

Town of Dedham

Dedham Square

Pedestrian Signal Evaluation

November 15, 2018



Purpose

BETA Group, Inc. (BETA) has conducted this study on behalf of the Board of Selectmen to evaluate operations and pedestrian safety.

- ✓ Evaluate and make recommendations relative to pedestrian safety
- ✓ Evaluate potential for No Turn on Red restriction
- ✓ Evaluate advanced technologies for applicability



Dedham Square Improvements

BETA Group, Inc. (BETA) has been working in conjunction with the Town of Dedham on Dedham Square improvements from initial scoping and funding assistance through design and construction. BETA has evaluated traffic safety and operation both immediately post-construction and today.

- 2009: Preliminary Design
- 2010-2011: Final Design
- 2012-2013: Construction
- 2013-2014: Post-Construction Operational Study
- 2018: Pedestrian Safety and Evaluation Study

Dedham Square Improvements

- High St at Washington St
 - Concurrent operation with short (3 second) leading pedestrian interval (LPI)
 - Allows peds to enter crosswalk before concurrent vehicle phase begins
- High St at Eastern Ave
 - New signals installed in August 2013
 - Exclusive operation – all three approaches stop during ped activated exclusive phase
- Both intersections operate under one traffic signal controller
- Overlap phases allow concurrent movements between the two intersections

Data Collection

2009 data
available for:

- Dedham Square: Washington St and Eastern Ave
- Lower Square: High St at East St and Harris St

2013 data
available for:

- Court St/Ames St
- Lower Square

2018 data
collected for:

- Dedham Square: Washington St and Eastern Ave

Vehicles, pedestrians and bicycles counted

Crash Data

- ✓ 2011 Study included MassDOT data from 2007-2009
- ✓ 2018 Study collected Town data from 2015-2017
- ✓ Also collected MassDOT data from 2014-2016 for comparison to 2011 study data

	2007-2009 MassDOT	2014-2016 MassDOT	2015-2017 Town
High at Washington	17	10	25
High at Eastern	4	3	9

- ✓ MassDOT data shows slight reduction at Eastern Ave and notable reduction at Washington
- ✓ Town data shows more crashes
- ✓ Reporting varies – for example, operator reports may be submitted to Town but not to RMV
- ✓ Town data more representative of total crashes, but MassDOT data allows for meaningful comparison between time periods

Traffic Volume Data

Average Daily Traffic (ADT) Comparison			
	2009	2018	Pct Change (per year)
High St (E of Washington)	13,375	12,210	-1.0%
Washington St (N of High)	11,715	6,540	-6.3%
Washington St (S of School)	9,380	9,120	-0.3%
Eastern Ave	9,465	8,320	-1.4%

- ✓ Data collected in September in both 2009 and 2018 – no seasonal adjustment
- ✓ Washington St (North) reduction
 - ✓ reduction in cut-through traffic due to improvements on Providence Highway
 - ✓ Potential for unknown outside influence affecting traffic – construction, road closure, etc.
- ✓ Overall, slight reduction in traffic shown could be indicative of general day-to-day fluctuations in traffic volume

Traffic Volume Data

Turning Movement Count (TMC) Comparison						
		2009	2014	2009-> 2014 (per year)	2018	2009-> 2018 (per year)
High St at Washington St	AM	1,866	1,785	-1.3%	1,692	-1.1%
	PM	1,922	1,785	0.2%	1,800	-0.7%
High St at Eastern Ave	AM	1,234	1,168	-2.1%	1,072	-1.6%
	PM	1,277	1,265	0.7%	1,301	0.2%

- ✓ Peak Hour volume comparisons
- ✓ Seasonal adjustment to compare September 2009, April 2014 and September 2018
- ✓ Decreases in the AM peak hour across all time periods
- ✓ Increases in the PM peak hour at Eastern Avenue

Pedestrian Data

Pedestrian Count Comparison						
		2009	2014	2018	2009-> 2018 (per year)	2014-> 2018 (per year)
High St at Washington St	AM	48	42	59	2.3%	8.9%
	PM	53	56	48	-1.1%	-3.8%
High St at Eastern Ave	AM	55	47	56	0.2%	-4.5%
	PM	145	153	134	-0.9%	-3.3%

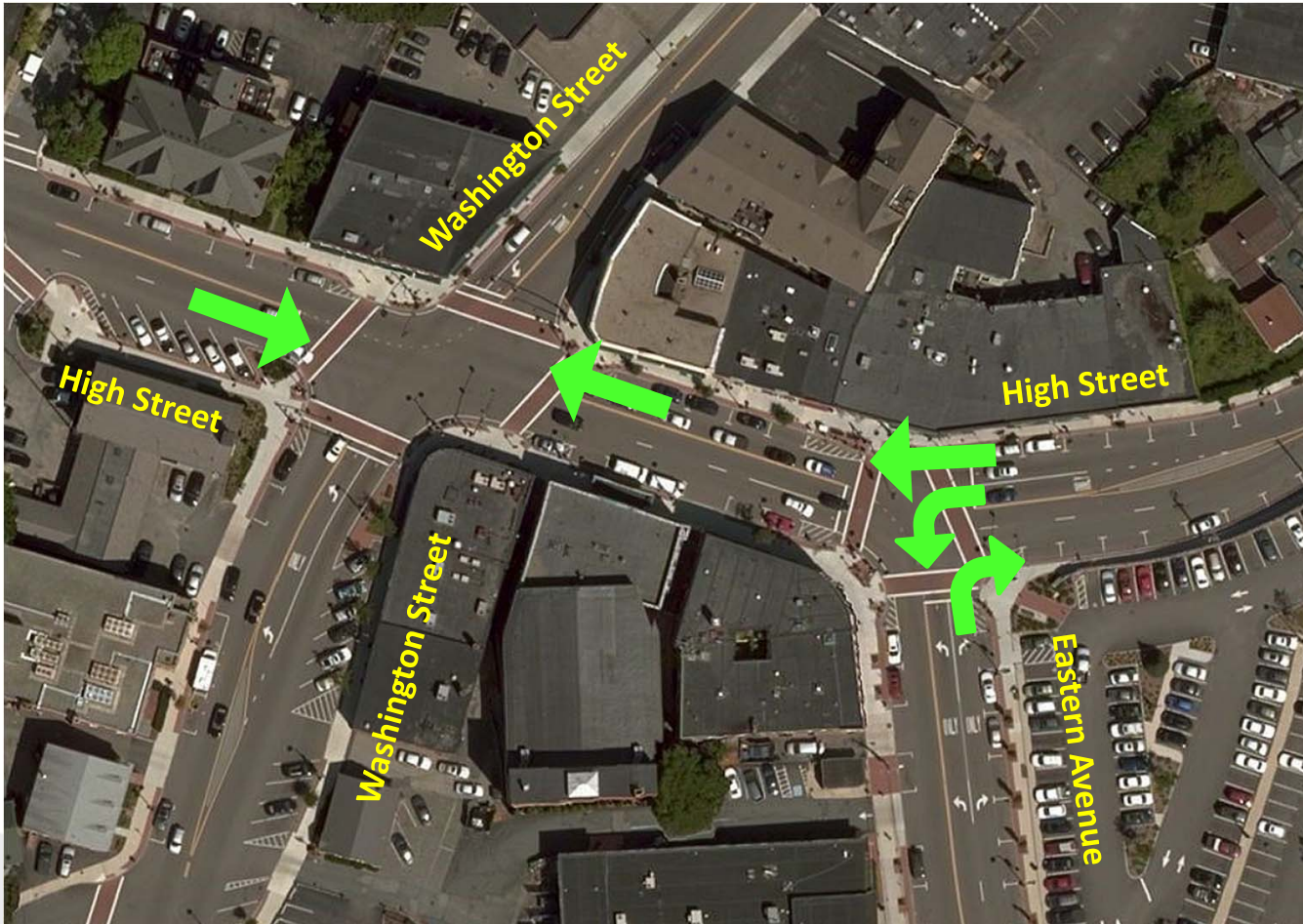
- ✓ Of note: rain on 2018 count day, no rain for 2009 or 2014
- ✓ Marked increase in crossing High St east leg at Eastern Ave – 15 in 2009, 75 in 2014, 72 in 2018

