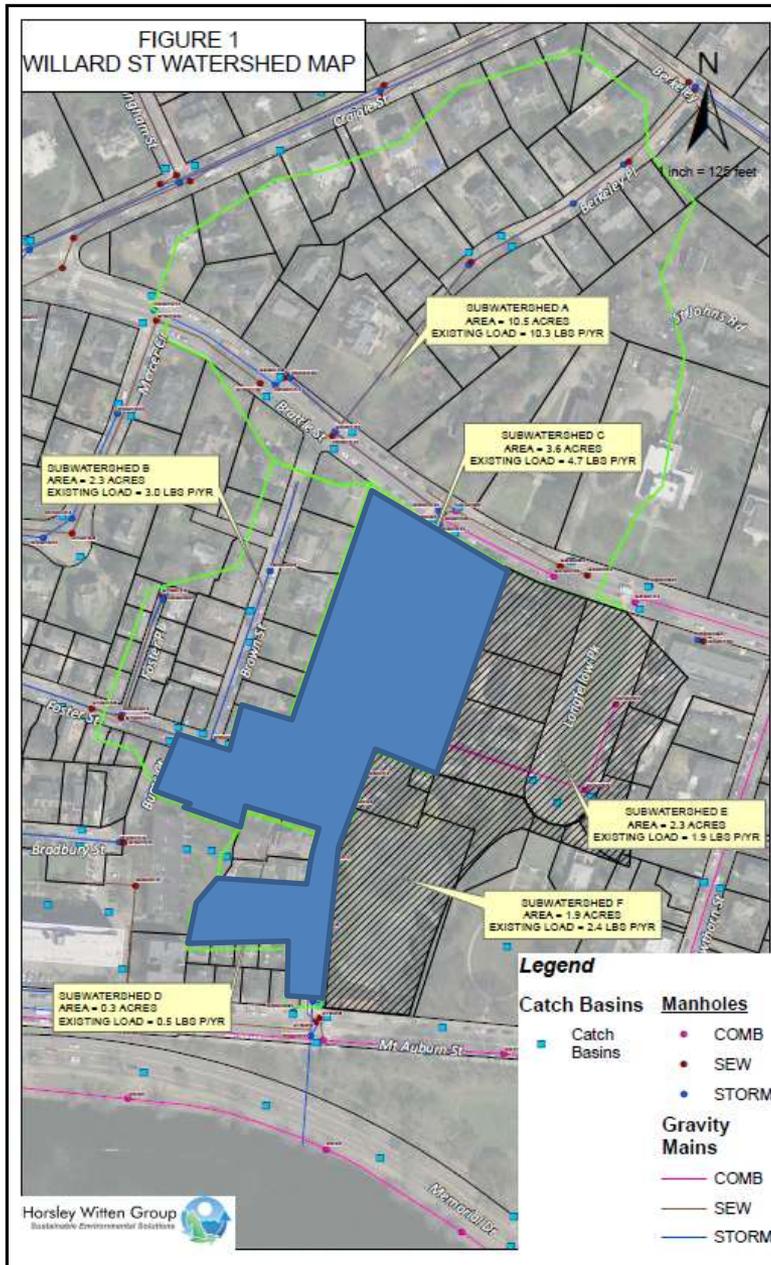
Watershed Overview & Proposed Stormwater Treatment



Treatment Requirements – Why and Who?

- Lower Charles Total Maximum Daily Load (TMDL) for phosphorus
- New outfall triggers treatment requirements
- 51% phosphorus reduction
- Onsite treatment options using green infrastructure (GI) controls
- Offsite treatment options – some now, some to phase in over time (underground storage/infiltration, GI, maybe some to sewer)?

