



To: City of Newton

Date: September 22, 2022

Memorandum

Project #: 15636.00

From: Randall C. Hart, Principal  
Ashley Domogala, EIT

Re: Response to Comments  
Transportation Engineering Peer Review, Green International 8 4 22  
1314 Washington Street Redevelopment Project  
Newton, Massachusetts

VHB has received and reviewed the Transportation Engineering Peer Review submitted to the City of Newton by the City's traffic review firm, Green International Affiliates, Inc., dated August 4, 2022, for the proposed 1314 Washington Street Redevelopment Project in Newton, Massachusetts. This memorandum summarizes VHB's responses to the comments. Each comment raised by the reviewer is listed below followed by the response by VHB. The comments follow the format and structure outlined in the Transportation Engineering Peer Review.

## Transportation Impact and Access Study

**Comment 1:** *We consider the study area to be adequate, complying with MassDOT 2014 Transportation Impact Assessment (TIA) Guidelines.*

**Response:** No response necessary.

**Comment 2:** *The source of April 2019 volumes is not presented in the report or appendices. Please provide the April 2019 count data or source of the data.*

**Response:** The April 2019 volumes were collected as part of the traffic study for the nearby Dunstan Residences development. The requested data is provided as an attachment.

**Comment 3:** *Although we generally agree with the method of calibrating 2021/2022 count data with pre-pandemic conditions, several of the approach volumes are still well below that of the 2019 volumes:*

- a. *The Washington St NBT volume at Elm St (Pm Peak Hour) was calibrated to be 150 vph, but in 2019 this volume was 259 vph (73% higher than existing condition assumed).*
- b. *The Washington St EBT volume at Cherry Street (Pm Peak Hour) was calibrated to be 540 vph, but in 2019 this volume was 638 vph (18% higher than existing conditions assumed).*

**We recommend matching the existing condition volumes for the two approaches indicated above to match the recorded 2019 volumes.**

**Response:** The Washington Street NBT volume at Elm Street and Washington Street EBT volume at Cherry Street were matched to 2019 volumes. The additional EBT volume was balanced through the other Washington Street intersections. Table 1 compares the weekday evening results at the Washington Street intersections. The revised Synchro capacity analysis worksheets are attached.

**Table 1 Signalized Intersection Capacity Analysis**

Location / Movement	2022 Existing Conditions					2029 No-Build Conditions					2029 Build Conditions				
	v/c <sup>a</sup>	Del <sup>b</sup>	LOS <sup>c</sup>	50 Q <sup>d</sup>	95 Q <sup>e</sup>	v/c	Del	LOS	50 Q	95 Q	v/c	Del	LOS	50 Q	95 Q
<b>Washington Street at Elm Street</b>															
<i>Weekday Evening – August 2022 TIAS</i>															
WB T/R	0.61	32	C	250	#456	0.66	34	C	235	m#444	0.66	35	C	236	m#445
NB L/T	0.51	17	B	28	101	0.54	19	B	37	114	0.54	19	B	37	114
NB R	0.66	23	C	97	#530	0.75	65	E	128	#924	0.76	66	E	131	#941
SB R	0.34	1	A	0	0	0.34	1	A	0	0	0.34	1	A	0	0
<b>Total</b>		<b>23</b>	<b>C</b>				<b>41</b>	<b>D</b>				<b>41</b>	<b>D</b>		
<i>Weekday Evening – Revised</i>															
WB T/R	0.65	35	D	250	#456	0.66	34	C	235	m#444	0.66	35	C	236	m#445
NB L/T	0.80	40	D	122	#264	0.85	46	D	139	#298	0.85	46	D	139	#298
NB R	0.75	66	E	128	#926	0.85	70	E	173	#1115	0.86	71	E	178	#1132
SB R	0.33	1	A	0	0	0.34	1	A	0	0	0.34	1	A	0	0
<b>Total</b>		<b>44</b>	<b>D</b>				<b>47</b>	<b>D</b>				<b>47</b>	<b>D</b>		
<b>Washington Street at Cherry Street</b>															
<i>Weekday Evening – August 2022 TIAS</i>															
EB L	0.84	74	E	120	#209	0.80	66	E	109	m#166	0.80	65	E	109	m#163
EB T	1.14	118	F	~592	#573	>1.20	>120	F	~500	#718	>1.20	>120	F	~518	#735
WB T	0.83	62	E	189	m163	0.95	62	E	272	m195	0.95	61	E	266	m191
WB R	0.22	2	A	16	m14	0.25	3	A	20	m16	0.26	3	A	20	m15
SB L/R	0.67	48	D	170	228	0.74	53	D	197	260	0.74	53	D	197	260
<b>Total</b>		<b>70</b>	<b>E</b>				<b>77</b>	<b>E</b>				<b>79</b>	<b>E</b>		
<i>Weekday Evening – Revised</i>															
EB L	0.84	72	E	116	m#191	0.80	62	E	107	m130	0.80	62	E	107	m128
EB T	>1.20	>120	F	~620	#763	>1.20	>120	F	~686	m#941	>1.20	>120	F	~704	m#944
WB T	0.83	62	E	189	m163	0.95	62	E	272	m195	0.95	61	E	266	m191
WB R	0.22	2	A	16	m14	0.25	3	A	20	m16	0.26	3	A	20	m15
SB L/R	0.66	48	D	170	228	0.74	53	D	197	260	0.74	53	D	197	260
<b>Total</b>		<b>99</b>	<b>F</b>				<b>106</b>	<b>F</b>				<b>108</b>	<b>F</b>		
<b>Washington Street at Highland Street</b>															
<i>Weekday Evening – August 2022 TIAS</i>															
EB T	0.57	20	C	107	m104	0.63	23	C	115	m110	0.63	24	C	116	m110
EB R	0.22	2	A	13	m16	0.22	3	A	14	m15	0.23	3	A	16	m17
WB L	0.44	48	D	65	m96	0.45	46	D	64	m90	0.45	46	D	64	m90
WB T	1.18	>120	F	~474	#688	>1.20	>120	F	~582	#801	>1.20	>120	F	~582	#800
NB L/R	0.86	71	E	241	#355	0.82	66	E	233	#379	0.86	74	E	248	#410
<b>Total</b>		<b>62</b>	<b>E</b>				<b>78</b>	<b>E</b>				<b>78</b>	<b>E</b>		
<i>Weekday Evening – Revised</i>															
EB T	0.65	29	C	130	m112	0.71	48	D	146	m118	0.71	50	D	148	m117
EB R	0.22	3	A	18	m16	0.22	3	A	19	m17	0.23	3	A	21	m17
WB L	0.44	47	D	63	m92	0.45	46	D	63	m88	0.45	46	D	63	m88
WB T	1.18	>120	F	~473	#678	>1.20	>120	F	~580	#800	>1.20	>120	F	~580	#800
NB L/R	0.86	71	E	241	#355	0.82	66	E	233	#379	0.86	74	E	248	#410
<b>Total</b>		<b>63</b>	<b>E</b>				<b>85</b>	<b>F</b>				<b>87</b>	<b>F</b>		

- a Volume to capacity ratio ~ Volume exceeds capacity, queue cannot be calculated
- b Average total delay, in seconds per vehicle # 95th percentile volume exceeds capacity, queue may be longer
- c Level-of-service m Volume for 95th percentile queue is metered by upstream signal
- d 50th percentile queue, in feet
- e 95th percentile queue, in feet

**Table 1 Signalized Intersection Capacity Analysis (continued)**

Location / Movement	2022 Existing Conditions					2029 No-Build Conditions					2029 Build Conditions					
	v/c <sup>a</sup>	Del <sup>b</sup>	LOS <sup>c</sup>	50 Q <sup>d</sup>	95 Q <sup>e</sup>	v/c	Del	LOS	50 Q	95 Q	v/c	Del	LOS	50 Q	95 Q	
<b>Washington Street at Waltham Street and Watertown Street</b>																
<i>Weekday Evening – August 2022 TIAS</i>																
EB L	0.45	58	E	280	m355	0.47	65	E	311	m378	0.48	65	E	313	m376	
EB T	0.29	6	A	90	m109	0.35	7	A	99	m124	0.35	7	A	99	m123	
WB T/R	0.63	87	F	191	256	0.72	103	F	218	#320	0.72	103	F	218	#323	
SB R	0.34	3	A	0	0	0.35	3	A	0	0	0.35	3	A	0	0	
SWB BR/R	0.74	54	D	240	#490	0.74	66	E	241	#546	0.74	66	E	241	#546	
<b>Total</b>		<b>47</b>	<b>D</b>				<b>55</b>	<b>E</b>				<b>56</b>	<b>E</b>			
<i>Weekday Evening – Revised</i>																
EB L	0.48	72	E	322	m381	0.52	92	F	352	m391	0.52	94	F	354	m391	
EB T	0.33	7	A	121	m131	0.39	9	A	119	m145	0.39	8	A	119	m145	
WB T/R	0.66	102	F	186	258	0.75	103	F	216	#323	0.75	103	F	216	#323	
SB R	0.34	2	A	0	0	0.33	3	A	0	0	0.33	3	A	0	0	
SWB BR/R	0.73	53	D	238	#490	0.74	66	E	241	#546	0.74	66	E	241	#546	
<b>Total</b>		<b>53</b>	<b>D</b>				<b>60</b>	<b>E</b>				<b>61</b>	<b>E</b>			
<b>Washington Street at Chestnut Street</b>																
<i>Weekday Evening – August 2022 TIAS</i>																
EB T	0.40	15	B	116	396	0.47	16	B	130	470	0.47	16	B	130	470	
EB R	0.04	9	A	2	16	0.05	9	A	2	18	0.05	9	A	2	18	
WB L	0.39	11	B	39	145	0.48	12	B	45	158	0.49	12	B	46	161	
WB T	0.29	10	A	63	225	0.35	11	B	84	278	0.35	11	B	84	278	
NB L	0.58	63	E	79	134	0.62	65	E	90	150	0.62	65	E	90	150	
NB R	0.37	5	A	0	34	0.39	5	A	0	36	0.39	5	A	0	36	
<b>Total</b>		<b>15</b>	<b>B</b>				<b>16</b>	<b>B</b>				<b>16</b>	<b>B</b>			
<i>Weekday Evening – Revised</i>																
EB T	0.46	16	B	141	460	0.54	20	B	150	#578	0.54	20	B	150	#577	
EB R	0.04	9	A	3	17	0.05	10	A	4	19	0.05	10	B	4	19	
WB L	0.43	11	B	39	143	0.52	13	B	45	158	0.53	13	B	46	161	
WB T	0.29	10	A	63	222	0.35	11	B	84	278	0.35	11	B	84	278	
NB L	0.58	64	E	79	135	0.62	65	E	90	150	0.62	65	E	90	150	
NB R	0.37	5	A	0	35	0.38	5	A	0	36	0.38	5	A	0	36	
<b>Total</b>		<b>15</b>	<b>B</b>				<b>17</b>	<b>B</b>				<b>17</b>	<b>B</b>			
a	Volume to capacity ratio					~	Volume exceeds capacity, queue cannot be calculated									
b	Average total delay, in seconds per vehicle					#	95th percentile volume exceeds capacity, queue may be longer									
c	Level-of-service					m	Volume for 95th percentile queue is metered by upstream signal									
d	50th percentile queue, in feet															
e	95th percentile queue, in feet															

As shown in Table 1, all intersections are expected to maintain the same Level of Service as previous analyses with the following changes:

- › **Washington Street at Elm Street:** Under 2022 Existing conditions, overall delay increases by 21 seconds due to additional NB volumes approaching capacity and causing slight redistribution of green time. NB L/T movement average delay increases by 23 seconds, but average queue only increases by approximately 100 feet. NB R movement average delay increases by 43 seconds, but average queue only increases by approximately 30 feet. Under 2029 No-Build and Build conditions, NB L/T average delay increases by 27 seconds, but average queue only increases by approximately 100 feet.