Traffic Signal Phasing

- Current Phasing modified from 2011 design phasing
 - Exclusive ped phase added at Eastern Ave
 - LPI added at Washington St
 - Overlap trailing green added to clear vehicles on High St between Eastern and Washington
 - Clearance phase added to clear Eastern Ave turning vehicles

Design vs Existing Operations

- Overall operations at acceptable level of service, but worse than predicted for future year from 2011 study
 - LOS C to LOS D at High/Wash in both peak periods
 - Maintain LOS C at High/Eastern
- Improvements based on focused phasing changes
 - High WB at Wash - AM
 - High EB queue at Eastern – AM, PM
 - Eastern – AM, PM

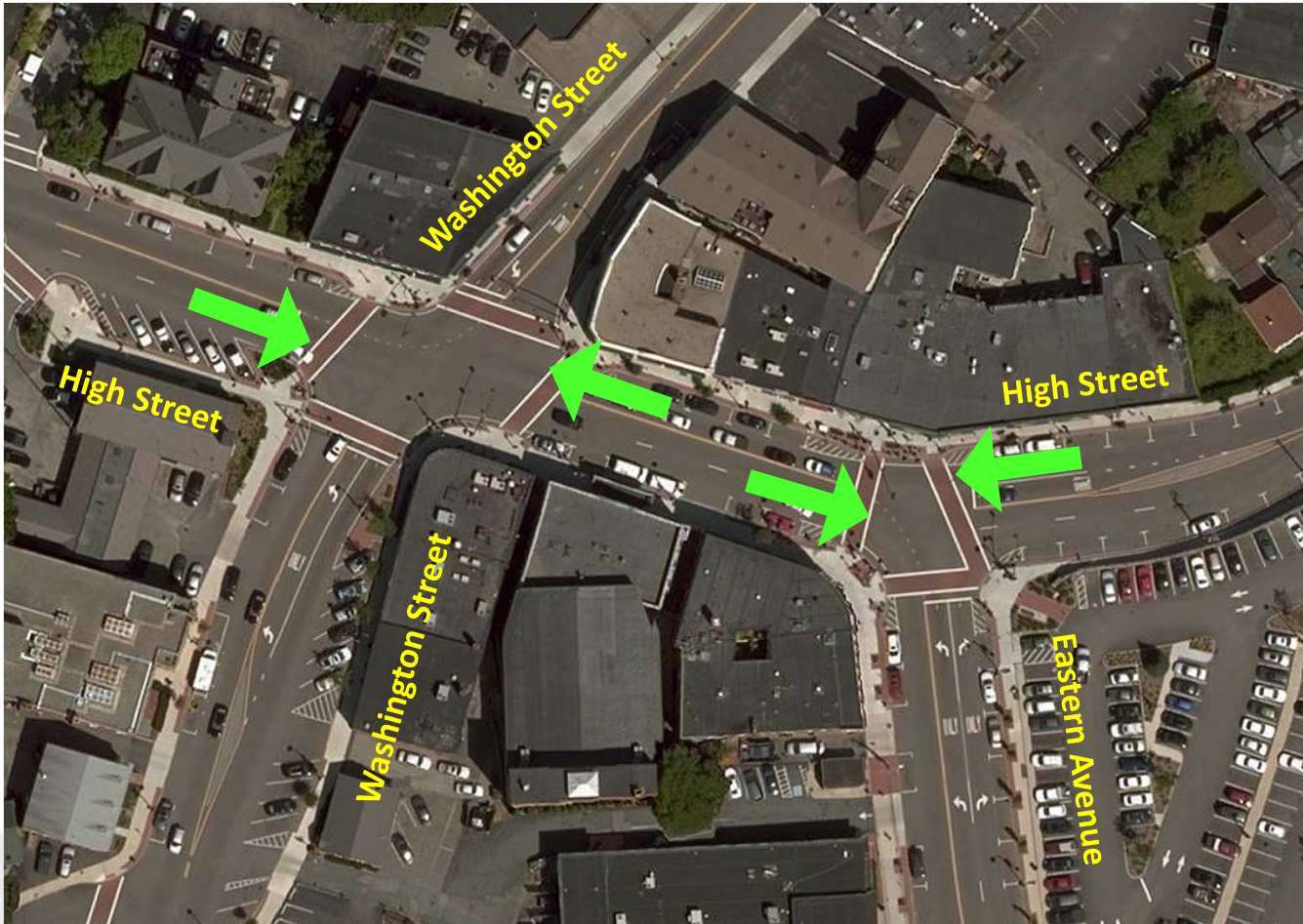


Existing Traffic Signal Phasing

High St Eastbound Protected Left Turn

High Street Eastbound/Westbound

High Street Westbound Left-turn & Through;
Eastern Avenue Right-turn overlap

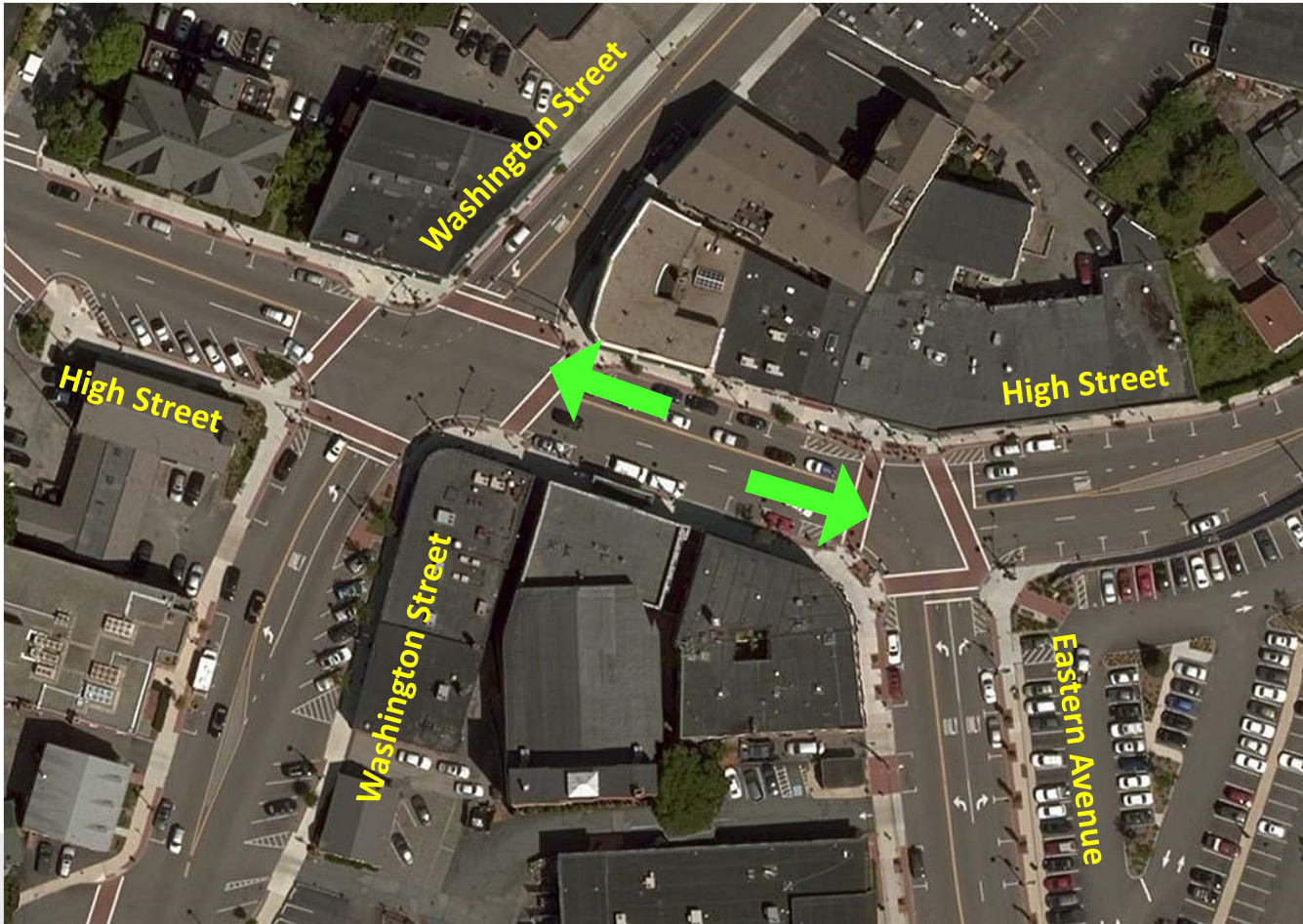


Existing Traffic Signal Phasing

High Street

High Street Eastbound/Westbound

High Street Eastbound/Westbound

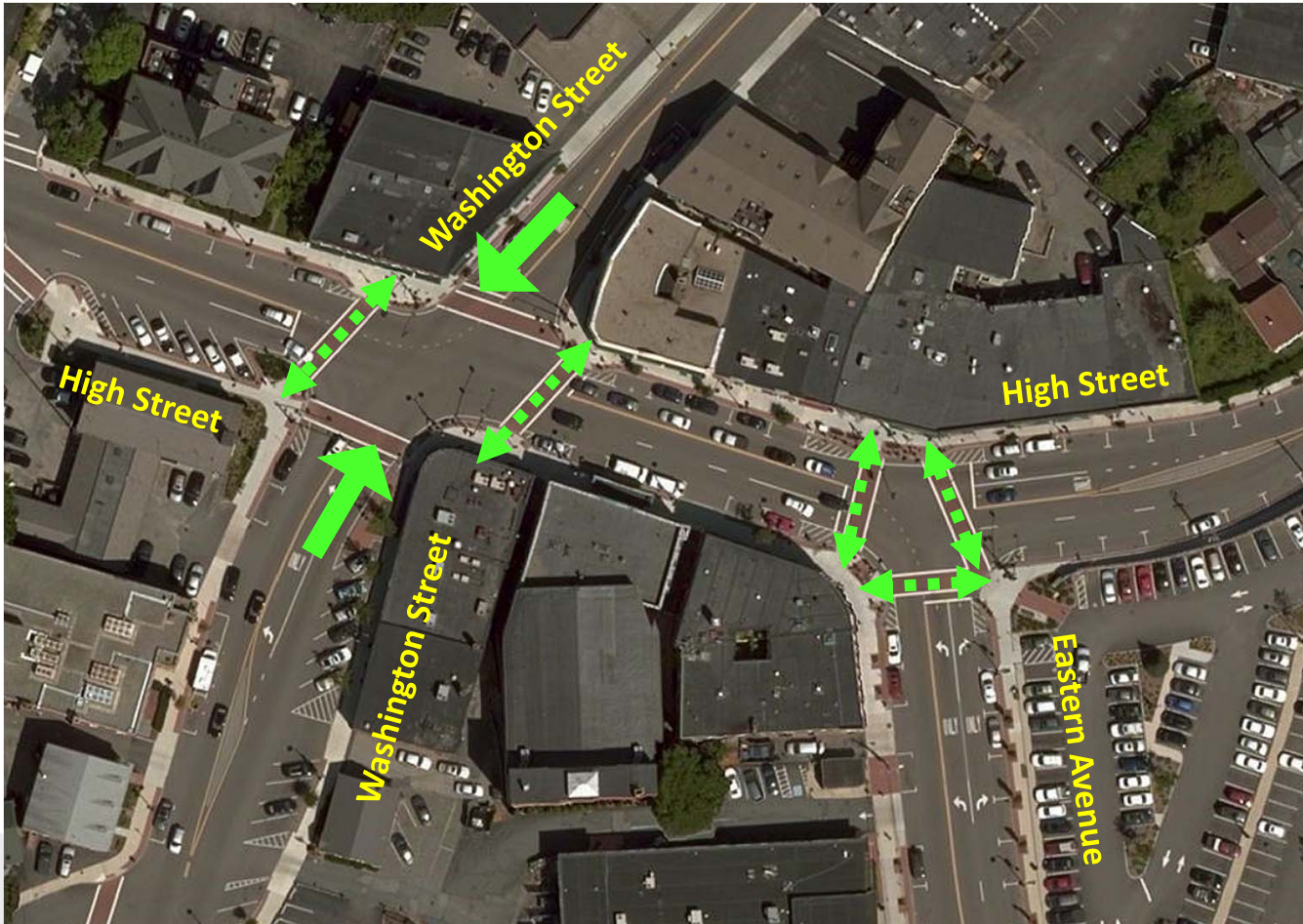


Existing Traffic Signal Phasing

Overlap Trailing Green

High Street Westbound