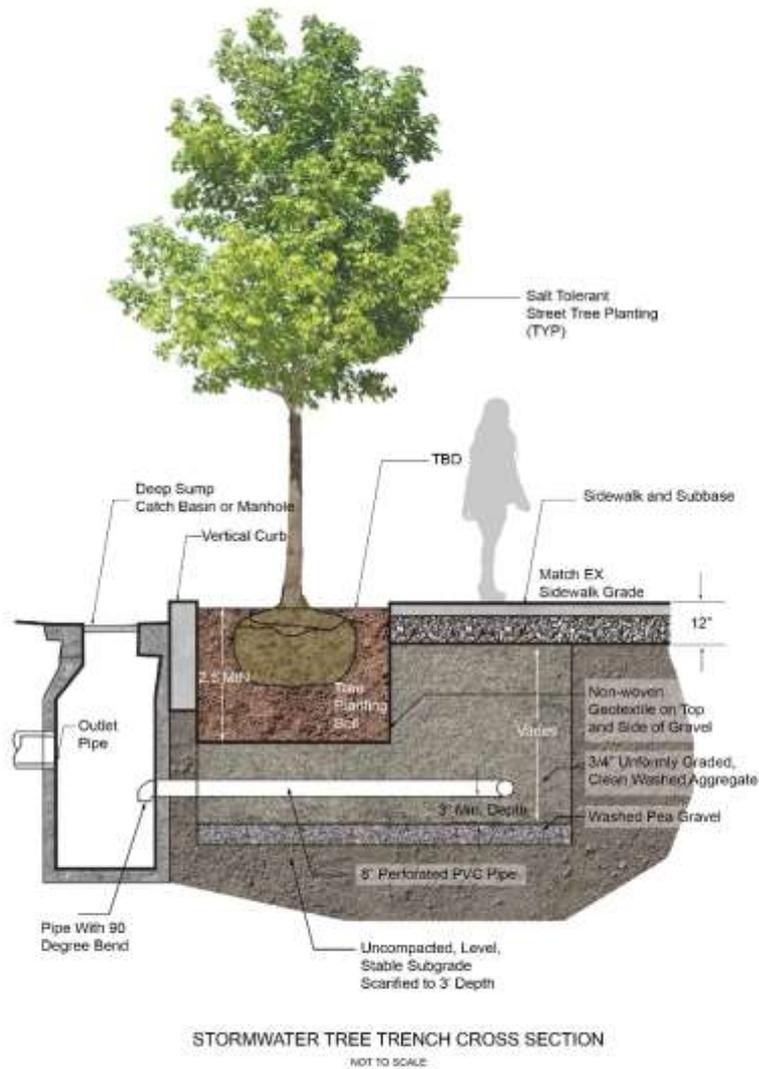
Watershed Overview



- Total Area: 20.9 acre watershed
- Made up of 6 sub-watersheds
- 3.6 acres of direct drainage from Willard Street & Adjacent areas
- 17.3 acres of “Offsite” drainage
 - 4.2 acres (Longfellow and Cambridge Skate Club) – stay in sewer
 - 13.1 ac (to new outfall)