- › **Washington Street at Cherry Street:** Overall delay increases by 29 seconds under all conditions due to additional oversaturation of EB T movement, while average queue for EB T movement increases by approximately 30 feet under 2022 Existing conditions and 200 feet under 2029 No-Build and Build conditions.
- › **Washington Street at Highland Street:** Under 2022 Existing conditions, negligible changes. Under 2029 No-Build and Build conditions, EB T movement average delay increases by 25-26 seconds, but average queue only increases by approximately 30 feet.
- › **Washington Street at Waltham Street and Watertown Street:** Under all conditions, EB L movement average delay increases by 14-29 seconds, but average queue only increases by approximately 40 feet.
- › **Washington Street at Chestnut Street:** Under all conditions, negligible changes.

Despite the changes in operations noted above, the Project is still not expected to noticeably worsen operations beyond the current failing conditions.

***Comment 4: Assuming that the number of residential units has not changed since the preparation of the May 2022 site plans, we take no issue with the trip generation or distribution. The July 2022 ground floor plan depicts a slightly smaller retail area than was modeled in the TIAS such that the analysis presented would be slightly conservative.***

**Response:** Since the May filing, there have been some tweaks to the site plan, but the unit count has not changed, 50 residential units are planned. However, the commercial space has been reduced from 4,119 sf (original submission) to 3,873 sf (August 2022 revised submission). This represents a minor reduction of 246 sf. The main change to the plan is related to access, parking, and circulation. In the original submission, there were 69 parking spaces with 50 spaces for residents (1-1 parking ration) and 19 spaces for commercial use. Under the revised plan, there are 63 parking spaces with 50 spaces for the residential use (below-ground) and 13 spaces for the commercial use (ground-level).

Under existing conditions, there are two curb cuts along Davis Street providing access and egress to the existing surface parking lot. Under the revised plan, all access to the site will be gained from Davis Street with a one-way into the at-grade parking (retail) and access/egress to the underground parking lot (residential). Egress from the commercial parking area will be provided via an exit-only driveway on Highland Street near the location of the existing Highland Street curb cut.

An updated TIA has been prepared and submitted to the City to reflect the changes to the site plan and associated traffic modifications.

***Comment 5: Site conditions were reviewed during the Am peak hours, which volumes and capacity analysis suggest to overall be slightly busier than the Pm peak hour. The reviewer site visit was conducted on a summer weekday, Tuesday, July 20, 2022. The 95<sup>th</sup> percentile queue lengths on the approaches stated in the TIAS to have the longest delays were found to be conservative to the longest queues observed in the field. No issues are taken with the modeling of this intersection.***

**Response:** No response necessary.

**Comment 6:** *The Project is located on a corridor that was recently reconstructed to increase the walkability and bikeability as part of the Washington Street Vision Plan. To promote walkability around the site including to the proposed rear walkways and stairwells, it is recommended that the Applicant replace the sidewalk along Highland Street and Davis Street sides of the site to be ADA-compliant to address locations of cracked or warped panels. We otherwise agree with the TDM and off-site measures recommended by the Applicant.*

**Response:** The project is replacing both the Highland Street and Davis Street portions of the sidewalk with new cast-in-place concrete walkways and new disabled ramps at the intersection of Davis Street and Highland Street, all of which will be constructed to meet ADA requirements.

**Comment 7:** *The proposed parking ratio is 1.0 parking stalls per 1 unit, less than the number required in the Newton City Ordinances Chapter 30: Zoning. If not done so already, the Applicant should seek an exception to maintain the proposed number of parking spaces.*

**Response:** The Proponent has requested a waiver from the 2 stalls per residential unit requirement.

**Comment 8:** *Review of intersection sight distance (ISD) from Davis Street site driveway location suggests that the distance stated in the report refers to viewing from the back of sidewalk, rather than from the AASHTO standard distance of 14.5 feet from the edge of the traveled way on Davis Street. ISD around the left/east is obscured by the vegetation on the adjacent parcel and was measured to be less than the distance state in the TIAS. This being stated, considering that drivers are likely to stop at the back of sidewalk rather than the longer distance near the proposed building's edge, we consider the measurement listed in the report appropriate.*

**Response:** No response necessary.

## Ground Floor Plan

**Comment 1:** *Although bicycle parking is proposed per the TIAS, it is not depicted in the plans. The Applicant should depict the locations of bicycle parking and the fix-it station proposed in the TIAS.*

**Response:** See attached A1 Sheet for the Level P1 basement plan which shows the bike storage room. This room can accommodate 50 bicycles. The bike fix it station will also be located in the bike storage room.

**Comment 2:** *The latest parking floor plan no longer matches the garage floor or upper floor layouts depicted in the May 2022 plans because access to the garage floor is not proposed to be via Davis Street and not Highland Street. The garage floor plan should be presented to confirm, among other items, the newly proposed connection to Davis Street, the number of accessible spaces provided, access to the elevators, and overall resident parking layout.*

**Response:** See attached A1 and A2 sheets for the current parking plan.

**Comment 3: The Applicant should provide figures demonstrating that emergency apparatuses can efficiently enter and exit both parking floors.**

**Response:** Fire trucks are not intended to access the parking garage. See the attached Fire Truck Exhibit which has been reviewed and approved by Newton Fire.

**Comment 4: Although the driveway grades are provided at the Davis St driveway, there are no labels for the pedestrian ramp access from parking area to Highland Street. Provide grades for pedestrian ramps to verify compliancy with ADA regulations.**

**Response:** The ramp rises 1 foot from EL 52.5 inside the parking area to EL 53.5 at Highland Street and is 12 feet long, resulting in an 8.33-percent grade. The elevations at each end of ramp are noted on the attached sheet titled Level 1 Plan.

## Attachments

- › April 2019 Count Data
- › Revised Synchro Capacity Analyses
- › Sheets A1 and A2
- › Fire Truck Exhibit
- › Level 1 Plan with Pedestrian Ramp Elevations

Response to Comments  
Ref: 15636.00  
September 22, 2022



## **April 2019 Count Data**



Client: Matthew Duranleau  
 Project #: 358\_064\_VHB  
 BTD #: Location 7  
 Location: West Newton, MA  
 Street 1: Washington Street  
 Street 2: Elm Street  
 Count Date: 4/11/2019  
 Day of Week: Thursday  
 Weather: Partly Sunny, 50°F



**PASSENGER CARS & HEAVY VEHICLES COMBINED**

Start Time	Washington Street Northbound				Elm Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	13	22	105	0	0	0	90	0	0	0	0	0	0	100	6
7:15 AM	0	21	26	119	0	0	0	125	0	0	0	0	0	0	120	7
7:30 AM	0	29	29	153	0	0	0	157	0	0	0	0	0	0	148	6
7:45 AM	0	25	31	163	0	0	0	128	0	0	0	0	0	0	147	12
8:00 AM	0	20	32	159	0	0	0	99	0	0	0	0	0	0	151	17
8:15 AM	0	15	31	166	0	0	0	83	0	0	0	0	0	0	156	15
8:30 AM	0	10	33	162	0	0	0	66	0	0	0	0	0	0	134	16
8:45 AM	0	11	30	178	0	0	0	68	0	0	0	0	0	0	135	14

Start Time	Washington Street Northbound				Elm Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	12	32	169	0	0	0	45	0	0	0	0	0	0	158	17
4:15 PM	0	14	36	175	0	0	0	47	0	0	0	0	0	0	151	18
4:30 PM	0	15	40	160	0	0	0	49	0	0	0	0	0	0	175	17
4:45 PM	0	13	46	160	0	0	0	65	0	0	0	0	0	0	173	21
5:00 PM	0	10	51	188	0	0	0	80	0	0	0	0	0	0	164	25
5:15 PM	0	11	63	184	0	0	0	69	0	0	0	0	0	0	152	20
5:30 PM	0	11	74	194	0	0	0	57	0	0	0	0	0	0	143	15
5:45 PM	0	12	71	208	0	0	0	54	0	0	0	0	0	0	135	16

AM PEAK HOUR 7:30 AM to 8:30 AM	Washington Street Northbound				Elm Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	89	123	641	0	0	0	467	0	0	0	0	0	0	602	50
<i>PHF</i>	0.97				0.74				0.00				0.95			
<i>HV %</i>	0.0%	2.2%	0.8%	3.7%	0.0%	0.0%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.3%	4.0%

PM PEAK HOUR 5:00 PM to 6:00 PM	Washington Street Northbound				Elm Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	44	259	774	0	0	0	260	0	0	0	0	0	0	594	76
<i>PHF</i>	0.93				0.81				0.00				0.89			
<i>HV %</i>	0.0%	0.0%	0.4%	1.3%	0.0%	0.0%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.2%	1.3%

Client: Matthew Duranleau  
 Project #: 358\_064\_VHB  
 BTD #: Location 7  
 Location: West Newton, MA  
 Street 1: Washington Street  
 Street 2: Elm Street  
 Count Date: 4/11/2019  
 Day of Week: Thursday  
 Weather: Partly Sunny, 50°F

# BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701  
 Office: 978-746-1259  
 DataRequest@BostonTrafficData.com  
 www.BostonTrafficData.com

## HEAVY VEHICLES

Start Time	Washington Street Northbound				Elm Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	5	0	0	0	0	0	0	0	0	0	0	7	0
7:15 AM	0	0	0	6	0	0	0	1	0	0	0	0	0	0	8	0
7:30 AM	0	1	0	6	0	0	0	0	0	0	0	0	0	0	7	1
7:45 AM	0	0	1	5	0	0	0	1	0	0	0	0	0	0	6	0
8:00 AM	0	1	0	7	0	0	0	1	0	0	0	0	0	0	7	0
8:15 AM	0	0	0	6	0	0	0	0	0	0	0	0	0	0	6	1
8:30 AM	0	0	1	5	0	0	0	1	0	0	0	0	0	0	6	1
8:45 AM	0	0	0	4	0	0	0	0	0	0	0	0	0	0	7	0

Start Time	Washington Street Northbound				Elm Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	4	0	0	0	1	0	0	0	0	0	0	4	0
4:15 PM	0	0	1	3	0	0	0	0	0	0	0	0	0	0	3	1
4:30 PM	0	1	0	5	0	0	0	0	0	0	0	0	0	0	4	0
4:45 PM	0	0	1	3	0	0	0	1	0	0	0	0	0	0	3	0
5:00 PM	0	0	0	3	0	0	0	0	0	0	0	0	0	0	3	0
5:15 PM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	4	1
5:30 PM	0	0	1	2	0	0	0	0	0	0	0	0	0	0	3	0
5:45 PM	0	0	0	3	0	0	0	1	0	0	0	0	0	0	3	0

AM PEAK HOUR 7:15 AM to 8:15 AM <i>PHF</i>	Washington Street Northbound				Elm Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	<b>0</b>	<b>2</b>	<b>1</b>	<b>24</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>28</b>
<b>0.84</b>				<b>0.75</b>				<b>0.00</b>				<b>0.91</b>				

PM PEAK HOUR 4:00 PM to 5:00 PM <i>PHF</i>	Washington Street Northbound				Elm Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	<b>0</b>	<b>1</b>	<b>2</b>	<b>15</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>14</b>
<b>0.75</b>				<b>0.50</b>				<b>0.00</b>				<b>0.94</b>				

Client: Matthew Duranleau  
 Project #: 358\_064\_VHB  
 BTM #: Location 7  
 Location: West Newton, MA  
 Street 1: Washington Street  
 Street 2: Elm Street  
 Count Date: 4/11/2019  
 Day of Week: Thursday  
 Weather: Partly Sunny, 50°F



