



Memorandum

To: Peter Cavanaugh
General Electric

Date: April 4, 2017

Project #: 13421.00

From: David Bohn, PE
Ryan White, PE

Re: A Street/Binford Street
Traffic/Intersection Assessment

Consistent with the Cooperation Agreement between the Boston Planning and Development Agency (BPDA) and GE respecting the HQ Project, as defined in that agreement, VHB has analyzed the intersection of A and Binford streets (including a review of crosswalks within 500 feet of the intersection) as specified in Section B (6) of that agreement.

Evaluation

Figure 1 shows the GE Headquarters Project Site along with nearby area curb use/on-street parking regulations. Figure 2 depicts the existing striping and signage 500 feet north and south of the intersection of A and Binford Streets. The evaluation used several methods to help identify and quantify issues. The subsequent sections describe each of the following:

- Field observations during the AM peak hour, PM peak hour, and midday period;
- Review of MassDOT crash data;
- Operational analysis for both the existing and future roadway conditions at the A Street/Binford Street intersection; and
- Signal warrants analysis for the intersection of A Street/Binford Street.

Field Observations

VHB conducted observations within 500 feet north and south of the intersection of A and Binford Streets during the week of January 9, 2017. These observations occurred during the AM peak hour (8:00-9:00 AM), the PM peak hour (5:00-6:00 PM) and a midday period (11:30 AM-12:30 PM) to help understand traffic and pedestrian conditions throughout a typical day. No new traffic counts were taken as part of this assessment. Traffic patterns were similar to our prior observations of the area for the GE Headquarters Project Expanded ENF/PNF. Peak hour volumes along A Street range from 900-1,000 vehicles per hour and 80-90 bicycles (along with 120-175 pedestrians crossing at Binford Street). A summary of volumes is presented in Figure 3.

Overall, we observed generally good compliance to the rules of the road for corridor users (drivers, pedestrians and cyclists). Most pedestrians cross at marked crosswalks and drivers and bicyclists yield to pedestrians while crossing. During instances when road users do not yield appropriately to pedestrians, sight line issues appear to be a cause. For drivers to yielding to pedestrians within a crosswalk, it is essential that drivers can see a pedestrian waiting to cross the street. Some crosswalks sight lines are affected by on-street parking. Pedestrians stand on the sidewalk/curb ramp, waiting to cross at the crosswalk, but are unable to be seen from a driver's perspective. This can lead to vehicles/bikes not yielding to pedestrians, or worse, pedestrians stepping into the street and surprising a road user traveling along A Street. Although some of the crossings have advance crosswalk warning signs, many of these signs are not in the optimal location for driver awareness. An example of this is at the Binford Street crosswalk. An advance warning sign with a diagonal downward pointing arrow carries the meaning that there is a crosswalk adjacent to the sign. However,

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as a vehicle travels in the southbound direction, the sign is located on the incorrect corner of the intersection, 50 feet ahead of the crosswalk. Other crosswalks, such as the Wormwood Street crossing, do not have any signage.

The intersection of A Street and Mt. Washington Avenue contains an abrupt shift in the roadway alignment due to the A Street curb to curb width increase from 34 feet to approximately 60 feet as it adds a buffered bicycle lane. The shift of about ten feet wholly occurs within the 50-foot long intersection itself. Due to this shift, vehicles traveling in both directions were observed entering the bike lane (starting the shift early) and crossing the double yellow centerline (ending the shift late).

During the PM peak observations, queueing was observed to be an issue along the corridor in the southbound direction (for traffic headed out of the immediate area toward Broadway). This can lead to a standing queue along portions of A Street and thus poor visibility of pedestrians as they walk through queued vehicles in the crosswalks. We observed that many pedestrians are very cautious when making these crossings as northbound drivers cannot see pedestrians until they enter the northbound lane. As these observations occurred in January, street lighting conditions were examined during the PM peak and lighting generally seems adequate to illuminate the roadway.

Other general observations include a high density of signage along portions of A Street, especially in the northbound direction from Mt. Washington Street to Necco Street. This can lead to drivers disregarding or missing important signage due to the amount of signage along the roadway. Also, many pedestrian curb ramps within the study area appear to be not ADA-compliant. Many of these ramps are apex ramps, with some A Street crosswalks not having any ramp but sharing a ramp facing the side street crosswalks.