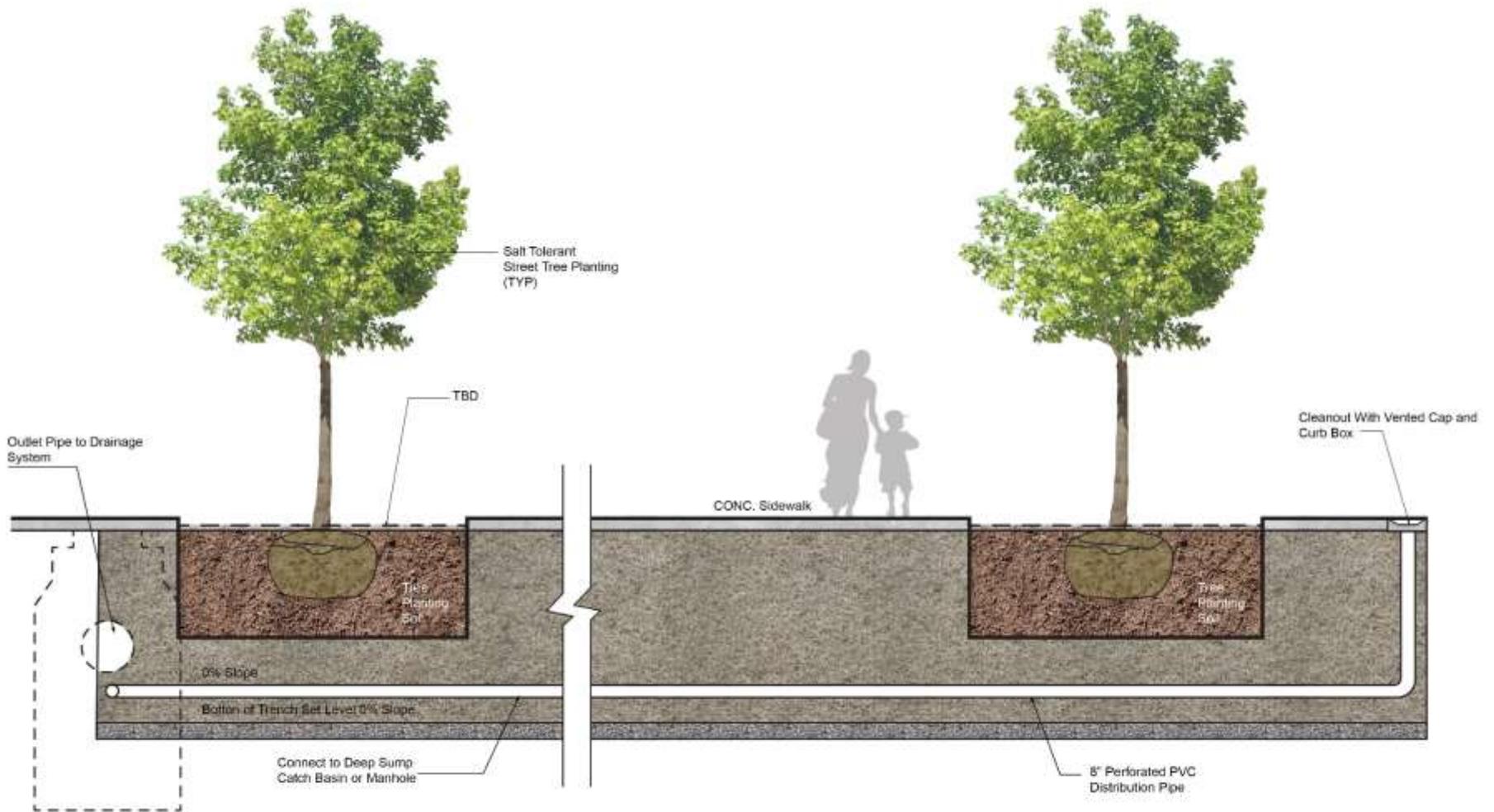


Green Infrastructure (GI) Treatment Alternatives – Tree Trenches



TYPICAL TREE TRENCH

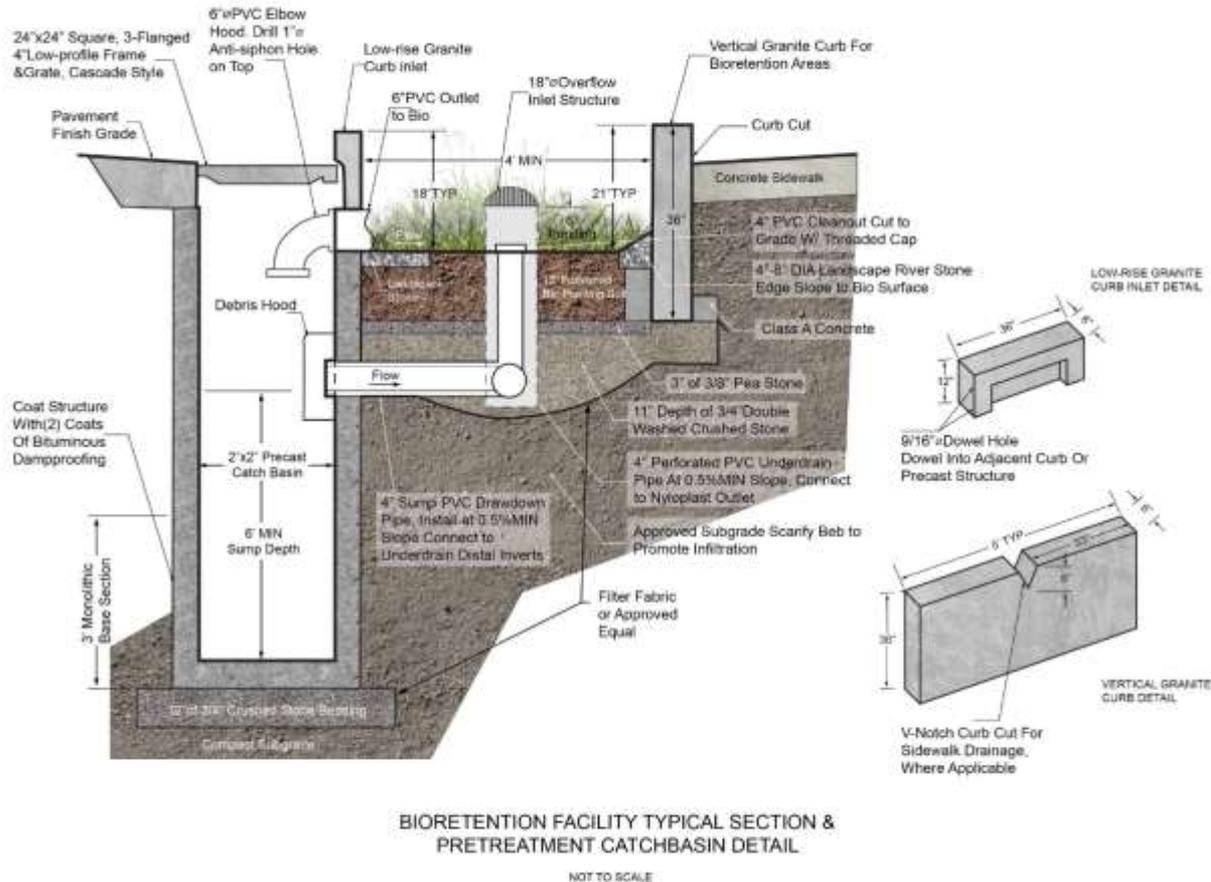
Green Infrastructure (GI) Treatment Alternatives – Tree Trenches



STORMWATER TREE TRENCH PROFILE

NOT TO SCALE

Green Infrastructure (GI) Treatment Alternatives – Bio Swales



BIOSWALE (TYP.)

GI Alternatives & Levels of Effectiveness

	TWO WAY TRAFFIC W/SHARED LANES	ONE WAY NB TRAFFIC W/BIKE LANE "A"	ONE WAY NB TRAFFIC W/BIKE LANE "B"
PROPOSED STORMWATER TREATMENT	<ul style="list-style-type: none"> Permeable pavement in parking lane 	<ul style="list-style-type: none"> Permeable pavement bike and parking lane, if subsurface conditions are conducive Bioretention tree filters 	<ul style="list-style-type: none"> Tree trench along west side of street Bioswale along east side of street
ADVANTAGES	<ul style="list-style-type: none"> Provides water quality benefits 	<ul style="list-style-type: none"> One way travel lane allows for linear stormwater treatment options Provides water quality benefits 	<ul style="list-style-type: none"> No permeable pavement maintenance Provides greening of the streetscape Provides water quality benefits Meets subwatershed 51% load reduction target
DISADVANTAGES	<ul style="list-style-type: none"> Limits the use and types of stormwater treatment BMPs with two way traffic and 6' width for ADA compliant sidewalks on both sides of the street Utilities along west side of street could limit the extent of permeable pavement or be cost prohibitive Does not meet the 51% watershed TMDL load reduction target 	<ul style="list-style-type: none"> Placement of 10' wide sidewalk on west side of street has more constraints limiting the opportunities for stormwater treatment and potential for underdrains to tie into central drain line. Maintaining a 6' sidewalk width for ADA compliance limits the use and types of stormwater management options on the east side adjacent to the sidewalk Does not meet the 51% watershed TMDL load reduction target 	<ul style="list-style-type: none"> Does not meet the 51% watershed TMDL load reduction target
GI LOAD REDUCTION (LBS P/YR)*	1.6	2.2	3.4
GREATER WATERSHED LOAD REDUCTION (%)**	9%	12%	19%
WILLARD STREET PROJECT AREA SUBWATERSHED LOAD REDUCTION (%)**	35%	48%	73%

*All phosphorus load reduction GI practices are proposed in Subcatchment C, along Willard Street

** 51% TMDL load reduction required for the Charles River



Community Meetings #1 & #2



3/30/17



3/30/17



3/30/17



6/15/17

What We Heard



Flooding & Drainage

- Flooding issues
- Water management



Utilities

- Consider underground utilities
- Improve lighting



Pedestrian

- Narrow sidewalks, poor condition
- Foster Street crosswalk
- Raised/lighted crosswalks