**PEDESTRIANS & BICYCLES**

Start Time	Washington Street Northbound				Elm Street Southbound				Washington Street Eastbound				Washington Street Westbound					
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED		
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
7:15 AM	0	0	1	1	0	0	0	0	1	0	0	0	0	2	0	0	0	3
7:30 AM	0	0	1	2	0	0	0	2	0	0	0	3	0	1	0	0	6	
7:45 AM	0	1	1	0	0	0	0	1	0	0	0	0	1	0	0	0	3	
8:00 AM	0	0	0	2	0	0	1	3	0	0	0	0	0	1	0	0	4	
8:15 AM	0	0	1	0	0	0	0	2	0	0	0	2	0	0	0	0	2	
8:30 AM	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0	3	
8:45 AM	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	2	

Start Time	Washington Street Northbound				Elm Street Southbound				Washington Street Eastbound				Washington Street Westbound				
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	
4:00 PM	0	1	0	0	0	0	0	7	0	0	0	1	0	0	0	0	3
4:15 PM	0	0	1	1	0	0	0	5	0	0	0	1	0	1	0	0	2
4:30 PM	1	0	0	2	0	0	1	4	0	0	0	3	0	0	0	0	4
4:45 PM	0	0	1	6	0	0	0	3	0	0	0	4	0	1	0	0	9
5:00 PM	0	1	0	3	0	0	1	4	0	0	0	2	0	0	0	0	3
5:15 PM	0	0	0	0	0	0	0	5	0	0	0	1	0	0	0	0	5
5:30 PM	0	0	1	2	0	0	0	4	0	0	0	3	0	1	0	0	3
5:45 PM	0	0	1	1	0	0	0	4	0	0	0	2	0	0	0	0	4

AM PEAK HOUR <sup>1</sup> 7:30 AM to 8:30 AM	Washington Street Northbound				Elm Street Southbound				Washington Street Eastbound				Washington Street Westbound				
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	
	0	1	3	4	0	0	1	8	0	0	0	6	0	2	0	0	15

PM PEAK HOUR <sup>1</sup> 5:00 PM to 6:00 PM	Washington Street Northbound				Elm Street Southbound				Washington Street Eastbound				Washington Street Westbound				
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	
	0	1	2	6	0	0	1	17	0	0	0	8	0	1	0	0	15

<sup>1</sup> Peak hours corresponds to vehicular peak hours.

Client: Matthew Duranleau  
 Project #: 358\_064\_VHB  
 BTD #: Location 8  
 Location: West Newton, MA  
 Street 1: Washington Street  
 Street 2: Cherry Street  
 Count Date: 4/11/2019  
 Day of Week: Thursday  
 Weather: Partly Sunny, 50°F



**PASSENGER CARS & HEAVY VEHICLES COMBINED**

Start Time	Northbound				Cherry Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	0	0	87	0	15	0	19	86	0	0	0	91	35
7:15 AM	0	0	0	0	0	92	0	17	0	21	98	0	0	0	110	43
7:30 AM	0	0	0	0	0	91	0	18	0	24	129	0	0	0	136	47
7:45 AM	0	0	0	0	0	89	0	19	0	23	140	0	0	0	140	45
8:00 AM	0	0	0	0	0	87	0	21	0	25	134	0	0	0	147	46
8:15 AM	0	0	0	0	0	84	0	20	0	22	144	0	0	0	151	44
8:30 AM	0	0	0	0	0	88	0	17	0	23	139	0	0	0	133	43
8:45 AM	0	0	0	0	0	85	0	18	0	20	158	0	0	0	131	41

Start Time	Northbound				Cherry Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	0	0	63	0	22	0	46	123	0	0	0	153	61
4:15 PM	0	0	0	0	0	66	0	23	0	48	127	0	0	0	146	58
4:30 PM	0	0	0	0	0	64	0	20	0	43	117	0	0	0	172	55
4:45 PM	0	0	0	0	0	61	0	21	0	39	121	0	0	0	173	56
5:00 PM	0	0	0	0	0	60	0	19	0	37	151	0	0	0	170	58
5:15 PM	0	0	0	0	0	58	0	18	0	35	149	0	0	0	154	55
5:30 PM	0	0	0	0	0	56	0	21	0	31	163	0	0	0	137	57
5:45 PM	0	0	0	0	0	55	0	19	0	33	175	0	0	0	132	54

AM PEAK HOUR 7:30 AM to 8:30 AM	Northbound				Cherry Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	0	0	0	0	351	0	78	0	94	547	0	0	0	574	182
<b>PHF</b>	0.00				0.98				0.97				0.97			
<b>HV %</b>	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	0.0%	2.6%	0.0%	2.1%	4.0%	0.0%	0.0%	0.0%	4.5%	1.6%

PM PEAK HOUR 4:30 PM to 5:30 PM	Northbound				Cherry Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	0	0	0	0	243	0	78	0	154	538	0	0	0	669	224
<b>PHF</b>	0.00				0.96				0.92				0.97			
<b>HV %</b>	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.0%	0.0%	0.0%	1.3%	2.0%	0.0%	0.0%	0.0%	2.2%	0.4%

Client: Matthew Duranleau  
 Project #: 358\_064\_VHB  
 BTD #: Location 8  
 Location: West Newton, MA  
 Street 1: Washington Street  
 Street 2: Cherry Street  
 Count Date: 4/11/2019  
 Day of Week: Thursday  
 Weather: Partly Sunny, 50°F

# BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701  
 Office: 978-746-1259  
 DataRequest@BostonTrafficData.com  
 www.BostonTrafficData.com

## HEAVY VEHICLES

Start Time	Northbound				Cherry Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	0	0	1	0	0	0	0	5	0	0	0	7	0
7:15 AM	0	0	0	0	0	1	0	0	0	1	5	0	0	0	8	0
7:30 AM	0	0	0	0	0	1	0	1	0	0	6	0	0	0	7	1
7:45 AM	0	0	0	0	0	2	0	0	0	0	5	0	0	0	6	0
8:00 AM	0	0	0	0	0	1	0	0	0	1	6	0	0	0	7	1
8:15 AM	0	0	0	0	0	2	0	1	0	1	5	0	0	0	6	1
8:30 AM	0	0	0	0	0	1	0	0	0	0	5	0	0	0	7	0
8:45 AM	0	0	0	0	0	1	0	0	0	0	4	0	0	0	7	0

Start Time	Northbound				Cherry Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	0	0	1	0	0	0	1	3	0	0	0	4	0
4:15 PM	0	0	0	0	0	0	0	1	0	0	3	0	0	0	3	0
4:30 PM	0	0	0	0	0	0	0	0	0	1	4	0	0	0	4	0
4:45 PM	0	0	0	0	0	1	0	0	0	0	3	0	0	0	3	1
5:00 PM	0	0	0	0	0	1	0	0	0	1	2	0	0	0	3	0
5:15 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	5	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	3	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0

AM PEAK HOUR 7:30 AM to 8:30 AM PHF	Northbound				Cherry Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	0	0	0	0	6	0	2	0	2	22	0	0	0	26	3
	0.00				0.67				0.86				0.91			

PM PEAK HOUR 4:00 PM to 5:00 PM PHF	Northbound				Cherry Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	0	0	0	0	2	0	1	0	2	13	0	0	0	14	1
	0.00				0.75				0.75				0.94			

Client: Matthew Duranleau  
 Project #: 358\_064\_VHB  
 BTM #: Location 8  
 Location: West Newton, MA  
 Street 1: Washington Street  
 Street 2: Cherry Street  
 Count Date: 4/11/2019  
 Day of Week: Thursday  
 Weather: Partly Sunny, 50°F



**PEDESTRIANS & BICYCLES**

Start Time	Northbound				Cherry Street Southbound				Washington Street Eastbound				Washington Street Westbound				
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	
7:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	3
7:15 AM	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	8
7:30 AM	0	0	0	0	0	0	0	1	0	2	0	0	0	0	1	0	4
7:45 AM	0	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	2
8:00 AM	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	0	2
8:15 AM	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	1
8:30 AM	0	0	0	0	0	0	0	4	0	0	0	0	0	0	1	0	0
8:45 AM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1

Start Time	Northbound				Cherry Street Southbound				Washington Street Eastbound				Washington Street Westbound				
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	
4:00 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	1
4:15 PM	0	0	0	0	0	0	0	3	0	1	0	0	0	0	1	0	2
4:30 PM	0	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	1	0	1
5:00 PM	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	3
5:15 PM	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	1	1
5:30 PM	0	0	0	0	0	0	0	4	0	1	0	0	0	0	1	0	1
5:45 PM	0	0	0	0	0	0	0	2	0	1	0	0	0	0	0	0	2

AM PEAK HOUR <sup>1</sup> 7:30 AM to 8:30 AM	Northbound				Cherry Street Southbound				Washington Street Eastbound				Washington Street Westbound				
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	
	0	0	0	0	0	0	0	1	7	0	4	0	0	0	2	0	9

PM PEAK HOUR <sup>1</sup> 4:30 PM to 5:30 PM	Northbound				Cherry Street Southbound				Washington Street Eastbound				Washington Street Westbound				
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	
	0	0	0	0	0	0	0	13	0	1	0	0	0	0	1	1	5

<sup>1</sup> Peak hours corresponds to vehicular peak hours.

Client: Matthew Duranleau  
 Project #: 358\_064\_VHB  
 BTD #: Location 9  
 Location: West Newton, MA  
 Street 1: Washington Street  
 Street 2: Highland Street  
 Count Date: 4/11/2019  
 Day of Week: Thursday  
 Weather: Partly Sunny, 50°F



**PASSENGER CARS & HEAVY VEHICLES COMBINED**

Start Time	Highland Street Northbound				Highland Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	21	0	7	0	0	0	0	0	0	108	65	0	15	105	0
7:15 AM	0	26	0	12	0	0	0	0	0	0	127	63	0	21	127	0
7:30 AM	0	32	0	15	0	0	0	0	0	0	159	61	0	27	151	0
7:45 AM	0	35	0	17	0	0	0	0	0	0	169	60	0	34	150	0
8:00 AM	0	44	0	21	0	0	0	0	0	0	163	58	1	38	149	0
8:15 AM	0	40	0	19	0	0	0	0	0	0	166	62	0	36	155	0
8:30 AM	0	37	0	18	0	0	0	0	0	0	168	59	0	34	139	0
8:45 AM	0	34	0	16	0	0	0	0	0	0	186	57	0	32	138	0

Start Time	Highland Street Northbound				Highland Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	43	0	8	0	0	0	0	0	0	142	44	0	32	171	0
4:15 PM	0	48	0	7	0	0	0	0	0	0	146	47	0	31	156	0
4:30 PM	0	55	0	7	0	0	0	0	0	0	135	46	0	30	172	0
4:45 PM	0	60	0	8	0	0	0	0	0	0	137	45	0	28	169	0
5:00 PM	0	64	0	6	0	0	0	0	0	0	162	49	0	26	164	0
5:15 PM	0	62	0	7	0	0	0	0	0	0	156	51	0	29	147	0
5:30 PM	0	61	0	7	0	0	0	0	0	0	172	47	0	24	133	0
5:45 PM	0	58	0	6	0	0	0	0	0	0	185	45	0	25	128	0

AM PEAK HOUR 7:45 AM to 8:45 AM	Highland Street Northbound				Highland Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	156	0	75	0	0	0	0	0	0	666	239	1	142	593	0
<b>PHF</b>	<b>0.89</b>				<b>0.00</b>				<b>0.99</b>				<b>0.96</b>			
<b>HV %</b>	<b>0.0%</b>	<b>1.3%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>3.9%</b>	<b>0.4%</b>	<b>0.0%</b>	<b>0.7%</b>	<b>4.6%</b>	<b>0.0%</b>