All roadways with the study are subject to the new default City speed limit of 25 mph. Although a speed study was not conducted, excessive speeding along the corridor was not observed.

A summary of these issues is shown in Figure 4.

Crash Data Review

VHB conducted a review of available crash data to help identify crash trends and/or roadway deficiencies in the study area. The most current vehicle crash data within the study area was obtained from the Massachusetts Department of Transportation (MassDOT) for the years 2012 to 2014. A summary of the study area vehicle crash history is presented in Table 1.

Table 1 Vehicular Crash Summary (2012-2014)

	A St/Binford St Area
Year	
2014	1
2013	0
<u>2012</u>	<u>1</u>
Total	2
Average	0.67/year
Collision Type	
Angle	1
<u>Single vehicle crash</u>	<u>1</u>
Total	2
Crash Severity	
Non-fatal injury	1
<u>Property damage only</u>	<u>1</u>
Total	2
Time of Day	
Weekday, 7:00 AM - 9:00 AM	0
Weekday, 4:00 PM - 6:00 PM	0
Weekday, other time	2
<u>Weekend</u>	<u>0</u>
Total	2
Pavement Conditions	
<u>Dry</u>	<u>2</u>
Total	2
Non Motorist (Bike, Pedestrian)	
Total	1

Source: MassDOT

There have only been two reported crashes along A Street within 500 feet north and south of the intersection of A and Binford Streets in the last three years of available data. Both occurred during favorable driving conditions on a weekday outside of peak commuting hours at the Mt. Washington Avenue intersection. One collision (in Aug 2014) involved a pedestrian who suffered an incapacitating, non-fatal injury while crossing within a crosswalk. No information is available on the travel direction of the vehicle in that collision, but sight line issues may have been a factor in the crash if the vehicle was traveling northbound.

Operational Analysis

VHB conducted an unsignalized level of service (LOS) operations analysis at the intersection of A Street at Binford Street. This operational analysis looks at the intersection of A Street at Binford Street as an independent location. LOS is a qualitative measure of control delay at an intersection providing an index to the operational qualities of a roadway or intersection. LOS designations range from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating condition. LOS D or better is typically considered acceptable in an urban environment. In line with the detailed transportation analysis contained in the GE Headquarters Project Expanded ENF/PNF, this analysis looked at the Existing Condition (2016), No-Build Condition (2021) and Build Condition (2021). A summary of this analysis is found in Table 2.

Table 2 A Street at Binford Street Unsignalized Intersection Level of Service (LOS) Summary

Critical Side Street Movement	Peak Period	2016 Existing Condition				2021 No-Build Condition				2021 Build Condition			
		v/c ¹	Delay ²	LOS ³	95th ⁴ Queue	v/c	Delay	LOS	95th Queue	v/c	Delay	LOS	95th Queue
Binford St WB	Weekday AM	0.24	19.3	C	24	0.28	21.9	C	28	0.31	24.6	C	32
	Weekday PM	0.23	21.3	C	21	0.28	25.5	D	27	0.30	28.2	D	31

Source: VHB

- 1 volume to capacity ratio
- 2 delay in seconds
- 3 level of service
- 4 95th percentile queue (reported in feet)

In all scenarios and time periods, the critical approach at the A Street/Binford Street intersection is the Binford Street westbound approach. This movement operates at LOS C in both the AM and PM peak hours in the Existing Condition. During the AM Peak, the approach will experience minor additional delay in the future conditions, but stays at LOS C for both the No-Build and Build Conditions. The Binford Street westbound movement degrades to LOS D in the No-Build Condition during the PM peak and maintains LOS D with the project generated trips added in the Build Condition. Overall, this is a functioning urban intersection with no movement operating below LOS D during any portion of the analysis.