Bicycles

- More go northbound
- Unsafe for children
- Consider buffered bike lane



Streetscape

- Loss of street trees
- Consistent signage
- More amenities



Vehicles

- High speeds
- More use NB due to left turn restrictions on Mt. Auburn
- Narrow Street for 2-way traffic
- Vehicle back up northbound at Brattle St.
- Remove parking – mixed feelings



One-Way Conversion

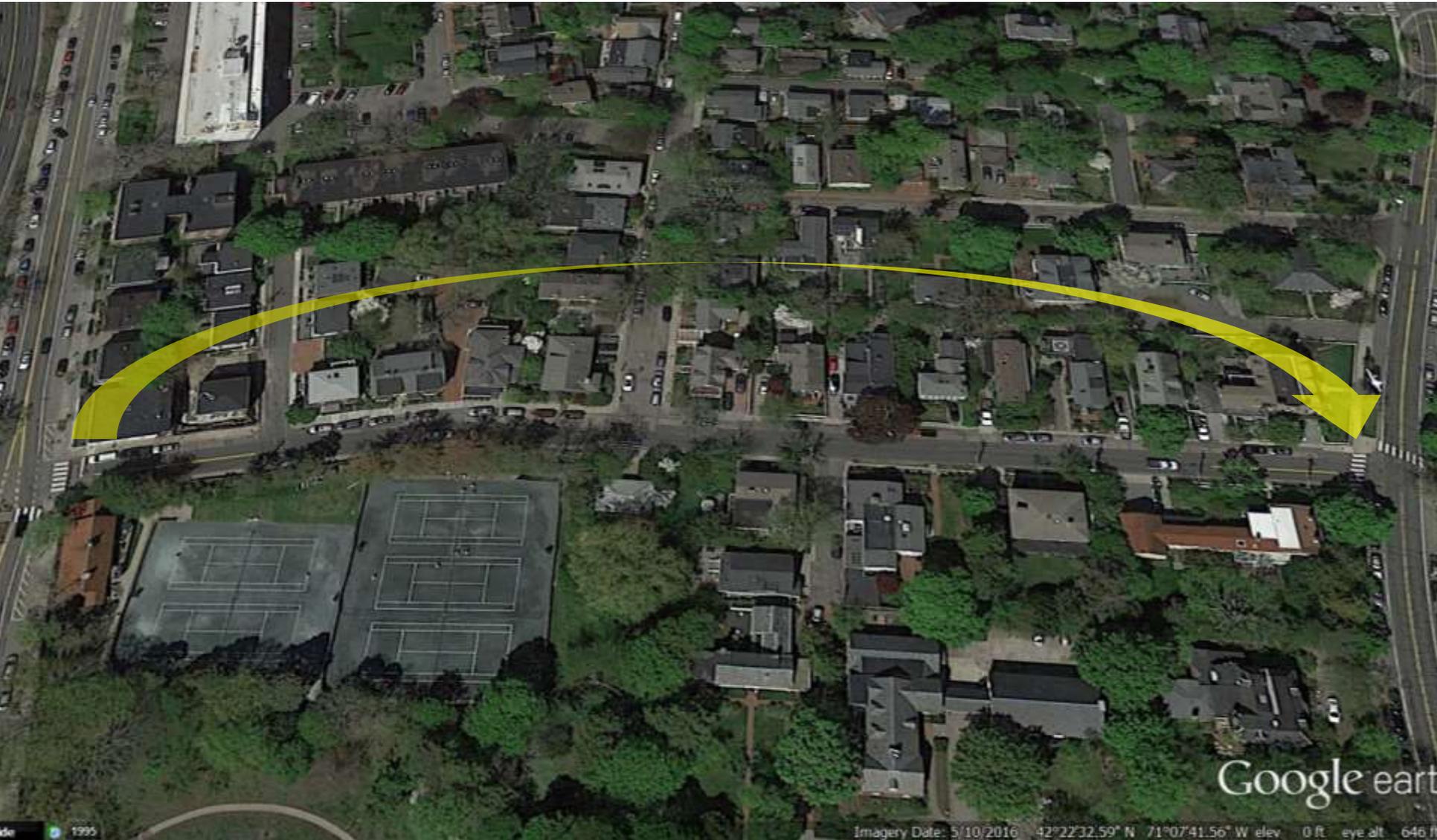
- May increase speeds
- Opportunity to improve, sidewalk, bicycle, and stormwater infrastructure
- Aesthetic and convenience preferences for 2-way street



Safety

- Left turns from Mt. Auburn
- Cut-through traffic
- Crashes at Mt. Auburn crossing island

Design Solutions Evaluated



TWO-WAY TRAFFIC WITH SHARED VEHICLE /BICYCLE LANES



TWO-WAY TRAFFIC WITH SHARED LANES

Features	Considerations
<ul style="list-style-type: none"> MAINTAINS TWO WAY TRAFFIC CIRCULATION FOR VEHICLES AND BICYCLES IMPROVED PEDESTRIAN CROSSING AT BRATTLE/WILLARD INTERSECTION PROVIDES IMPROVED SAFETY AT CROSS WALK. RAISED INTERSECTION TREATMENT AT FOSTER STREET, RAISED SIDESTREET TREATMENTS AT WILLARD ST. & DINSMORE COURTS AND NARROWER ROADWAY PROVIDE ADDITIONAL TRAFFIC CALMING FEATURES. 	<ul style="list-style-type: none"> CYCLISTS MUST SHARE LANES WITH VEHICLES LIMITED OPPORTUNITY FOR ADDITIONAL STREET TREES NO OPPORTUNITY FOR ENHANCED STORMWATER TREATMENT NO PEDESTRIAN CROSSING AT FOSTER WOULD REQUIRE AN ADA VARIANCE FOR ONE NON-COMPLIANT SIDEWALK LOCATION (EAST SIDE)