PM PEAK HOUR 4:30 PM to 5:30 PM	Highland Street Northbound				Highland Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	241	0	28	0	0	0	0	0	0	590	191	0	113	652	0
<b>PHF</b>	<b>0.96</b>				<b>0.00</b>				<b>0.93</b>				<b>0.95</b>			
<b>HV %</b>	<b>0.0%</b>	<b>0.8%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>2.0%</b>	<b>0.5%</b>	<b>0.0%</b>	<b>0.9%</b>	<b>2.1%</b>	<b>0.0%</b>

Client: Matthew Duranleau  
 Project #: 358\_064\_VHB  
 BTD #: Location 9  
 Location: West Newton, MA  
 Street 1: Washington Street  
 Street 2: Highland Street  
 Count Date: 4/11/2019  
 Day of Week: Thursday  
 Weather: Partly Sunny, 50°F

# BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701  
 Office: 978-746-1259  
 DataRequest@BostonTrafficData.com  
 www.BostonTrafficData.com

## HEAVY VEHICLES

Start Time	Highland Street Northbound				Highland Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	0	0	0	0	0	0	0	6	0	0	0	7	0
7:15 AM	0	1	0	0	0	0	0	0	0	0	5	1	0	0	7	0
7:30 AM	0	0	0	0	0	0	0	0	0	0	7	0	0	1	8	0
7:45 AM	0	0	0	0	0	0	0	0	0	0	7	0	0	0	7	0
8:00 AM	0	1	0	0	0	0	0	0	0	0	6	1	0	1	7	0
8:15 AM	0	1	0	0	0	0	0	0	0	0	7	0	0	0	6	0
8:30 AM	0	0	0	0	0	0	0	0	0	0	6	0	0	0	7	0
8:45 AM	0	0	0	0	0	0	0	0	0	0	5	0	0	0	7	0

Start Time	Highland Street Northbound				Highland Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0
4:30 PM	0	1	0	0	0	0	0	0	0	0	4	0	0	0	3	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	3	1	0	0	4	0
5:00 PM	0	0	0	0	0	0	0	0	0	0	3	0	0	1	3	0
5:15 PM	0	1	0	0	0	0	0	0	0	0	2	0	0	0	4	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	0	3	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	0

AM PEAK HOUR 7:15 AM to 8:15 AM <i>PHF</i>	Highland Street Northbound				Highland Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	2	0	0	0	0	0	0	0	0	25	2	0	2	29	0
	<b>0.50</b>				<b>0.00</b>				<b>0.96</b>				<b>0.86</b>			

PM PEAK HOUR 4:00 PM to 5:00 PM <i>PHF</i>	Highland Street Northbound				Highland Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	1	0	0	0	0	0	0	0	0	14	1	0	0	14	0
	<b>0.25</b>				<b>0.00</b>				<b>0.94</b>				<b>0.88</b>			



Client: Matthew Duranleau  
 Project #: 358\_064\_VHB  
 BTM #: Location 9  
 Location: West Newton, MA  
 Street 1: Washington Street  
 Street 2: Highland Street  
 Count Date: 4/11/2019  
 Day of Week: Thursday  
 Weather: Partly Sunny, 50°F



**PEDESTRIANS & BICYCLES**

Start Time	Highland Street Northbound				Southbound				Washington Street Eastbound				Washington Street Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
7:00 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
7:15 AM	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0	2
7:30 AM	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	1
7:45 AM	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	2
8:00 AM	1	0	0	1	0	0	0	0	0	0	0	0	1	0	1	3
8:15 AM	0	0	0	3	0	0	0	0	0	0	1	0	0	0	0	2
8:30 AM	1	0	0	2	0	0	0	0	0	0	0	0	0	1	0	1
8:45 AM	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	2

Start Time	Highland Street Northbound				Southbound				Washington Street Eastbound				Washington Street Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
4:00 PM	0	0	0	2	0	0	0	0	0	0	0	0	1	0	0	2
4:15 PM	0	0	0	2	0	0	0	0	0	0	1	0	0	0	1	1
4:30 PM	1	0	0	3	0	0	0	0	0	0	0	0	0	0	0	2
4:45 PM	0	0	0	2	0	0	0	0	0	0	0	0	1	0	1	3
5:00 PM	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	2
5:15 PM	1	0	0	4	0	0	0	0	0	0	0	0	1	0	0	1
5:30 PM	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	2
5:45 PM	0	0	0	2	0	0	0	0	0	0	2	0	0	0	0	1

AM PEAK HOUR <sup>1</sup> 7:45 AM to 8:45 AM	Highland Street Northbound				Southbound				Washington Street Eastbound				Washington Street Westbound				
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	
	2	0	0	8	0	0	0	0	0	0	3	0	2	0	1	0	8

PM PEAK HOUR <sup>1</sup> 4:30 PM to 5:30 PM	Highland Street Northbound				Southbound				Washington Street Eastbound				Washington Street Westbound				
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	
	2	0	0	10	0	0	0	0	0	0	1	0	2	0	2	0	8

<sup>1</sup> Peak hours corresponds to vehicular peak hours.

Client: Matthew Duranleau  
 Project #: 358\_064\_VHB  
 BTD #: Location 10  
 Location: West Newton, MA  
 Street 1: Washington Street  
 Street 2: Watertown Street & Waltham Street  
 Count Date: 4/11/2019  
 Day of Week: Thursday  
 Weather: Partly Sunny, 50°F



**PASSENGER CARS & HEAVY VEHICLES COMBINED**

Start Time	Watertown Street Southwestbound				Waltham Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Soft Left	Thru	Right	U-Turn	Thru	Right	Hard Right
7:00 AM	0	0	39	6	0	0	0	50	0	51	64	0	0	31	27	3
7:15 AM	0	0	62	7	0	0	0	54	0	73	66	0	0	32	29	6
7:30 AM	0	0	75	8	0	0	0	51	0	72	102	0	0	52	35	5
7:45 AM	0	0	60	11	0	0	0	55	0	84	102	0	0	69	37	6
8:00 AM	0	0	64	13	0	0	0	52	0	75	109	0	0	71	43	4
8:15 AM	0	0	62	14	0	0	0	51	0	81	104	0	0	78	47	5
8:30 AM	0	0	64	15	0	0	0	56	0	69	117	0	0	53	45	4
8:45 AM	0	0	54	12	0	0	0	53	0	86	116	0	0	63	49	5

Start Time	Watertown Street Southwestbound				Waltham Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Soft Left	Thru	Right	U-Turn	Thru	Right	Hard Right
4:00 PM	0	0	70	17	0	0	0	50	0	82	68	0	0	83	31	5
4:15 PM	0	0	71	15	0	0	0	53	0	89	64	0	0	63	30	5
4:30 PM	0	0	75	18	0	0	0	51	0	75	67	0	0	76	32	6
4:45 PM	0	0	77	17	0	0	0	47	0	90	55	0	0	73	36	7
5:00 PM	0	0	79	16	0	0	0	49	0	87	81	0	0	62	39	8
5:15 PM	0	0	78	15	0	0	0	45	0	72	91	0	0	53	44	5
5:30 PM	0	0	67	12	0	0	0	47	0	75	104	0	0	43	42	6
5:45 PM	0	0	65	13	0	0	0	44	0	79	112	0	0	44	38	7

AM PEAK HOUR 8:00 AM to 9:00 AM	Watertown Street Southwestbound				Waltham Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Soft Left	Thru	Right	U-Turn	Thru	Right	Hard Right
	0	0	244	54	0	0	0	212	0	311	446	0	0	265	184	18
<b>PHF</b>	0.94				0.95				0.94				0.90			
<b>HV %</b>	0.0%	0.0%	3.7%	0.0%	0.0%	0.0%	0.0%	3.3%	0.0%	3.2%	3.1%	0.0%	0.0%	5.3%	0.5%	0.0%

PM PEAK HOUR 4:30 PM to 5:30 PM	Watertown Street Southwestbound				Waltham Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Soft Left	Thru	Right	U-Turn	Thru	Right	Hard Right
	0	0	309	66	0	0	0	192	0	324	294	0	0	264	151	26
<b>PHF</b>	0.99				0.94				0.92				0.95			
<b>HV %</b>	0.0%	0.0%	1.9%	1.5%	0.0%	0.0%	0.0%	2.1%	0.0%	1.9%	2.0%	0.0%	0.0%	1.9%	0.7%	0.0%

Client: Matthew Duranleau  
 Project #: 358\_064\_VHB  
 BTD #: Location 10  
 Location: West Newton, MA  
 Street 1: Washington Street  
 Street 2: Watertown Street & Waltham Street  
 Count Date: 4/11/2019  
 Day of Week: Thursday  
 Weather: Partly Sunny, 50°F

# BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701  
 Office: 978-746-1259  
 DataRequest@BostonTrafficData.com  
 www.BostonTrafficData.com

## HEAVY VEHICLES

Start Time	Watertown Street Southwestbound				Waltham Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Soft Left	Thru	Right	U-Turn	Thru	Right	Hard Right
7:00 AM	0	0	2	0	0	0	0	1	0	2	4	0	0	4	0	0
7:15 AM	0	0	2	0	0	0	0	1	0	2	3	0	0	4	0	0
7:30 AM	0	0	2	0	0	0	0	2	0	3	4	0	0	5	1	0
7:45 AM	0	0	3	1	0	0	0	1	0	4	4	0	0	4	1	0
8:00 AM	0	0	2	0	0	0	0	2	0	3	3	0	0	4	0	0
8:15 AM	0	0	3	0	0	0	0	1	0	3	4	0	0	3	1	0
8:30 AM	0	0	2	0	0	0	0	2	0	2	4	0	0	3	0	0
8:45 AM	0	0	2	0	0	0	0	2	0	2	3	0	0	4	0	0

Start Time	Watertown Street Southwestbound				Waltham Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Soft Left	Thru	Right	U-Turn	Thru	Right	Hard Right
4:00 PM	0	0	2	0	0	0	0	0	0	3	2	0	0	2	0	0
4:15 PM	0	0	1	0	0	0	0	1	0	2	1	0	0	1	1	0
4:30 PM	0	0	1	1	0	0	0	1	0	1	2	0	0	1	0	0
4:45 PM	0	0	2	0	0	0	0	0	0	2	1	0	0	2	0	0
5:00 PM	0	0	2	0	0	0	0	1	0	1	2	0	0	1	0	0
5:15 PM	0	0	1	0	0	0	0	2	0	2	1	0	0	1	1	0
5:30 PM	0	0	2	0	0	0	0	0	0	1	1	0	0	1	0	0
5:45 PM	0	0	1	0	0	0	0	1	0	2	1	0	0	2	0	0

AM PEAK HOUR 7:30 AM to 8:30 AM PHF	Watertown Street Southwestbound				Waltham Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Soft Left	Thru	Right	U-Turn	Thru	Right	Hard Right
	0	0	10	1	0	0	0	6	0	13	15	0	0	16	3	0
	0.69				0.75				0.88				0.79			

PM PEAK HOUR 4:00 PM to 5:00 PM PHF	Watertown Street Southwestbound				Waltham Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Soft Left	Thru	Right	U-Turn	Thru	Right	Hard Right
	0	0	6	1	0	0	0	2	0	8	6	0	0	6	1	0
	0.88				0.50				0.70				0.88			

Client: Matthew Duranleau  
 Project #: 358\_064\_VHB  
 BTM #: Location 10  
 Location: West Newton, MA  
 Street 1: Washington Street  
 Street 2: Watertown Street & Waltham Street  
 Count Date: 4/11/2019  
 Day of Week: Thursday  
 Weather: Partly Sunny, 50°F