Signal Warrant Analysis

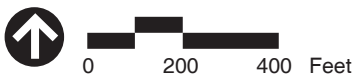
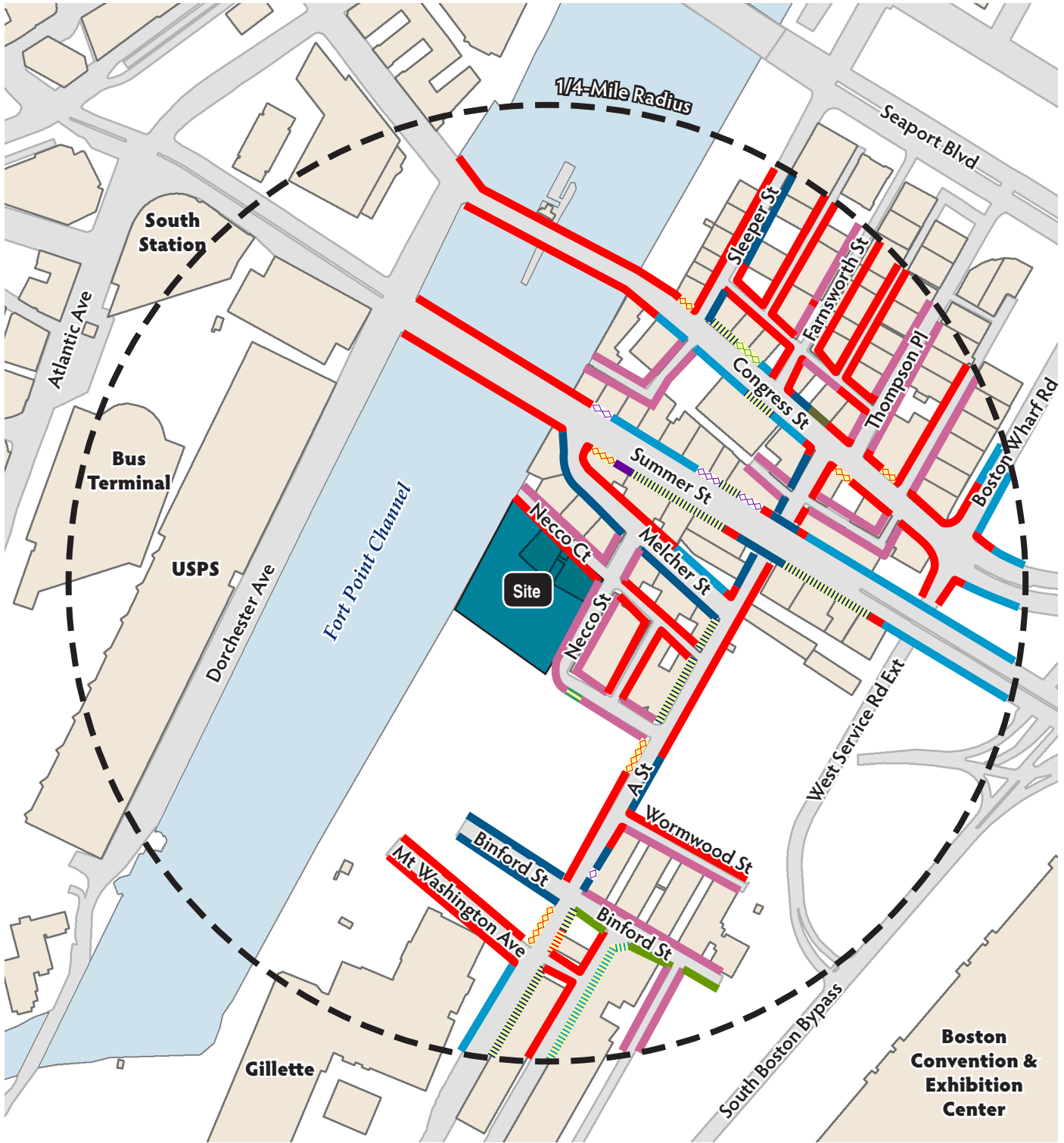
VHB conducted a preliminary signal warrant analysis using only available information for the intersection of A Street at Binford Street. The signal warrant analysis includes a study of traffic conditions, pedestrian characteristics, and physical characteristics of the intersection to help determine whether installation of traffic control signal is justified. The Federal Highway Administration's *Manual on Uniform Traffic Control Devices* (MUTCD), 2009 Edition, which is relied upon by the BTM, outlines a total of nine signal warrants. However, only four are applicable and were analyzed in this study.

None of the potentially applicable signal warrants would be met with the configuration and volumes at the intersection. Table 3 provides a short summary of the analysis.