ONE-WAY NB TRAFFIC WITH DESIGNATED BIKE LANE

On-Street Parking

Dinsmore Ct Improvements

Brattle Crossing Ped-Safety Improvements

Dedicated Bicycle Lane

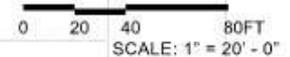
ONE WAY (NB) TRAFFIC WITH BIKE LANE

Features

- DEDICATED BICYCLE LANE PROVIDES BETTER BIKE ACCOMMODATIONS AND IS POSITIONED AWAY FROM THE PARKED CARS "DOOR ZONE"
- CONSISTENT WITH THE 2015 BIKE NETWORK PLAN (REDUCES TRAFFIC VOLUMES AND IMPROVES LEVEL OF COMFORT FOR CYCLISTS)
- CURB EXTENSIONS PROVIDE TRAFFIC CALMING FEATURE
- RAISED INTERSECTION TREATMENT AT FOSTER STREET, RAISED SIDESTREET TREATMENTS AT WILLARD ST. & DINSMORE COURTS AND NARROWER ROADWAY PROVIDE ADDITIONAL TRAFFIC CALMING FEATURES.
- IMPROVED PEDESTRIAN CROSSING AT BRATTLEWILLARD INTERSECTION PROVIDES IMPROVED SAFETY AT CROSS WALK.
- REDUCES TURN CONFLICTS AT MT. AUBURN
- ADDITIONAL STREET TREE ZONE WITH STORMWATER FILTRATION (WEST SIDE) AND ADDITIONAL STREET TREES ON EAST SIDE.

Considerations

- ELIMINATES SOUTHBOUND VEHICULAR AND BICYCLE MOVEMENTS
- NEIGHBORHOOD ADJUSTMENT PERIOD TO NEW CIRCULATION PATTERNS
- WOULD REQUIRE AN ADA VARIANCE FOR ONE NON-COMPLIANT SIDEWALK LOCATION (EAST SIDE)