**PEDESTRIANS & BICYCLES**

Start Time	Watertown Street Southwestbound				Waltham Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Soft Left	Thru	Right	PED	Thru	Right	Hard Right	PED
7:00 AM	0	0	0	2	0	0	1	1	1	0	0	1	0	0	0	1
7:15 AM	0	1	0	1	0	0	1	0	0	1	0	0	0	0	0	0
7:30 AM	0	0	0	1	0	0	0	1	0	2	0	1	1	0	0	0
7:45 AM	0	1	0	2	0	0	0	2	1	1	0	2	0	0	0	1
8:00 AM	0	0	1	4	0	0	0	0	0	0	0	1	0	0	0	0
8:15 AM	0	1	0	3	0	0	1	1	2	1	0	3	1	0	0	0
8:30 AM	0	0	0	1	0	0	0	2	1	0	0	1	0	0	0	1
8:45 AM	0	1	0	2	0	0	0	2	0	0	0	2	1	0	0	0

Start Time	Watertown Street Southwestbound				Waltham Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Soft Left	Thru	Right	PED	Thru	Right	Hard Right	PED
4:00 PM	0	1	0	12	0	0	0	2	1	0	0	1	0	1	0	1
4:15 PM	0	0	0	7	0	0	0	3	1	0	0	1	1	0	0	1
4:30 PM	0	1	0	9	0	0	1	1	2	1	0	2	1	0	0	0
4:45 PM	0	0	0	6	0	0	1	2	0	0	0	2	0	0	0	0
5:00 PM	0	1	0	8	0	0	0	4	1	1	0	3	1	0	0	1
5:15 PM	0	0	0	5	0	0	1	3	1	0	0	2	0	0	0	0
5:30 PM	0	1	0	6	0	0	0	2	0	0	0	1	1	0	0	1
5:45 PM	0	1	0	6	0	0	0	3	1	2	0	2	0	0	0	0

AM PEAK HOUR <sup>1</sup> 8:00 AM to 9:00 AM	Watertown Street Southwestbound				Waltham Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Soft Left	Thru	Right	PED	Thru	Right	Hard Right	PED
	0	2	1	10	0	0	1	5	3	1	0	7	2	0	0	1

PM PEAK HOUR <sup>1</sup> 4:30 PM to 5:30 PM	Watertown Street Southwestbound				Waltham Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Soft Left	Thru	Right	PED	Thru	Right	Hard Right	PED
	0	2	0	28	0	0	3	10	4	2	0	9	2	0	0	1

<sup>1</sup> Peak hours corresponds to vehicular peak hours.

Client: Matthew Duranleau  
 Project #: 358\_064\_VHB  
 BTD #: Location 11  
 Location: West Newton, MA  
 Street 1: Washington Street  
 Street 2: Chestnut Street  
 Count Date: 4/11/2019  
 Day of Week: Thursday  
 Weather: Partly Sunny, 50°F



**PASSENGER CARS & HEAVY VEHICLES COMBINED**

Start Time	Chestnut Street Northbound				Chestnut Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	15	0	32	0	0	0	0	0	0	55	9	0	21	46	0
7:15 AM	0	26	0	49	0	0	0	0	0	0	56	10	0	32	41	0
7:30 AM	0	38	0	71	0	0	0	0	0	0	92	10	0	43	54	0
7:45 AM	0	36	0	65	0	0	0	0	0	0	90	12	0	41	76	0
8:00 AM	0	34	0	62	0	0	0	0	0	0	96	13	0	42	84	0
8:15 AM	0	35	0	58	0	0	0	0	0	0	89	15	0	40	95	0
8:30 AM	0	32	0	55	0	0	0	0	0	0	101	16	0	41	70	0
8:45 AM	0	31	0	59	0	0	0	0	0	0	103	13	0	39	86	0

Start Time	Chestnut Street Northbound				Chestnut Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	21	0	33	0	0	0	0	0	0	57	11	0	50	98	0
4:15 PM	0	23	0	37	0	0	0	0	0	0	54	10	0	48	75	0
4:30 PM	0	22	0	45	0	0	0	0	0	0	58	9	0	47	92	0
4:45 PM	0	25	0	52	0	0	0	0	0	0	45	10	0	46	91	0
5:00 PM	0	24	0	61	0	0	0	0	0	0	73	8	0	49	85	0
5:15 PM	0	26	0	58	0	0	0	0	0	0	82	9	0	47	76	0
5:30 PM	0	23	0	56	0	0	0	0	0	0	96	8	0	46	68	0
5:45 PM	0	22	0	60	0	0	0	0	0	0	105	7	0	43	67	0

AM PEAK HOUR 8:00 AM to 9:00 AM	Chestnut Street Northbound				Chestnut Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	132	0	234	0	0	0	0	0	0	389	57	0	162	335	0
<i>PHF</i>	0.95				0.00				0.95				0.92			
<i>HV %</i>	0.0%	1.5%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	3.6%	0.0%	0.0%	0.6%	4.5%	0.0%

PM PEAK HOUR 5:00 PM to 6:00 PM	Chestnut Street Northbound				Chestnut Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	95	0	235	0	0	0	0	0	0	356	32	0	185	296	0
<i>PHF</i>	0.97				0.00				0.87				0.90			
<i>HV %</i>	0.0%	1.1%	0.0%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	0.0%	0.0%	0.5%	2.0%	0.0%

Client: Matthew Duranleau  
 Project #: 358\_064\_VHB  
 BTD #: Location 11  
 Location: West Newton, MA  
 Street 1: Washington Street  
 Street 2: Chestnut Street  
 Count Date: 4/11/2019  
 Day of Week: Thursday  
 Weather: Partly Sunny, 50°F

# BOSTON TRAFFIC DATA

PO BOX 1723, Framingham, MA 01701  
 Office: 978-746-1259  
 DataRequest@BostonTrafficData.com  
 www.BostonTrafficData.com

## HEAVY VEHICLES

Start Time	Chestnut Street Northbound				Chestnut Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
7:00 AM	0	0	0	0	0	0	0	0	0	0	4	0	0	1	4	0
7:15 AM	0	0	0	0	0	0	0	0	0	0	3	0	0	0	4	0
7:30 AM	0	1	0	0	0	0	0	0	0	0	4	0	0	0	5	0
7:45 AM	0	0	0	1	0	0	0	0	0	0	5	0	0	1	4	0
8:00 AM	0	1	0	0	0	0	0	0	0	0	4	0	0	0	5	0
8:15 AM	0	0	0	0	0	0	0	0	0	0	3	0	0	1	3	0
8:30 AM	0	0	0	1	0	0	0	0	0	0	4	0	0	0	4	0
8:45 AM	0	1	0	0	0	0	0	0	0	0	3	0	0	0	3	0

Start Time	Chestnut Street Northbound				Chestnut Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
4:00 PM	0	0	0	1	0	0	0	0	0	0	2	0	0	0	2	0
4:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
4:30 PM	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0
4:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1	0
5:00 PM	0	0	0	1	0	0	0	0	0	0	2	0	0	0	2	0
5:15 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0
5:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
5:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	2	0

AM PEAK HOUR 7:15 AM to 8:15 AM PHF	Chestnut Street Northbound				Chestnut Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	2	0	1	0	0	0	0	0	0	16	0	0	1	18	0
	0.75				0.00				0.80				0.95			

PM PEAK HOUR 4:30 PM to 5:30 PM PHF	Chestnut Street Northbound				Chestnut Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right
	0	2	0	1	0	0	0	0	0	0	4	0	0	2	5	0
	0.75				0.00				0.50				0.88			

Client: Matthew Duranleau  
 Project #: 358\_064\_VHB  
 BTM #: Location 11  
 Location: West Newton, MA  
 Street 1: Washington Street  
 Street 2: Chestnut Street  
 Count Date: 4/11/2019  
 Day of Week: Thursday  
 Weather: Partly Sunny, 50°F



**PEDESTRIANS & BICYCLES**

Start Time	Chestnut Street Northbound				Chestnut Street Southbound				Washington Street Eastbound				Washington Street Westbound				
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	
7:00 AM	0	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0
7:15 AM	0	0	0	3	0	0	0	0	0	1	0	1	0	0	0	0	0
7:30 AM	0	0	0	4	0	0	0	0	0	2	0	1	0	1	0	0	0
7:45 AM	0	0	0	3	0	0	0	0	0	1	0	2	0	0	0	0	0
8:00 AM	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	0	0	0	3	0	0	0	0	0	1	0	1	0	0	0	0	0
8:30 AM	0	0	0	2	0	0	0	0	0	0	0	1	0	1	0	0	0
8:45 AM	0	0	0	2	0	0	0	0	0	0	0	0	0	1	0	0	0

Start Time	Chestnut Street Northbound				Chestnut Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
4:00 PM	0	0	0	2	0	0	0	0	0	0	0	3	0	1	0	0
4:15 PM	0	0	0	1	0	0	0	0	0	0	0	1	0	1	0	0
4:30 PM	0	0	0	3	0	0	0	0	0	1	0	1	0	1	0	0
4:45 PM	0	0	0	2	0	0	0	0	0	0	0	2	0	0	0	0
5:00 PM	0	0	0	5	0	0	0	0	0	1	0	2	0	0	0	0
5:15 PM	0	0	0	4	0	0	0	0	0	0	0	3	0	0	0	0
5:30 PM	0	0	0	2	0	0	0	0	0	0	0	1	0	1	0	0
5:45 PM	0	0	0	1	0	0	0	0	0	2	0	2	0	0	0	0

AM PEAK HOUR <sup>1</sup> 8:00 AM to 9:00 AM	Chestnut Street Northbound				Chestnut Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
	0	0	0	11	0	0	0	0	0	1	0	2	0	2	0	0

PM PEAK HOUR <sup>1</sup> 5:00 PM to 6:00 PM	Chestnut Street Northbound				Chestnut Street Southbound				Washington Street Eastbound				Washington Street Westbound			
	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED	Left	Thru	Right	PED
	0	0	0	12	0	0	0	0	0	3	0	8	0	1	0	0

<sup>1</sup> Peak hours corresponds to vehicular peak hours.

Response to Comments  
Ref: 15636.00  
September 22, 2022



## Revised Synchro Capacity Analyses



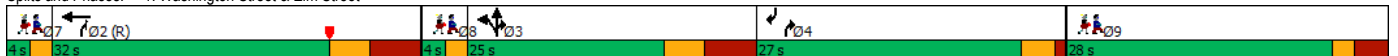


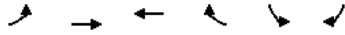
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø7	Ø8	Ø9
Lane Configurations					↕↕			↕	↕			↕			
Traffic Volume (vph)	0	0	0	0	635	50	40	260	810	0	0	235			
Future Volume (vph)	0	0	0	0	635	50	40	260	810	0	0	235			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Satd. Flow (prot)	0	0	0	0	3454	0	0	1847	1583	0	0	1611			
Fit Permitted								0.993							
Satd. Flow (perm)	0	0	0	0	3454	0	0	1844	1583	0	0	1611			
Right Turn on Red			Yes			Yes	Yes		No			Yes			
Satd. Flow (RTOR)					6			164				620			
Link Speed (mph)		30			30			30			30				
Link Distance (ft)		100			336			433			533				
Travel Time (s)		2.3			7.6			9.8			12.1				
Confl. Peds. (#/hr)						17	4								
Confl. Bikes (#/hr)						4									
Peak Hour Factor	0.92	0.92	0.92	0.84	0.84	0.84	0.93	0.93	0.93	0.88	0.88	0.88			
Heavy Vehicles (%)	0%	0%	0%	0%	2%	7%	3%	2%	2%	0%	0%	2%			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	0	0	0	816	0	0	323	871	0	0	267			
Turn Type					NA		Split	NA	custom			Prot			
Protected Phases					2		3	3	2 3 4			4	7	8	9
Permitted Phases															
Detector Phase					2		3	3	2 3 4			4			
Switch Phase															
Minimum Initial (s)					6.0		6.0	6.0			6.0	2.0	2.0	5.0	
Minimum Split (s)					17.5		19.5	19.5			10.0	4.0	4.0	27.0	
Total Split (s)					32.0		25.0	25.0			27.0	4.0	4.0	28.0	
Total Split (%)					26.7%		20.8%	20.8%			22.5%	3%	3%	23%	
Yellow Time (s)					3.5		3.5	3.5			3.0	2.0	2.0	2.0	
All-Red Time (s)					4.5		4.5	4.5			1.0	0.0	0.0	3.0	
Lost Time Adjust (s)					0.0		0.0	0.0			0.0				
Total Lost Time (s)					8.0		8.0	8.0			4.0				
Lead/Lag					Lag		Lag	Lag					Lead	Lead	
Lead-Lag Optimize?															
Recall Mode					C-Min		None	None			None	Min	Min	None	
Act Effct Green (s)					43.6		17.0	87.6			23.0				
Actuated g/C Ratio					0.36		0.14	0.73			0.19				
v/c Ratio					0.65		0.80	0.75			0.33				
Control Delay					32.5		40.3	14.1			1.1				
Queue Delay					2.9		0.0	51.5			0.0				
Total Delay					35.4		40.3	65.7			1.1				
LOS					D		D	E			A				
Approach Delay					35.4		58.8				1.1				
Approach LOS					D		E				A				
Queue Length 50th (ft)					250		122	128			0				
Queue Length 95th (ft)					#456		#264	#926			0				
Internal Link Dist (ft)		20			256		353			453					
Turn Bay Length (ft)															
Base Capacity (vph)					1258		402	1155			809				
Starvation Cap Reductn					321		0	0			0				
Spillback Cap Reductn					0		0	521			0				
Storage Cap Reductn					0		0	0			0				
Reduced v/c Ratio					0.87		0.80	1.37			0.33				