High Street Eastbound

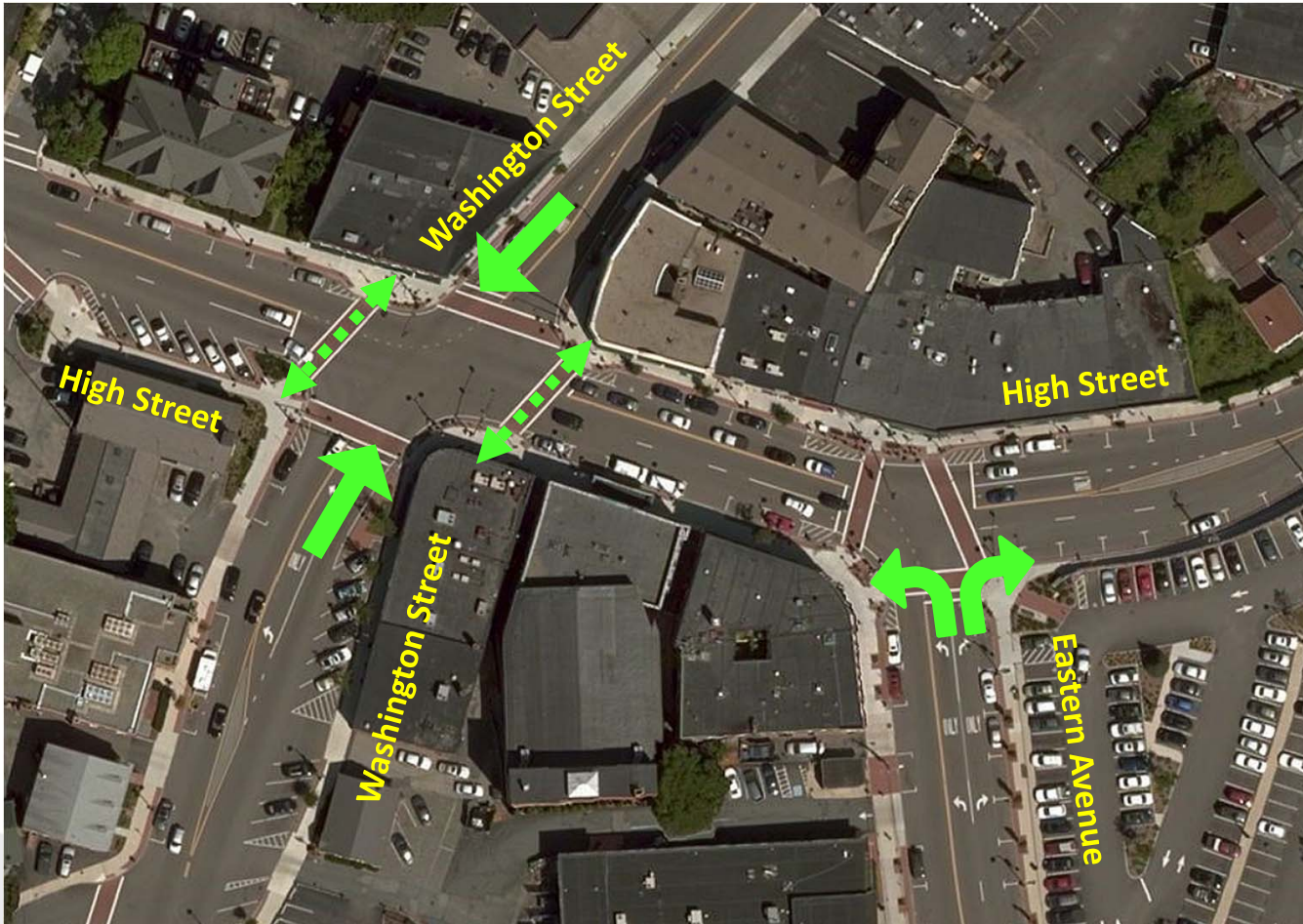


Existing Traffic Signal Phasing

Washington Street

Washington Street Northbound/Southbound;
Concurrent Pedestrian Phase with LPI

Exclusive Pedestrian Phase

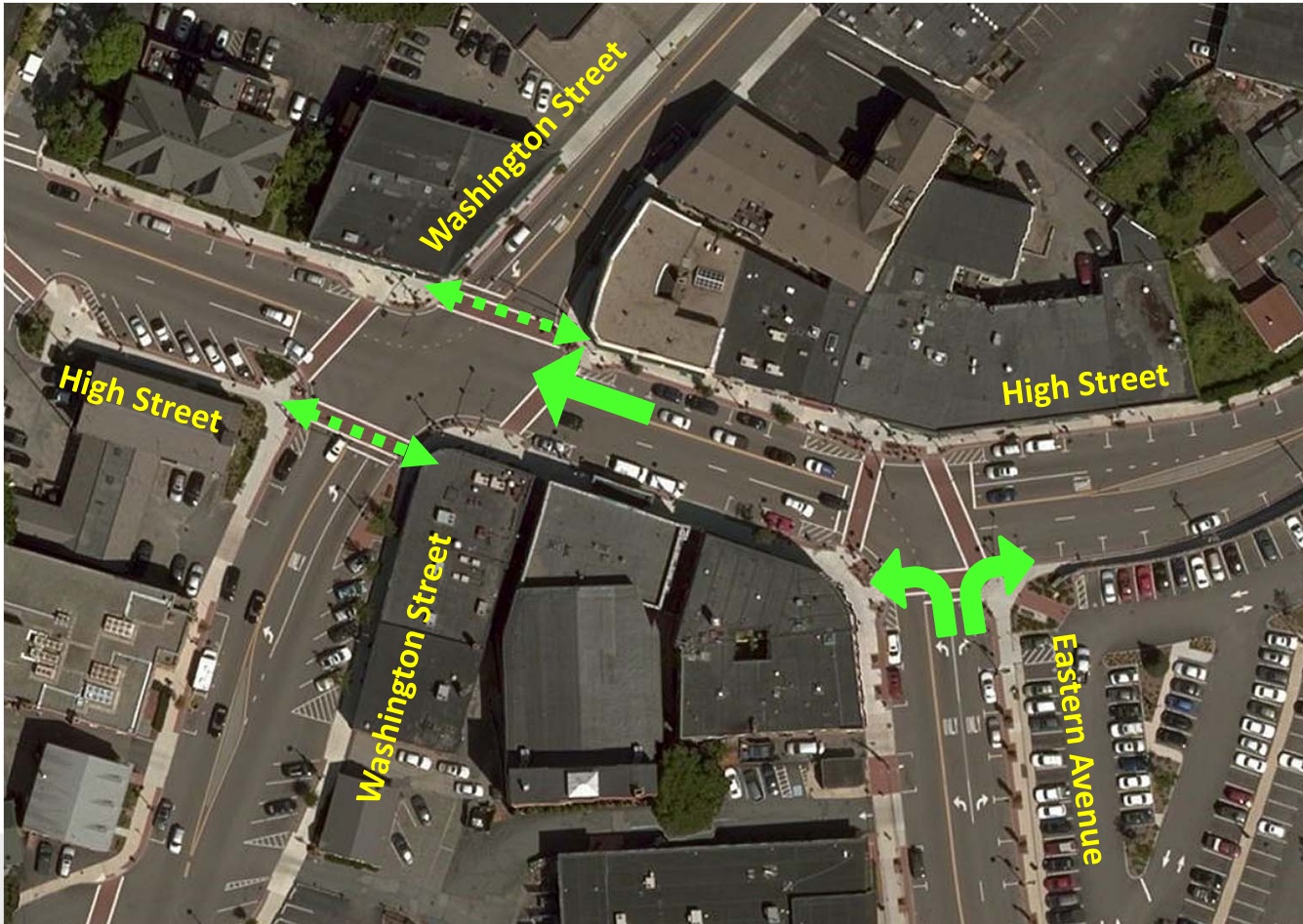


Existing Traffic Signal Phasing

Eastern Avenue

Washington Street Northbound/Southbound;
Concurrent Pedestrian Phase with LPI

Eastern Avenue Northbound



Existing Traffic Signal Phasing

Eastern Avenue clearance phase

Washington Street Westbound;
Concurrent Pedestrian Phase with LPI