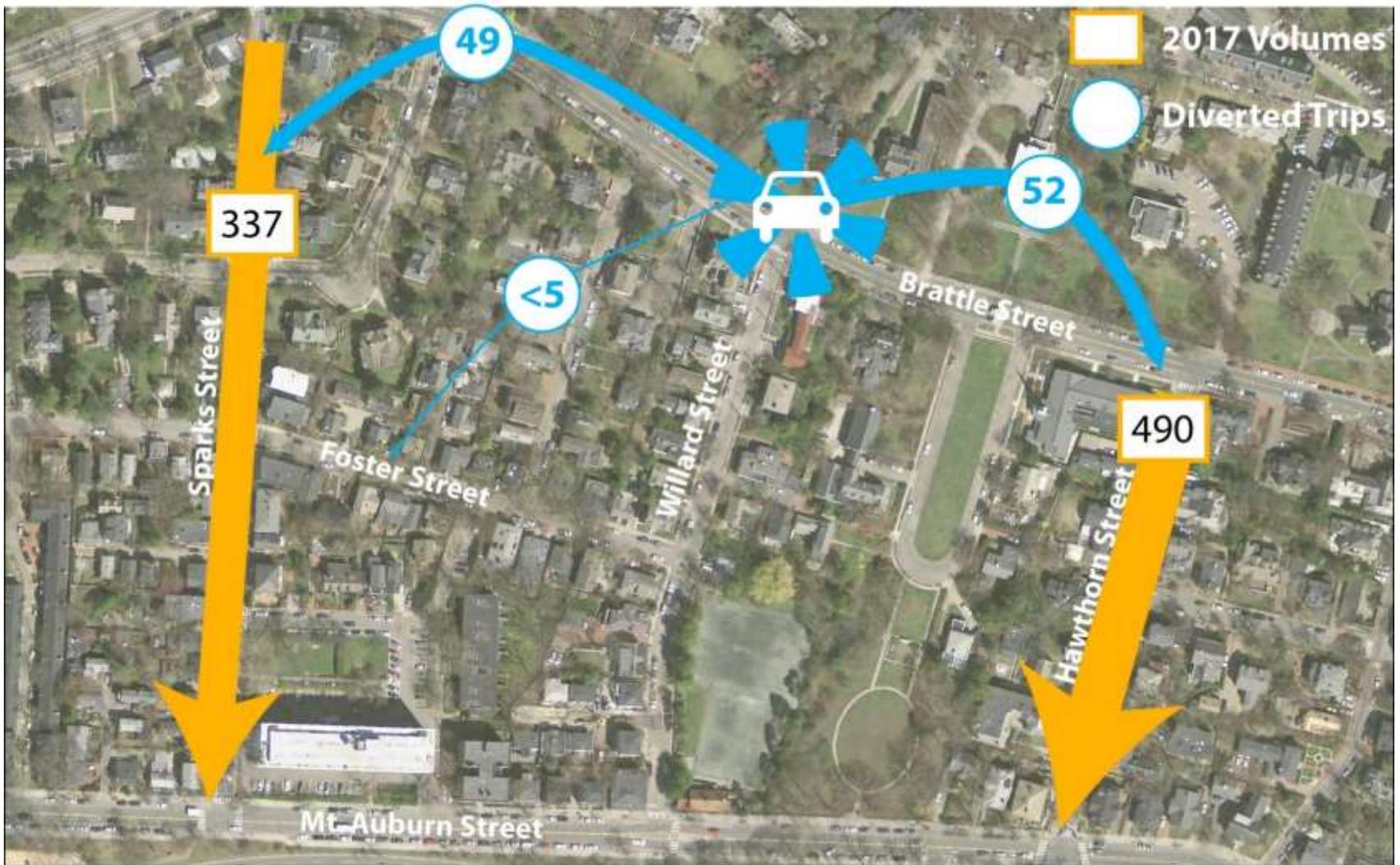


HALVORSON DESIGN



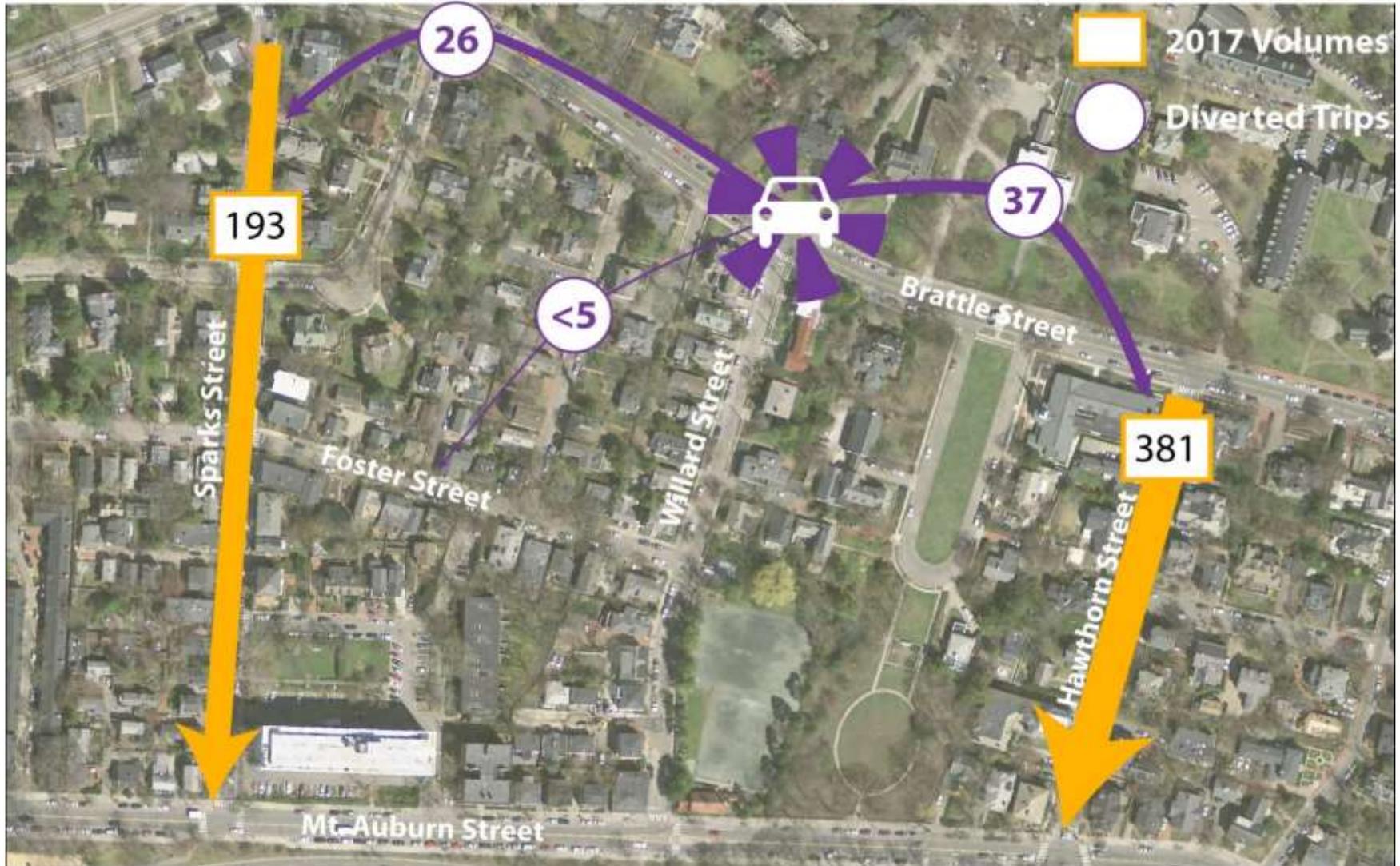
MCMAHON

One-Way NB Option - Southbound Diverted Trips (AM Peak Hour)