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 5 (4%), Referenced to phase 2:WBT, Start of Yellow  
 Natural Cycle: 115  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.80  
 Intersection Signal Delay: 43.7  
 Intersection Capacity Utilization 66.4%  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Washington Street & Elm Street





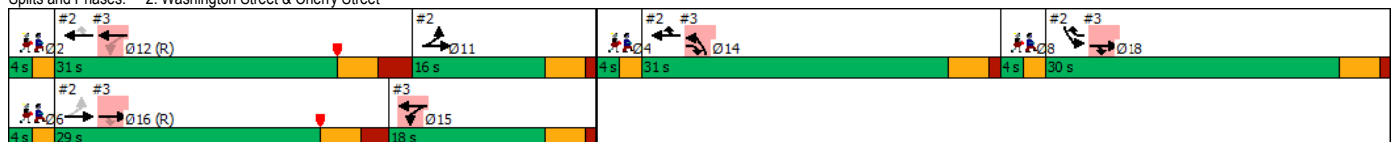
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø2	Ø4	Ø6	Ø8	Ø12	Ø14	Ø15	Ø16
Lane Configurations	↖	↗	↖	↗	↖	↗								
Traffic Volume (vph)	170	640	585	235	350	100								
Future Volume (vph)	170	640	585	235	350	100								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900								
Storage Length (ft)	200				0	100								
Storage Lanes	1			1	1	0								
Taper Length (ft)	25				25									
Satd. Flow (prot)	1787	1863	1845	1599	3365	0								
Flt Permitted	0.174				0.963									
Satd. Flow (perm)	327	1863	1845	1519	3365	0								
Right Turn on Red				Yes		Yes								
Satd. Flow (RTOR)				247	29									
Link Speed (mph)		30	30		30									
Link Distance (ft)		336	185		438									
Travel Time (s)		7.6	4.2		10.0									
Confl. Peds. (#/hr)				7		18								
Confl. Bikes (#/hr)				3										
Peak Hour Factor	0.85	0.85	0.95	0.95	0.92	0.92								
Heavy Vehicles (%)	1%	2%	3%	1%	0%	0%								
Shared Lane Traffic (%)														
Lane Group Flow (vph)	200	753	616	247	489	0								
Turn Type	custom	NA	NA	custom	Prot									
Protected Phases	11	11 16	12 14	14 18	18		2	4	6	8	12	14	15	16
Permitted Phases	16			12										
Detector Phase	11	11 16	12 14	14 18	18									
Switch Phase														
Minimum Initial (s)	8.0				8.0		2.0	2.0	2.0	2.0	8.0	8.0	8.0	8.0
Minimum Split (s)	12.5				20.0		4.0	4.0	4.0	4.0	15.0	19.0	12.5	16.5
Total Split (s)	16.0				30.0		4.0	4.0	4.0	4.0	31.0	31.0	18.0	29.0
Total Split (%)	13.3%				25.0%		3%	3%	3%	3%	26%	26%	15%	24%
Yellow Time (s)	3.5				3.5		2.0	2.0	2.0	2.0	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0				1.0		0.0	0.0	0.0	0.0	3.0	1.0	1.0	2.5
Lost Time Adjust (s)	0.0				0.0									
Total Lost Time (s)	4.5				4.5									
Lead/Lag					Lag		Lead	Lead	Lead	Lead	Lag	Lag		Lag
Lead-Lag Optimize?														
Recall Mode	None				None		Min	Min	Min	Min	C-Min	None	None	C-Min
Act Effct Green (s)	36.0	36.0	48.4	77.9	25.5									
Actuated g/C Ratio	0.30	0.30	0.40	0.65	0.21									
v/c Ratio	0.84	1.35	0.83	0.22	0.66									
Control Delay	71.5	199.9	11.2	1.7	45.7									
Queue Delay	0.0	0.9	51.0	0.8	1.8									
Total Delay	71.5	200.8	62.2	2.4	47.5									
LOS	E	F	E	A	D									
Approach Delay		173.7	45.1		47.5									
Approach LOS		F	D		D									
Queue Length 50th (ft)	116	~620	189	16	170									
Queue Length 95th (ft)	m#191	#763	m163	m14	228									
Internal Link Dist (ft)		256	105		358									
Turn Bay Length (ft)	200				100									
Base Capacity (vph)	238	558	753	1113	737									
Starvation Cap Reductn	0	22	209	585	0									
Spillback Cap Reductn	0	60	88	0	120									
Storage Cap Reductn	0	0	0	0	0									
Reduced v/c Ratio	0.84	1.51	1.13	0.47	0.79									

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 12:WBT and 16:EBTL, Start of Yellow  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.35  
 Intersection Signal Delay: 98.8  
 Intersection LOS: F  
 Intersection Capacity Utilization 66.6%  
 ICU Level of Service C  
 Analysis Period (min) 15

- ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

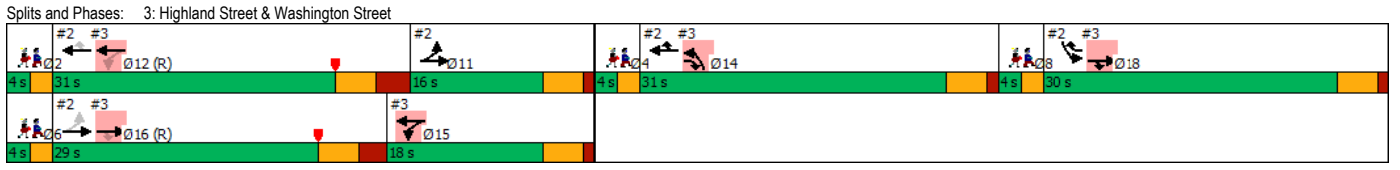
Splits and Phases: 2: Washington Street & Cherry Street



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø2	Ø4	Ø6	Ø8	Ø11	Ø12	Ø16	Ø18
Lane Configurations	↑↑	↑	↓	↑	↓	↓								
Traffic Volume (vph)	785	205	105	580	240	40								
Future Volume (vph)	785	205	105	580	240	40								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900								
Storage Length (ft)		85	0		0	0								
Storage Lanes		1	1		1	0								
Taper Length (ft)			25		25									
Satd. Flow (prot)	3539	1615	1787	1845	1751	0								
Flt Permitted			0.163		0.959									
Satd. Flow (perm)	3539	1511	307	1845	1751	0								
Right Turn on Red		Yes				Yes								
Satd. Flow (RTOR)		181			6									
Link Speed (mph)	30			30	30									
Link Distance (ft)	185			301	145									
Travel Time (s)	4.2			6.8	3.3									
Confl. Peds. (#/hr)		11				6								
Peak Hour Factor	0.87	0.87	0.89	0.89	0.85	0.85								
Heavy Vehicles (%)	2%	0%	1%	3%	2%	0%								
Shared Lane Traffic (%)														
Lane Group Flow (vph)	902	236	118	652	329	0								
Turn Type	NA	custom	custom	NA	Prot									
Protected Phases	16 18	14 18	15	12 15	14		2	4	6	8	11	12	16	18
Permitted Phases		16	12											
Detector Phase	16 18	14 18	15	12 15	14									
Switch Phase														
Minimum Initial (s)			8.0		8.0		2.0	2.0	2.0	2.0	8.0	8.0	8.0	8.0
Minimum Split (s)			12.5		19.0		4.0	4.0	4.0	4.0	12.5	15.0	16.5	20.0
Total Split (s)			18.0		31.0		4.0	4.0	4.0	4.0	16.0	31.0	29.0	30.0
Total Split (%)			15.0%		25.8%		3%	3%	3%	3%	13%	26%	24%	25%
Yellow Time (s)			3.5		3.5		2.0	2.0	2.0	2.0	3.5	3.5	3.5	3.5
All-Red Time (s)			1.0		1.0		0.0	0.0	0.0	0.0	1.0	3.0	2.5	1.0
Lost Time Adjust (s)			0.0		0.0									
Total Lost Time (s)			4.5		4.5									
Lead/Lag					Lag		Lead	Lead	Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?														
Recall Mode			None		None		Min	Min	Min	Min	None	C-Min	C-Min	None
Act Effct Green (s)	47.0	75.9	40.0	36.0	25.9									
Actuated g/C Ratio	0.39	0.63	0.33	0.30	0.22									
v/c Ratio	0.65	0.22	0.44	1.18	0.86									
Control Delay	19.1	2.2	47.0	131.2	66.6									
Queue Delay	9.5	0.7	0.0	0.9	4.2									
Total Delay	28.6	2.9	47.0	132.0	70.8									
LOS	C	A	D	F	E									
Approach Delay	23.3			119.0	70.8									
Approach LOS	C			F	E									
Queue Length 50th (ft)	130	18	63	-473	241									
Queue Length 95th (ft)	m112	m16	m92	#678	#355									
Internal Link Dist (ft)	105			221	65									
Turn Bay Length (ft)		85												
Base Capacity (vph)	1386	1073	268	553	391									
Starvation Cap Reductn	454	552	0	56	0									
Spillback Cap Reductn	387	0	0	48	26									
Storage Cap Reductn	0	0	0	0	0									
Reduced v/c Ratio	0.97	0.45	0.44	1.31	0.90									

**Intersection Summary**  
 Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 12:WBT and 16:EBTL, Start of Yellow  
 Natural Cycle: 100  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.35  
 Intersection Signal Delay: 63.2  
 Intersection Capacity Utilization 56.7%  
 Analysis Period (min) 15  
 Intersection LOS: E  
 ICU Level of Service B

- Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.