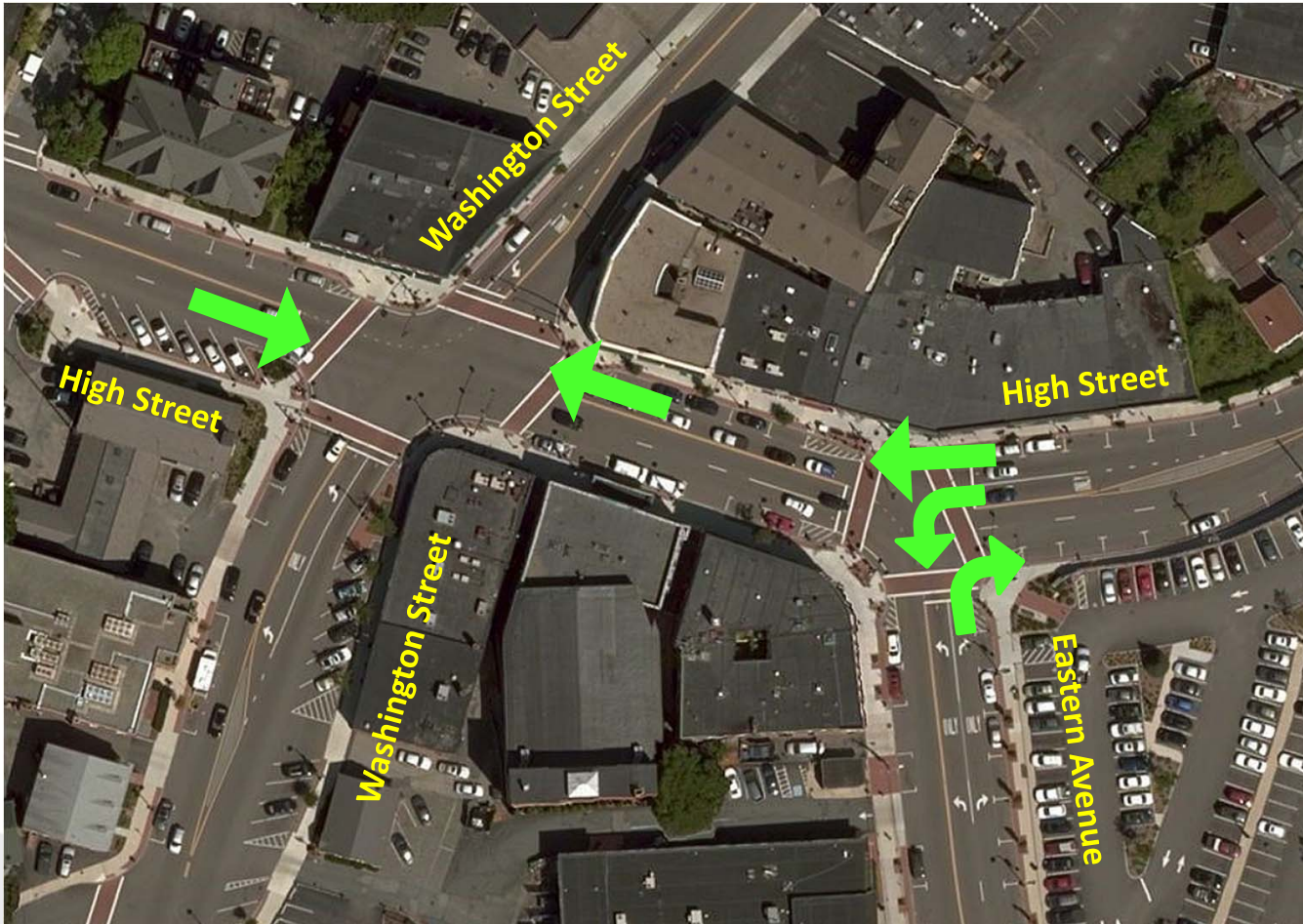
Eastern Avenue Northbound

Improvement Strategies

- Consider Exclusive Pedestrian Phase for Washington Street
 - Exclusive Ped at Washington and Eastern at same time
 - Sequential Exclusive phases
- Consider No Turn on Red restriction on all approaches
 - Eliminates conflicts between turning vehicles and pedestrians

Recommended Option

- Sequential Exclusive pedestrian phases at Washington St and Eastern Ave
- Implement No Turn on Red restriction on all approaches
- No change in overall LOS, all approaches operate at acceptable LOS (D or better)