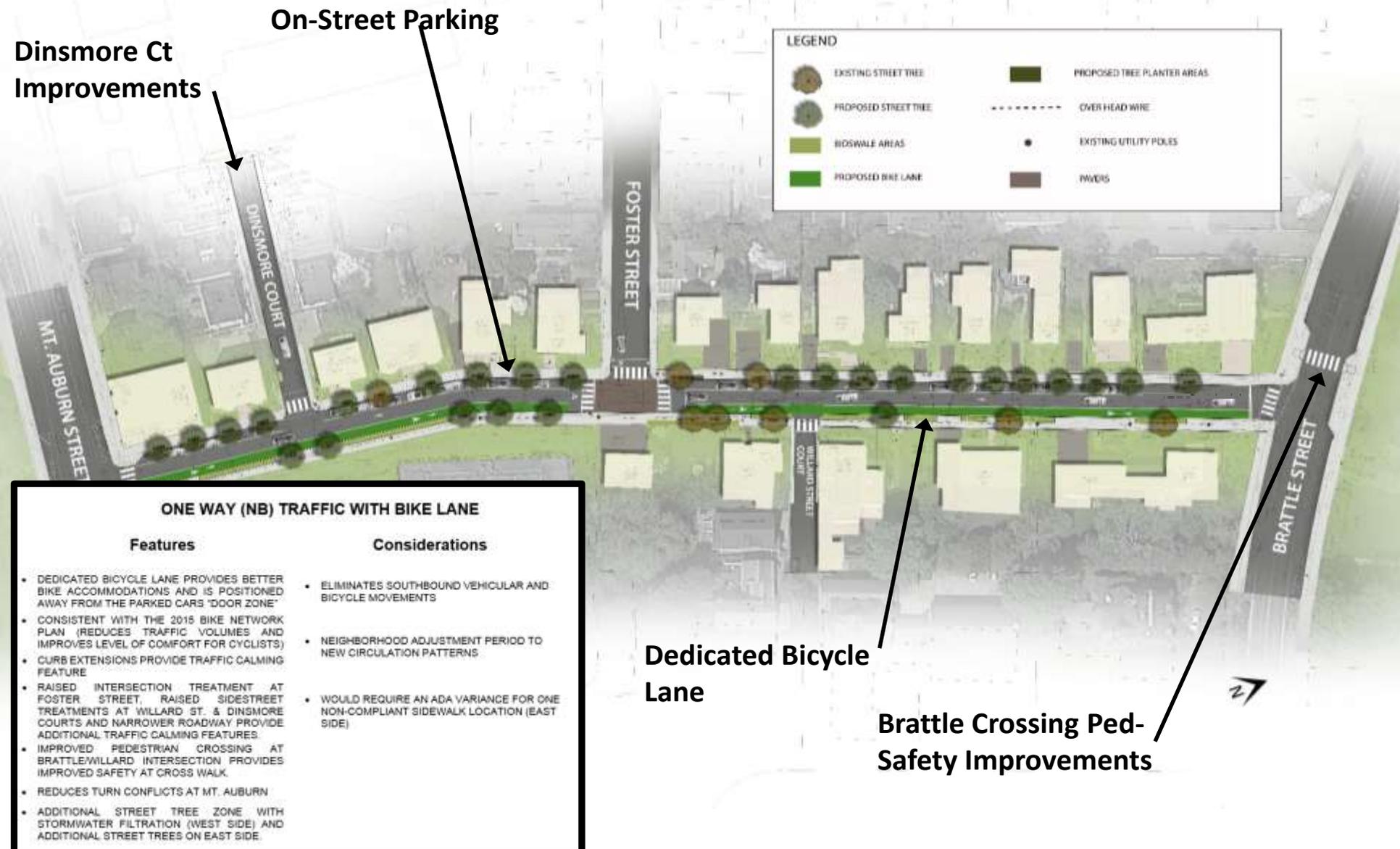
*SB vehicles diverted to Sparks St. and Hawthorn St. include those from Willard St. S as well as those originating from Willard St. and those from the surrounding area that are assumed to take these streets southbound instead of Willard St. B

One-Way NB Option - Southbound Diverted Trips (PM Peak Hour)



*SB vehicles diverted to Sparks St. and Hawthorn St. include those from Willard St. SB as well as those originating from Willard St. and those from the surrounding area that are assumed to take these streets southbound instead of Willard St.