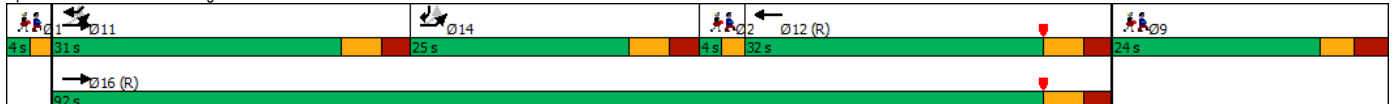


Lane Group	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SWL	SWR	SWR2	Ø1	Ø2	Ø9	Ø16
Lane Configurations		↖	↗	↕	↕	↕		↖		↖	↖				
Traffic Volume (vph)	5	360	460	245	205	5	0	155	0	285	40				
Future Volume (vph)	5	360	460	245	205	5	0	155	0	285	40				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900				
Satd. Flow (prot)	0	1770	1863	3008	0	0	0	1627	0	1615	0				
Fit Permitted		0.994													
Satd. Flow (perm)	0	1852	1863	3008	0	0	0	1627	0	1615	0				
Right Turn on Red						Yes		Yes			No				
Satd. Flow (RTOR)				1				437							
Link Speed (mph)		30	30				30		30						
Link Distance (ft)			301	274			478		461						
Travel Time (s)			6.8	6.2			10.9		10.5						
Confl. Peds. (#/hr)						17					25				
Confl. Bikes (#/hr)					1	1					3				
Peak Hour Factor	0.90	0.90	0.90	0.92	0.92	0.92	0.87	0.87	0.83	0.83	0.83				
Heavy Vehicles (%)	0%	2%	2%	4%	1%	0%	0%	1%	0%	2%	0%				
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	406	511	494	0	0	0	178	0	391	0				
Turn Type	custom	Prot	NA	NA				Prot		Over					
Protected Phases		11 14	11 16	12				14		11		1	2	9	16
Permitted Phases	11 14														
Detector Phase	11 14	11 14	11 16	12				14		11					
Switch Phase															
Minimum Initial (s)				6.0				6.0		6.0		2.0	2.0	5.0	6.0
Minimum Split (s)				12.5				12.0		15.5		4.0	4.0	23.0	12.0
Total Split (s)				32.0				25.0		31.0		4.0	4.0	24.0	92.0
Total Split (%)				26.7%				20.8%		25.8%		3%	3%	20%	77%
Yellow Time (s)				3.5				3.5		3.5		2.0	2.0	3.0	3.5
All-Red Time (s)				2.5				2.5		2.5		0.0	0.0	3.0	2.5
Lost Time Adjust (s)				0.0				0.0		0.0					
Total Lost Time (s)				6.0				6.0		6.0					
Lead/Lag				Lag				Lag		Lead				Lead	
Lead-Lag Optimize?															
Recall Mode				C-Min				None		None		Min	Min	None	C-Min
Act Effct Green (s)		55.0	98.3	30.0				9.4		39.5					
Actuated g/C Ratio		0.46	0.82	0.25				0.08		0.33					
v/c Ratio		0.48	0.33	0.66				0.34		0.73					
Control Delay		49.8	5.8	47.6				1.7		47.8					
Queue Delay		21.8	1.4	54.4				0.7		5.1					
Total Delay		71.6	7.3	102.0				2.4		52.9					
LOS		E	A	F				A		D					
Approach Delay			35.7	102.0			2.4		52.9						
Approach LOS			D	F			A		D						
Queue Length 50th (ft)		322	121	186				0		238					
Queue Length 95th (ft)		m381	m131	258				0		#490					
Internal Link Dist (ft)			221	194			398		381						
Turn Bay Length (ft)															
Base Capacity (vph)		996	1526	752				625		532					
Starvation Cap Reductn		586	787	217				0		0					
Spillback Cap Reductn		0	100	305				221		88					
Storage Cap Reductn		0	0	0				0		0					
Reduced v/c Ratio		0.99	0.69	1.11				0.44		0.88					

**Intersection Summary**

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 113 (94%), Referenced to phase 12:WBT and 16:EBT, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.73  
 Intersection Signal Delay: 52.7 Intersection LOS: D  
 Intersection Capacity Utilization 69.6% ICU Level of Service C  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

**Splits and Phases: 4: Washington Street & Waltham Street & Watertown Street**

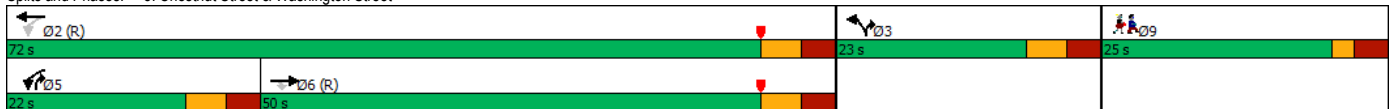


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø9
Lane Configurations	↑	↑	↑	↑	↑	↑	
Traffic Volume (vph)	430	30	235	355	100	180	
Future Volume (vph)	430	30	235	355	100	180	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		35	0		0	150	
Storage Lanes		1	1		1	1	
Taper Length (ft)			25		25		
Satd. Flow (prot)	1863	1615	1805	1845	1787	1599	
Flt Permitted			0.347		0.950		
Satd. Flow (perm)	1863	1615	659	1845	1787	1599	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)		8				191	
Link Speed (mph)	30			30	30		
Link Distance (ft)	274			584	336		
Travel Time (s)	6.2			13.3	7.6		
Peak Hour Factor	0.89	0.89	0.95	0.95	0.94	0.94	
Heavy Vehicles (%)	2%	0%	0%	3%	1%	1%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	483	34	247	374	106	191	
Turn Type	NA	Perm	pm+pt	NA	Prot	pt+ov	
Protected Phases	6		5	2	3	3.5	9
Permitted Phases		6	2				
Detector Phase	6	6	5	2	3	3.5	
Switch Phase							
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		5.0
Minimum Split (s)	12.5	12.5	12.5	12.5	12.5		24.0
Total Split (s)	50.0	50.0	22.0	72.0	23.0		25.0
Total Split (%)	41.7%	41.7%	18.3%	60.0%	19.2%		21%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		2.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0		3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?							
Recall Mode	C-Min	C-Min	None	C-Min	None		None
Act Effct Green (s)	67.2	67.2	85.1	85.1	12.3		27.6
Actuated g/C Ratio	0.56	0.56	0.71	0.71	0.10		0.23
v/c Ratio	0.46	0.04	0.43	0.29	0.58		0.37
Control Delay	14.6	9.0	11.0	9.7	63.6		4.7
Queue Delay	1.4	0.0	0.0	0.1	0.0		0.0
Total Delay	15.9	9.0	11.0	9.8	63.6		4.7
LOS	B	A	B	A	E		A
Approach Delay	15.5			10.3	25.7		
Approach LOS	B			B	C		
Queue Length 50th (ft)	141	3	39	63	79		0
Queue Length 95th (ft)	460	17	143	222	135		35
Internal Link Dist (ft)	194			504	256		
Turn Bay Length (ft)		35					150
Base Capacity (vph)	1043	908	617	1308	245		563
Starvation Cap Reductn	354	0	0	0	0		0
Spillback Cap Reductn	0	0	0	200	0		0
Storage Cap Reductn	0	0	0	0	0		0
Reduced v/c Ratio	0.70	0.04	0.40	0.34	0.43		0.34

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 7 (6%), Referenced to phase 2:WBT and 6:EBT, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.58  
 Intersection Signal Delay: 15.4 Intersection LOS: B  
 Intersection Capacity Utilization 57.4% ICU Level of Service B  
 Analysis Period (min) 15

Splits and Phases: 5: Chestnut Street & Washington Street



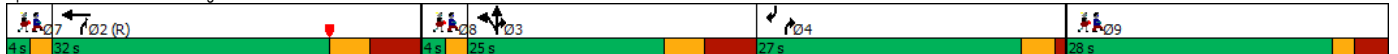


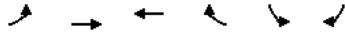
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø7	Ø8	Ø9
Lane Configurations					↕↔			↕↔	↕↔			↕↔			
Traffic Volume (vph)	0	0	0	0	705	55	40	275	905	0	0	250			
Future Volume (vph)	0	0	0	0	705	55	40	275	905	0	0	250			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Satd. Flow (prot)	0	0	0	0	3454	0	0	1849	1583	0	0	1611			
Fit Permitted								0.994							
Satd. Flow (perm)	0	0	0	0	3454	0	0	1846	1583	0	0	1611			
Right Turn on Red				Yes		Yes	Yes		No			Yes			
Satd. Flow (RTOR)					6			164				620			
Link Speed (mph)		30			30			30			30				
Link Distance (ft)		100			336			433			533				
Travel Time (s)		2.3			7.6			9.8			12.1				
Confl. Peds. (#/hr)						17	4								
Confl. Bikes (#/hr)						4									
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Heavy Vehicles (%)	0%	0%	0%	0%	2%	7%	3%	2%	2%	0%	0%	2%			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	0	0	0	826	0	0	342	984	0	0	272			
Turn Type					NA		Split	NA	custom			Prot			
Protected Phases					2		3	3	2 3 4			4	7	8	9
Permitted Phases															
Detector Phase					2		3	3	2 3 4			4			
Switch Phase															
Minimum Initial (s)					6.0		6.0	6.0			6.0	2.0	2.0	5.0	
Minimum Split (s)					17.5		19.5	19.5			10.0	4.0	4.0	27.0	
Total Split (s)					32.0		25.0	25.0			27.0	4.0	4.0	28.0	
Total Split (%)					26.7%		20.8%	20.8%			22.5%	3%	3%	23%	
Yellow Time (s)					3.5		3.5	3.5			3.0	2.0	2.0	2.0	
All-Red Time (s)					4.5		4.5	4.5			1.0	0.0	0.0	3.0	
Lost Time Adjust (s)					0.0		0.0	0.0			0.0				
Total Lost Time (s)					8.0		8.0	8.0			4.0				
Lead/Lag					Lag		Lag	Lag					Lead	Lead	
Lead-Lag Optimize?															
Recall Mode					C-Min		None	None			None	Min	Min	None	
Act Effct Green (s)					43.6		17.0	87.6			23.0				
Actuated g/C Ratio					0.36		0.14	0.73			0.19				
v/c Ratio					0.66		0.85	0.85			0.34				
Control Delay					30.6		46.2	18.8			1.1				
Queue Delay					3.7		0.0	51.2			0.0				
Total Delay					34.3		46.2	70.0			1.1				
LOS					C		D	E			A				
Approach Delay					34.3		63.8				1.1				
Approach LOS					C		E				A				
Queue Length 50th (ft)					235		139	173			0				
Queue Length 95th (ft)					m#444		#298	#1115			0				
Internal Link Dist (ft)		20			256		353			453					
Turn Bay Length (ft)															
Base Capacity (vph)					1258		402	1155			809				
Starvation Cap Reductn					335		0	0			0				
Spillback Cap Reductn					0		0	590			0				
Storage Cap Reductn					0		0	0			0				
Reduced v/c Ratio					0.89		0.85	1.74			0.34				

**Intersection Summary**

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 5 (4%), Referenced to phase 2:WBT, Start of Yellow  
 Natural Cycle: 125  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.85  
 Intersection Signal Delay: 46.7  
 Intersection LOS: D  
 Intersection Capacity Utilization 70.2%  
 ICU Level of Service C  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Washington Street & Elm Street