Table 3 A Street at Binford Street: Summary of Potentially Applicable Signal Warrant Analysis

Warrant	Result
Warrant 2, Four-Hour Vehicular Volume	Not met, conflicting major and minor street volumes do not meet threshold limits
Warrant 3, Peak Hour	Not met, conflicting major and minor street volumes do not meet threshold limits
Warrant 4, Pedestrian Volume	Not met, major street volumes and conflicting major street pedestrians do not meet threshold limits
Warrant 7, Crash Experience	Not met, not enough crashes at the location

Source: MUTCD, 2009 Edition



Source: BWSC

- | | | | |
|--|--|--|-------------|
| | No Parking | | Bus Stop |
| | Resident Only | | Loading |
| | Metered - 2-Hour | | Valet |
| | 2-Hour, Daytime/
Residential, Overnight | | Hubway |
| | Handicapped | | Zipcar |
| | Private | | Unregulated |
| | | | 15-Minute |



Figure 1
Site Location and On-Street Parking

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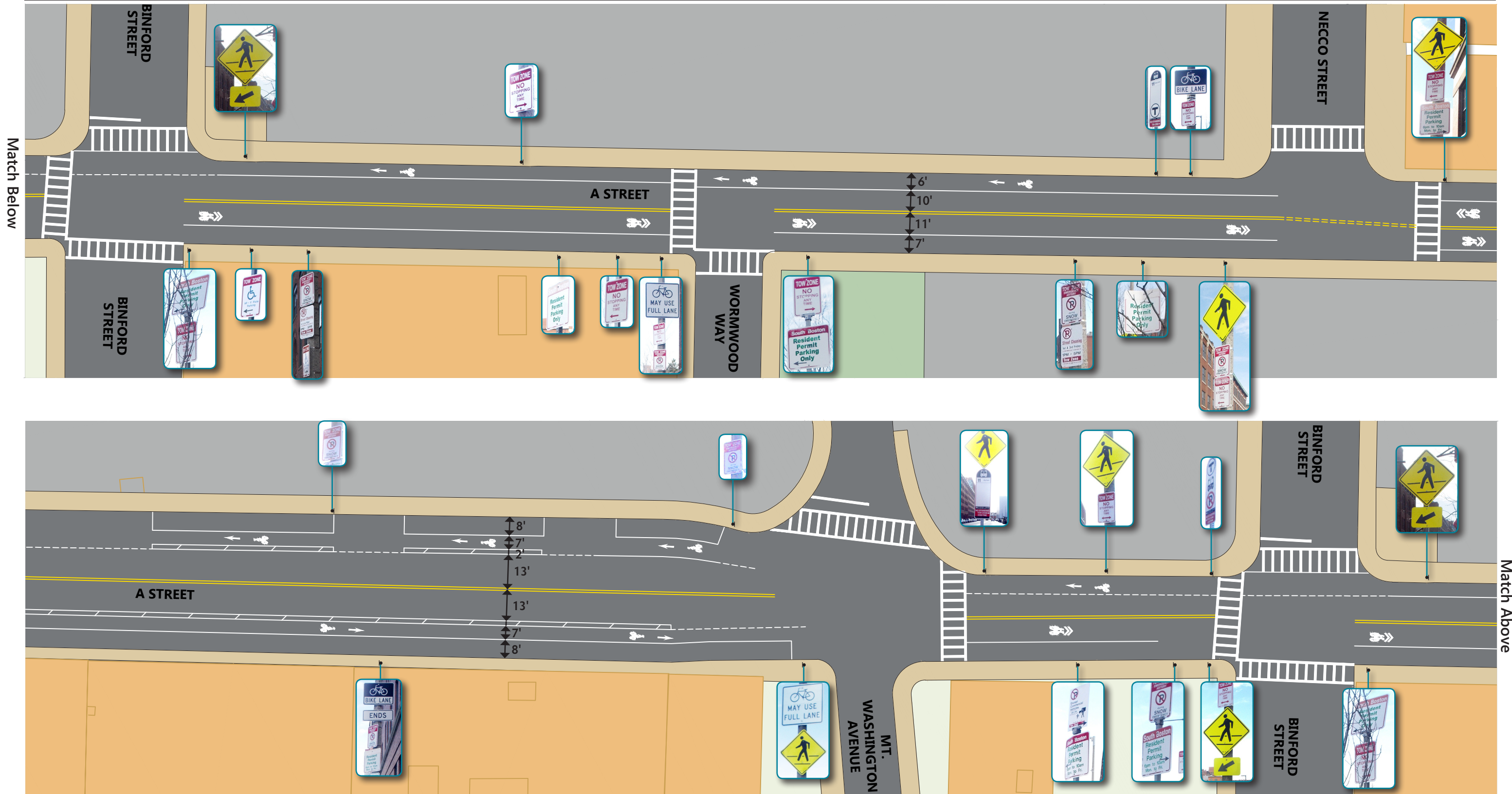