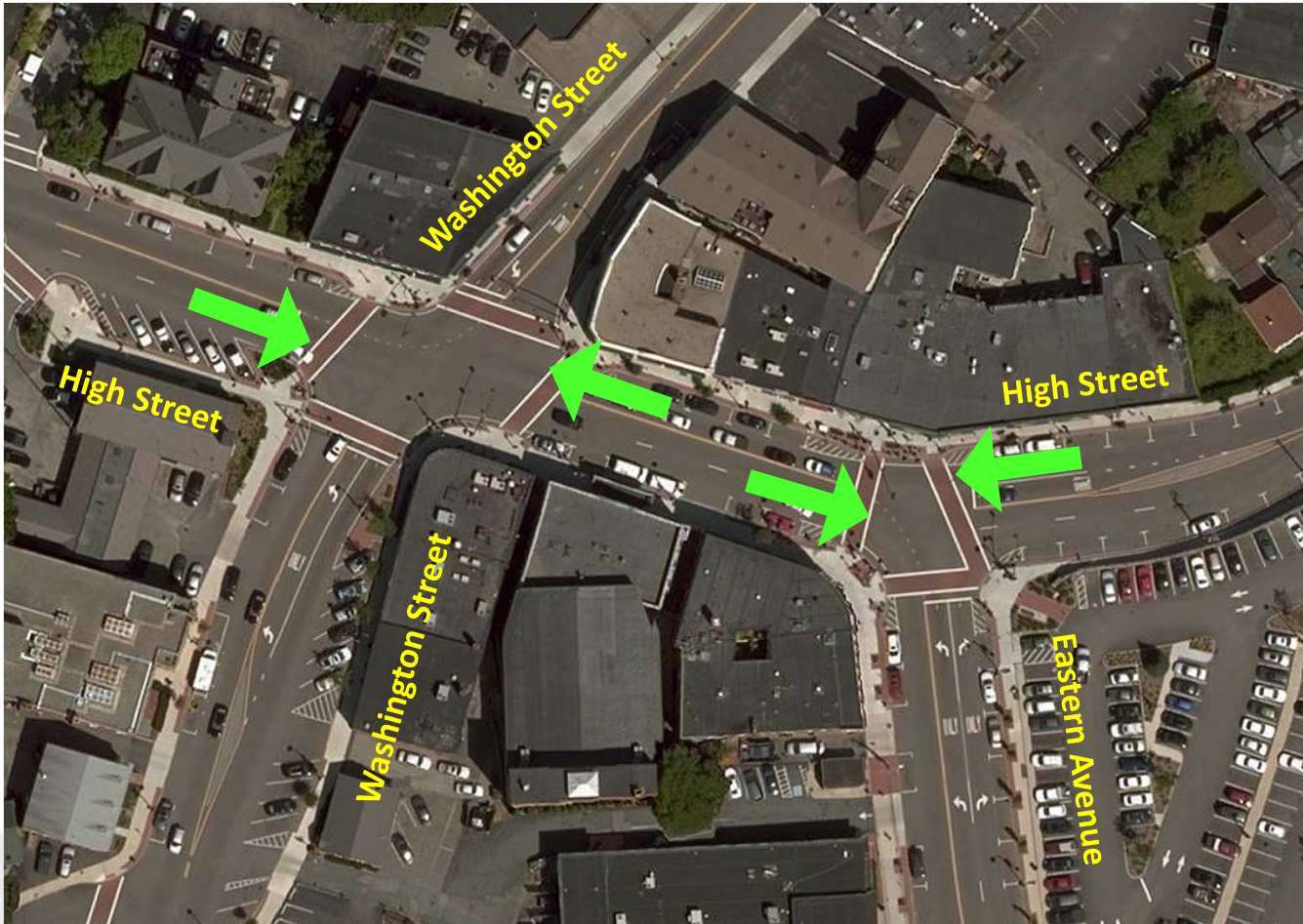


Recommended Traffic Signal Phasing

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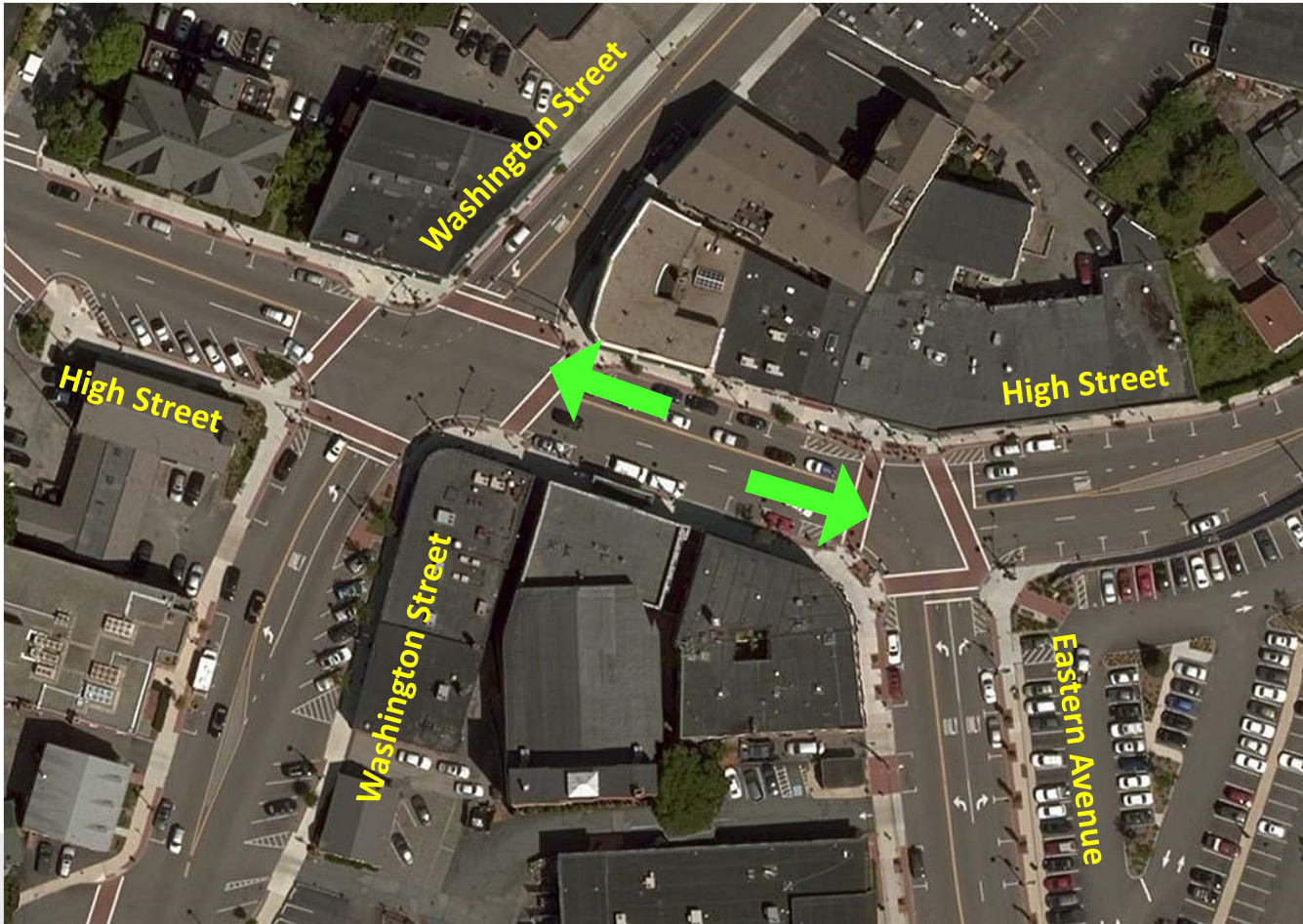