-PREFERRED ALTERNATIVE- ONE-WAY NB TRAFFIC WITH DESIGNATED BIKE LANE



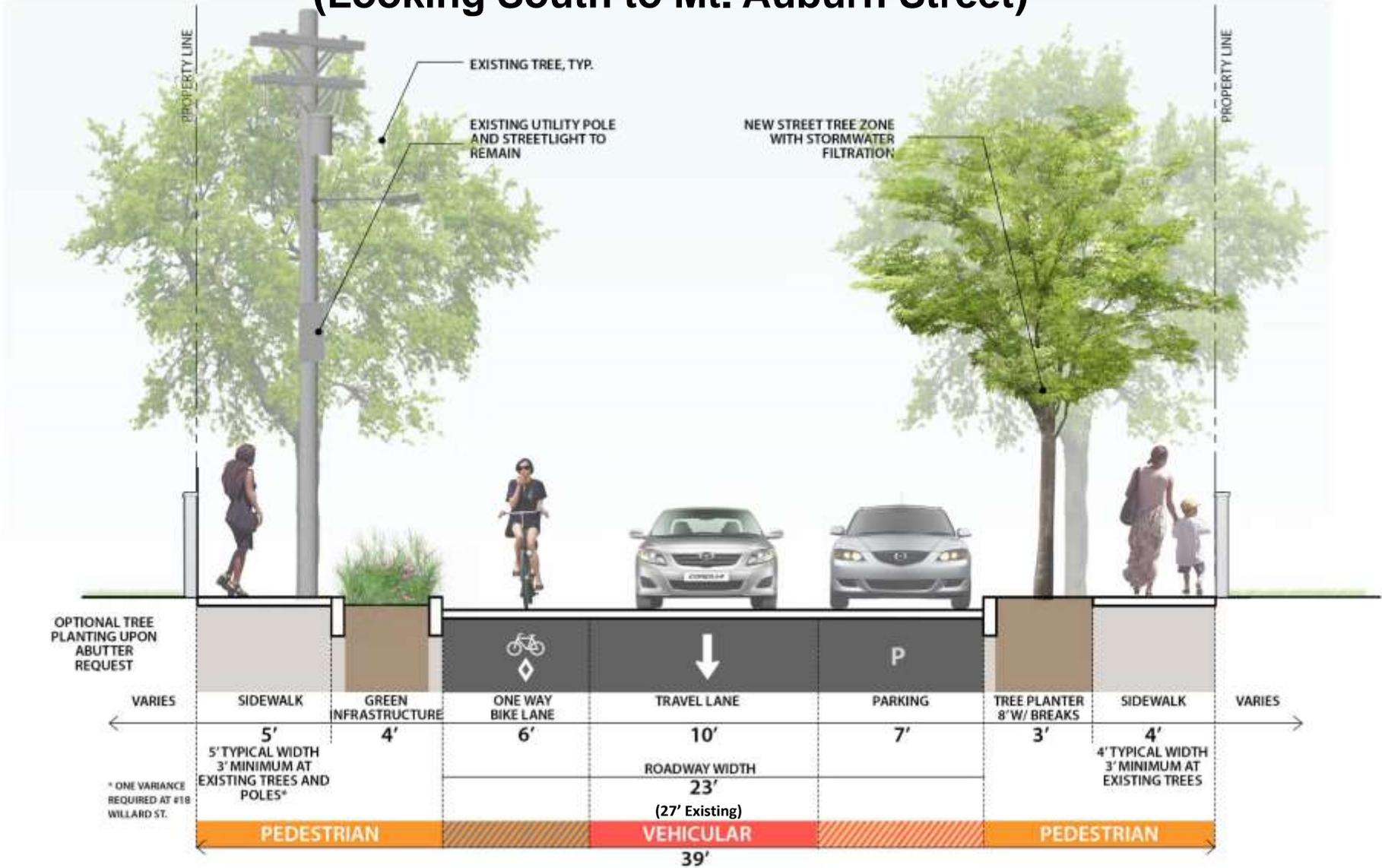
LEGEND

	EXISTING STREET TREE		PROPOSED TREE PLANTER AREAS
	PROPOSED STREET TREE		OVER HEAD WIRE
	BIDSWALE AREAS		EXISTING UTILITY POLES
	PROPOSED BIKE LANE		PWERS

ONE WAY (NB) TRAFFIC WITH BIKE LANE

Features	Considerations
<ul style="list-style-type: none"> • DEDICATED BICYCLE LANE PROVIDES BETTER BIKE ACCOMMODATIONS AND IS POSITIONED AWAY FROM THE PARKED CARS "DOOR ZONE" • CONSISTENT WITH THE 2015 BIKE NETWORK PLAN (REDUCES TRAFFIC VOLUMES AND IMPROVES LEVEL OF COMFORT FOR CYCLISTS) • CURB EXTENSIONS PROVIDE TRAFFIC CALMING FEATURE • RAISED INTERSECTION TREATMENT AT FOSTER STREET, RAISED SIDESTREET TREATMENTS AT WILLARD ST. & DINSMORE COURTS AND NARROWER ROADWAY PROVIDE ADDITIONAL TRAFFIC CALMING FEATURES. • IMPROVED PEDESTRIAN CROSSING AT BRATTLEWILLARD INTERSECTION PROVIDES IMPROVED SAFETY AT CROSS WALK. • REDUCES TURN CONFLICTS AT MT. AUBURN • ADDITIONAL STREET TREE ZONE WITH STORMWATER FILTRATION (WEST SIDE) AND ADDITIONAL STREET TREES ON EAST SIDE. 	<ul style="list-style-type: none"> • ELIMINATES SOUTHBOUND VEHICULAR AND BICYCLE MOVEMENTS • NEIGHBORHOOD ADJUSTMENT PERIOD TO NEW CIRCULATION PATTERNS • WOULD REQUIRE AN ADA VARIANCE FOR ONE NON-COMPLIANT SIDEWALK LOCATION (EAST SIDE)

-PREFERRED ALTERNATIVE- ONE-WAY NB TRAFFIC WITH DESIGNATED BIKE LANE (Looking South to Mt. Auburn Street)



ONE-WAY NB TRAFFIC WITH BIKE LANE ENLARGEMENT – FOSTER TO MT. AUBURN STREET



ONE-WAY NB TRAFFIC WITH BIKE LANE ENLARGEMENT – FOSTER TO BRATTLE STREET



Raised Side Street Treatment (Willard St. Ct)

Brattle Ped. Crossing Safety Improvements

Dedicated Bicycle Lane

Raised Side Street Treatment (Willard)

STREET TREES - OPTIONS



Gleditsia triacanthos
Honey Locust



Liquidambar styraciflua
Sweet Gum



Nyssa sylvatica
Black Gum



Platanus occidentalis
American Sycamore

- Species above have been chosen for urban resiliency and salt tolerance

PROPOSED STREET TREE LOCATIONS



GREEN INFRASTRUCTURE PLANT MATERIAL



Shizachyrium scoparium
Little Bluestem



Liatris spicata
Blazing Star



Calamagrostis x acutiflora
Feather Reed Grass



Phlox paniculata
Garden Phlox



Iris versicolor
Northern Blue Flag



Echinacea purpurea
Coneflower

- Species above have been chosen for urban resiliency and salt tolerance



BEFORE



AFTER



BEFORE



AFTER

Schedule & Next Steps

- Community Meeting #2..... June 15, 2017
- Refine Design Options..... July-Oct 2017
- Additional Sewer Inspections (Dye Testing)..... July-Oct 2017
- **Community Meeting #3..... Oct. 19, 2017**
- Final Design & Permitting..... Winter-Spr. 2018
- Pre-Construction Community Outreach..... Spring 2018
- Construction (tentative)* 2018-2019

**Dependent on permitting*

Questions?

Stay in Touch!

For more information visit:

www.cambridgema.gov/theworks/willardstreet

To join email distribution list for updates visit:

bit.ly/WillardSt

For questions about this project, contact:

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