Figure 2
A Street
Existing Conditions and Signage
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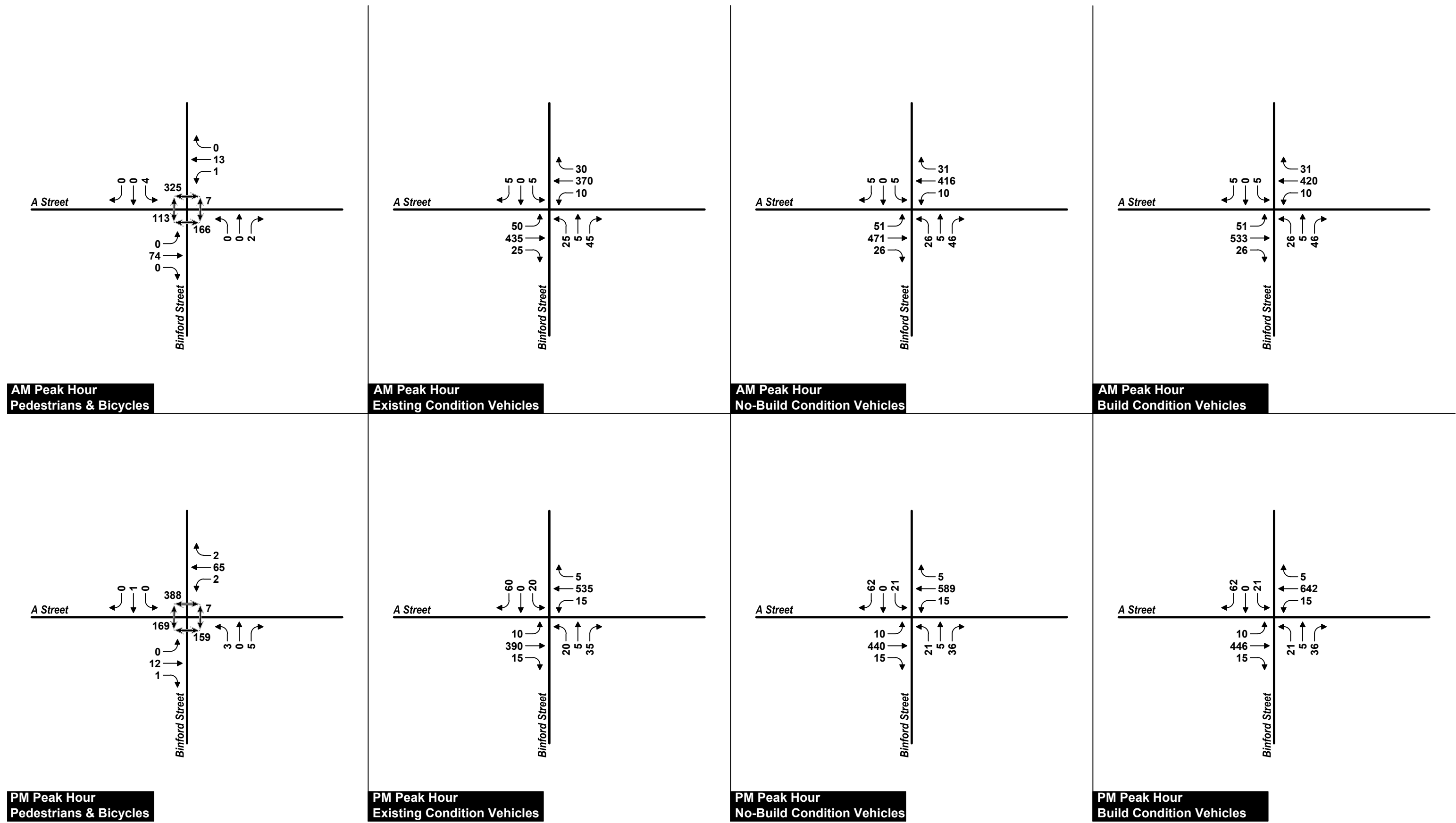
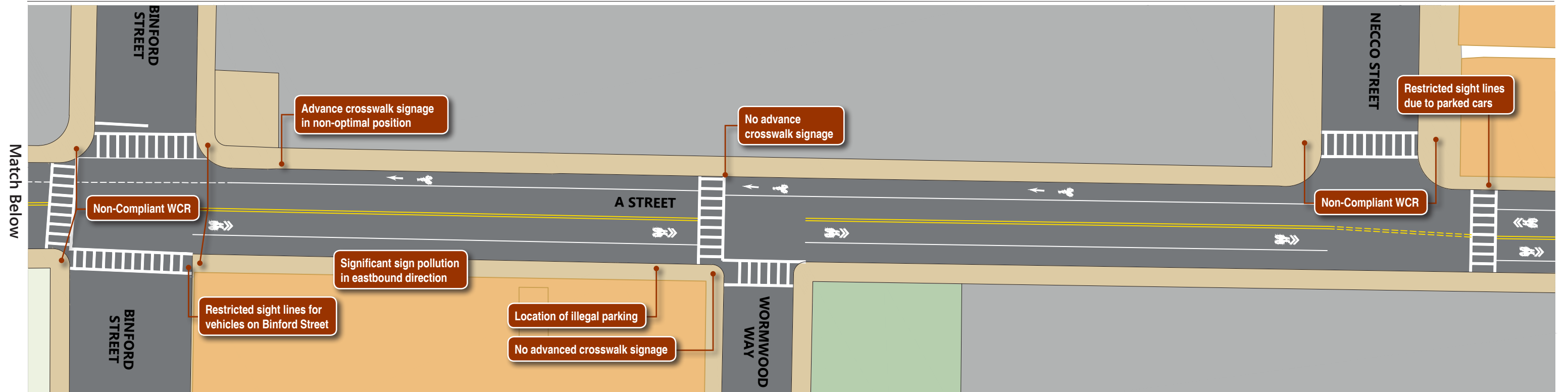