Recommended Traffic Signal Phasing

High Street

High Street Eastbound/Westbound

High Street Eastbound/Westbound

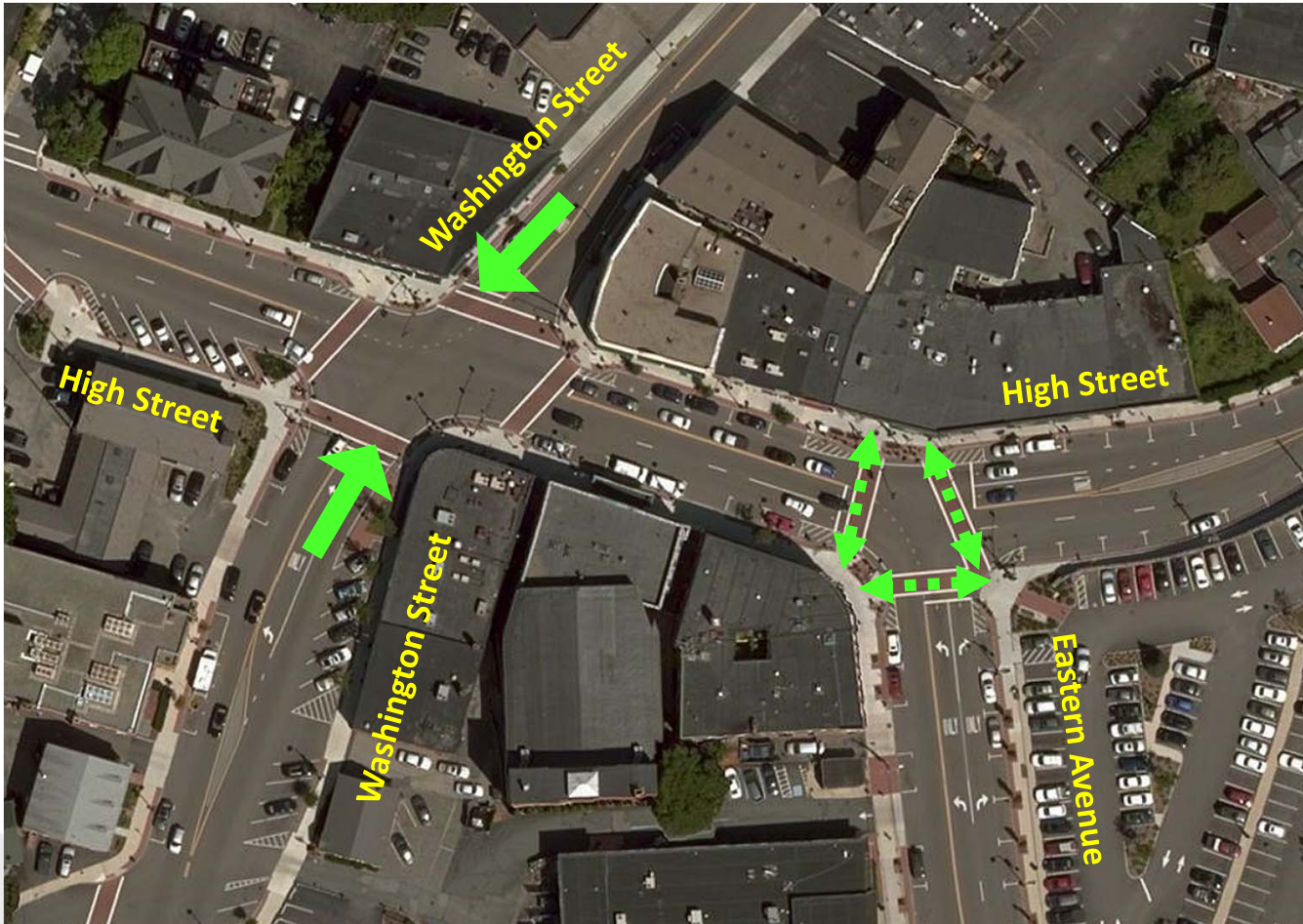


Recommended Traffic Signal Phasing

Overlap Trailing Green

High Street Westbound

High Street Eastbound

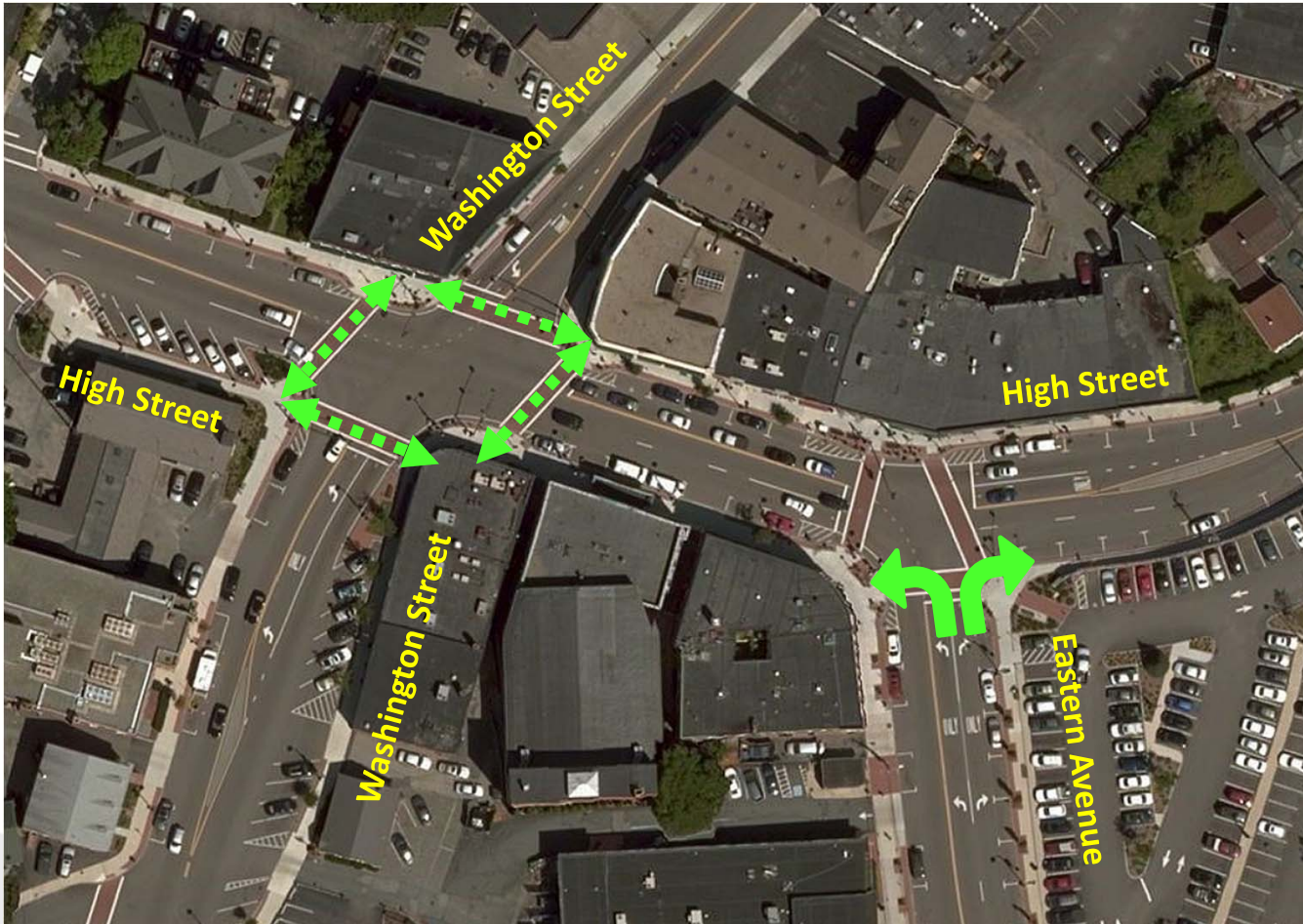


Recommended Traffic Signal Phasing

Washington Street

Washington Street Northbound/Southbound

Exclusive Pedestrian Phase

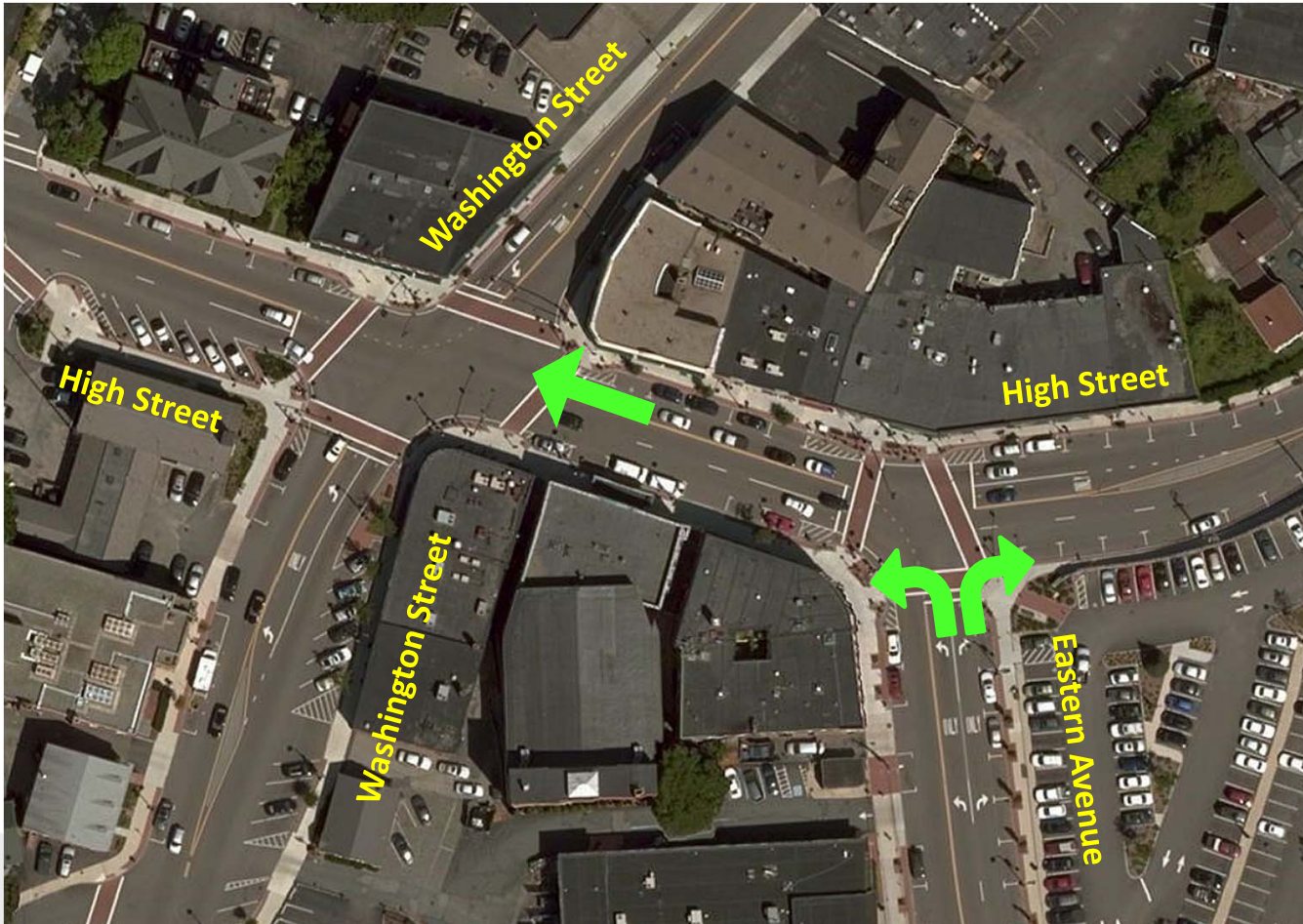


Recommended Traffic Signal Phasing

Washington Street Exclusive Ped

Exclusive Pedestrian Phase

Eastern Avenue Northbound



Recommended Traffic Signal Phasing

Eastern Avenue

Washington Street Westbound

Eastern Avenue Northbound

Signal Coordination and Advanced Technologies

- Signal Coordination
 - Benefits main street (High St), can degrade side streets
 - No benefit shown, slight degradation of side streets
 - Not recommended
- Adaptive or Traffic Responsive Control
 - Require additional detectors and equipment (\$\$\$)
 - Adaptive benefits main street, can degrade side streets (not recommended)
 - Traffic responsive can benefit whole system, adapt to day-to-day fluctuations in traffic
 - Whole system – include Court St and Lower Square
 - Require extensive observation and adjustment following implementation
- Consider Court St improvements recommended in 2014 study

Questions?