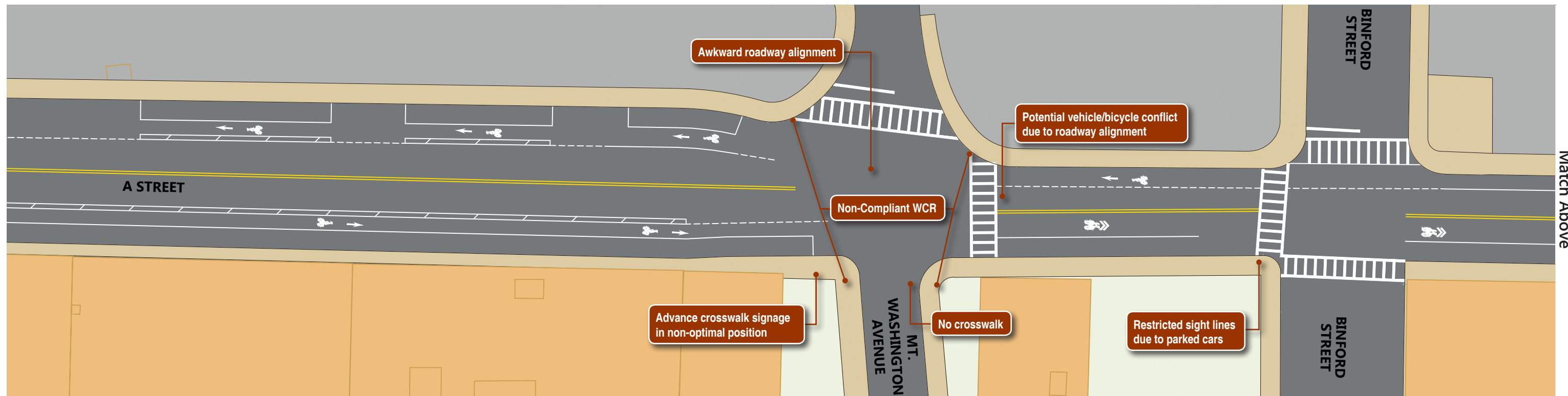


Figure 3



Match Below



Match Above

*WCR = Wheel Chair Ramp



Figure 4
A Street
Identified Issues

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