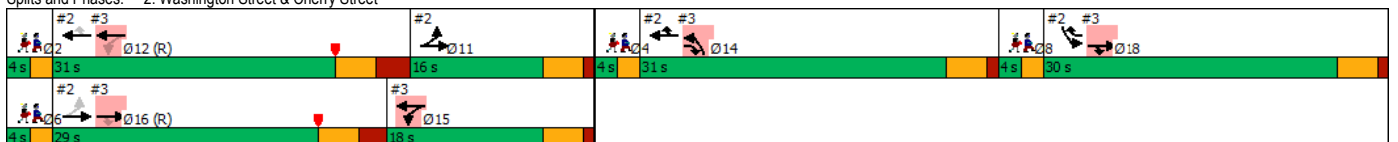
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø2	Ø4	Ø6	Ø8	Ø12	Ø14	Ø15	Ø16
Lane Configurations	↖	↗	↖	↗	↖	↗								
Traffic Volume (vph)	175	730	655	260	400	105								
Future Volume (vph)	175	730	655	260	400	105								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900								
Storage Length (ft)	200			0	100	0								
Storage Lanes	1			1	1	0								
Taper Length (ft)	25				25									
Satd. Flow (prot)	1787	1863	1845	1599	3373	0								
Flt Permitted	0.174				0.962									
Satd. Flow (perm)	327	1863	1845	1519	3373	0								
Right Turn on Red				Yes		Yes								
Satd. Flow (RTOR)				283	26									
Link Speed (mph)		30	30		30									
Link Distance (ft)		336	185		438									
Travel Time (s)		7.6	4.2		10.0									
Confl. Peds. (#/hr)				7		18								
Confl. Bikes (#/hr)				3										
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92								
Heavy Vehicles (%)	1%	2%	3%	1%	0%	0%								
Shared Lane Traffic (%)														
Lane Group Flow (vph)	190	793	712	283	549	0								
Turn Type	custom	NA	NA	custom	Prot									
Protected Phases	11	11 16	12 14	14 18	18		2	4	6	8	12	14	15	16
Permitted Phases	16			12										
Detector Phase	11	11 16	12 14	14 18	18									
Switch Phase														
Minimum Initial (s)	8.0				8.0		2.0	2.0	2.0	2.0	8.0	8.0	8.0	8.0
Minimum Split (s)	12.5				20.0		4.0	4.0	4.0	4.0	15.0	19.0	12.5	16.5
Total Split (s)	16.0				30.0		4.0	4.0	4.0	4.0	31.0	31.0	18.0	29.0
Total Split (%)	13.3%				25.0%		3%	3%	3%	3%	26%	26%	15%	24%
Yellow Time (s)	3.5				3.5		2.0	2.0	2.0	2.0	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0				1.0		0.0	0.0	0.0	0.0	3.0	1.0	1.0	2.5
Lost Time Adjust (s)	0.0				0.0									
Total Lost Time (s)	4.5				4.5									
Lead/Lag					Lag		Lead	Lead	Lead	Lead	Lag	Lag		Lag
Lead-Lag Optimize?														
Recall Mode	None				None		Min	Min	Min	Min	C-Min	None	None	C-Min
Act Effct Green (s)	36.0	36.0	49.0	78.5	25.5									
Actuated g/C Ratio	0.30	0.30	0.41	0.65	0.21									
v/c Ratio	0.80	1.42	0.95	0.25	0.74									
Control Delay	61.9	227.7	16.9	1.7	49.2									
Queue Delay	0.0	1.1	44.6	0.9	4.1									
Total Delay	61.9	228.8	61.5	2.7	53.3									
LOS	E	F	E	A	D									
Approach Delay		196.6	44.8		53.3									
Approach LOS		F	D		D									
Queue Length 50th (ft)	107	~686	272	20	197									
Queue Length 95th (ft)	m130	m#941	m195	m16	260									
Internal Link Dist (ft)		256	105		358									
Turn Bay Length (ft)	200				100									
Base Capacity (vph)	238	558	753	1126	737									
Starvation Cap Reductn	0	24	182	582	0									
Spillback Cap Reductn	0	72	63	0	119									
Storage Cap Reductn	0	0	0	0	0									
Reduced v/c Ratio	0.80	1.63	1.25	0.52	0.89									

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 12:WBT and 16:EBTL, Start of Yellow  
 Natural Cycle: 110  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.42  
 Intersection Signal Delay: 105.7 Intersection LOS: F  
 Intersection Capacity Utilization 72.2% ICU Level of Service C  
 Analysis Period (min) 15

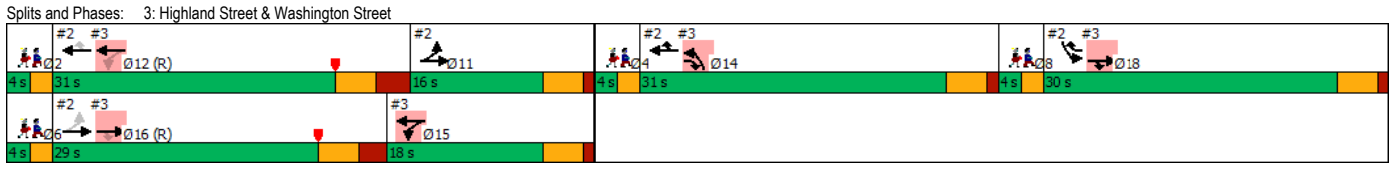
- ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Washington Street & Cherry Street



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø2	Ø4	Ø6	Ø8	Ø11	Ø12	Ø16	Ø18
Lane Configurations	↑↑	↑	↓	↑	↓	↓								
Traffic Volume (vph)	910	220	110	660	255	40								
Future Volume (vph)	910	220	110	660	255	40								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900								
Storage Length (ft)		85	0		0	0								
Storage Lanes		1	1		1	0								
Taper Length (ft)			25		25									
Satd. Flow (prot)	3539	1615	1787	1845	1753	0								
Flt Permitted			0.163		0.959									
Satd. Flow (perm)	3539	1511	307	1845	1753	0								
Right Turn on Red		Yes				Yes								
Satd. Flow (RTOR)		167			6									
Link Speed (mph)	30			30	30									
Link Distance (ft)	185			301	145									
Travel Time (s)	4.2			6.8	3.3									
Confl. Peds. (#/hr)		11				6								
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92								
Heavy Vehicles (%)	2%	0%	1%	3%	2%	0%								
Shared Lane Traffic (%)														
Lane Group Flow (vph)	989	239	120	717	320	0								
Turn Type	NA	custom	custom	NA	Prot									
Protected Phases	16 18	14 18	15	12 15	14		2	4	6	8	11	12	16	18
Permitted Phases		16	12											
Detector Phase	16 18	14 18	15	12 15	14									
Switch Phase														
Minimum Initial (s)			8.0		8.0		2.0	2.0	2.0	2.0	8.0	8.0	8.0	8.0
Minimum Split (s)			12.5		19.0		4.0	4.0	4.0	4.0	12.5	15.0	16.5	20.0
Total Split (s)			18.0		31.0		4.0	4.0	4.0	4.0	16.0	31.0	29.0	30.0
Total Split (%)			15.0%		25.8%		3%	3%	3%	3%	13%	26%	24%	25%
Yellow Time (s)			3.5		3.5		2.0	2.0	2.0	2.0	3.5	3.5	3.5	3.5
All-Red Time (s)			1.0		1.0		0.0	0.0	0.0	0.0	1.0	3.0	2.5	1.0
Lost Time Adjust (s)			0.0		0.0									
Total Lost Time (s)			4.5		4.5									
Lead/Lag					Lag		Lead	Lead	Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?														
Recall Mode			None		None		Min	Min	Min	Min	None	C-Min	C-Min	None
Act Effct Green (s)	47.0	76.5	40.0	36.0	26.5									
Actuated g/C Ratio	0.39	0.64	0.33	0.30	0.22									
v/c Ratio	0.71	0.22	0.45	1.30	0.82									
Control Delay	19.0	2.3	45.9	177.4	61.5									
Queue Delay	29.4	0.8	0.0	1.1	4.6									
Total Delay	48.4	3.1	45.9	178.5	66.1									
LOS	D	A	D	F	E									
Approach Delay	39.6			159.5	66.1									
Approach LOS	D			F	E									
Queue Length 50th (ft)	146	19	63	-580	233									
Queue Length 95th (ft)	m118	m17	m88	#800	#379									
Internal Link Dist (ft)	105			221	65									
Turn Bay Length (ft)		85												
Base Capacity (vph)	1386	1068	268	553	391									
Starvation Cap Reductn	442	557	0	31	0									
Spillback Cap Reductn	388	0	0	73	33									
Storage Cap Reductn	0	0	0	0	0									
Reduced v/c Ratio	1.05	0.47	0.45	1.49	0.89									

**Intersection Summary**  
 Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 12:WBT and 16:EBTL, Start of Yellow  
 Natural Cycle: 110  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.42  
 Intersection Signal Delay: 85.2 Intersection LOS: F  
 Intersection Capacity Utilization 61.0% ICU Level of Service B  
 Analysis Period (min) 15  
 - Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.





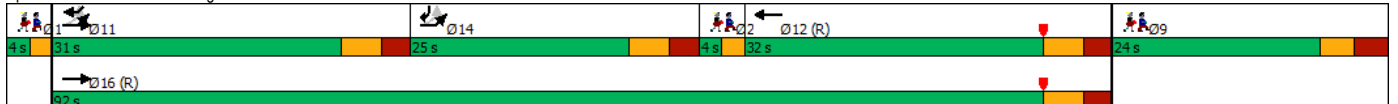


Lane Group	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SWL	SWR	SWR2	Ø1	Ø2	Ø9	Ø16
Lane Configurations		↖	↗	↕	↕			↖		↖	↖				
Traffic Volume (vph)	5	400	545	300	220	5	0	160	0	310	45				
Future Volume (vph)	5	400	545	300	220	5	0	160	0	310	45				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900				
Satd. Flow (prot)	0	1770	1863	3041	0	0	0	1627	0	1615	0				
Fit Permitted		0.996													
Satd. Flow (perm)	0	1856	1863	3041	0	0	0	1627	0	1615	0				
Right Turn on Red						Yes		Yes			No				
Satd. Flow (RTOR)				1				414							
Link Speed (mph)		30	30				30		30						
Link Distance (ft)		301	274				478		461						
Travel Time (s)			6.8	6.2			10.9		10.5						
Confl. Peds. (#/hr)						17					25				
Confl. Bikes (#/hr)					1	1					3				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92				
Heavy Vehicles (%)	0%	2%	2%	4%	1%	0%	0%	1%	0%	2%	0%				
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	440	592	570	0	0	0	174	0	386	0				
Turn Type	custom	Prot	NA	NA				Prot		Over					
Protected Phases		11 14	11 16	12				14		11		1	2	9	16
Permitted Phases	11 14														
Detector Phase	11 14	11 14	11 16	12				14		11					
Switch Phase															
Minimum Initial (s)				6.0				6.0		6.0		2.0	2.0	5.0	6.0
Minimum Split (s)				12.5				12.0		15.5		4.0	4.0	23.0	12.0
Total Split (s)				32.0				25.0		31.0		4.0	4.0	24.0	92.0
Total Split (%)				26.7%				20.8%		25.8%		3%	3%	20%	77%
Yellow Time (s)				3.5				3.5		3.5		2.0	2.0	3.0	3.5
All-Red Time (s)				2.5				2.5		2.5		0.0	0.0	3.0	2.5
Lost Time Adjust (s)				0.0				0.0		0.0					
Total Lost Time (s)				6.0				6.0		6.0					
Lead/Lag				Lag				Lag		Lead				Lead	
Lead-Lag Optimize?															
Recall Mode				C-Min				None		None		Min	Min	None	C-Min
Act Effct Green (s)		55.2	98.3	30.1				10.6		38.7					
Actuated g/C Ratio		0.46	0.82	0.25				0.09		0.32					
v/c Ratio		0.52	0.39	0.75				0.33		0.74					
Control Delay		50.0	6.3	49.2				1.7		48.8					
Queue Delay		41.5	2.2	53.5				0.9		17.0					
Total Delay		91.5	8.5	102.7				2.6		65.8					
LOS		F	A	F				A		E					
Approach Delay			43.9	102.7			2.6		65.8						
Approach LOS			D	F			A		E						
Queue Length 50th (ft)		352	119	216				0		241					
Queue Length 95th (ft)		m391	m145	#323				0		#546					
Internal Link Dist (ft)			221	194			398		381						
Turn Bay Length (ft)															
Base Capacity (vph)		985	1526	764				606		520					
Starvation Cap Reductn		570	764	222				0		0					
Spillback Cap Reductn		0	105	307				229		125					
Storage Cap Reductn		0	0	0				0		0					
Reduced v/c Ratio		1.06	0.78	1.25				0.46		0.98					

Intersection Summary

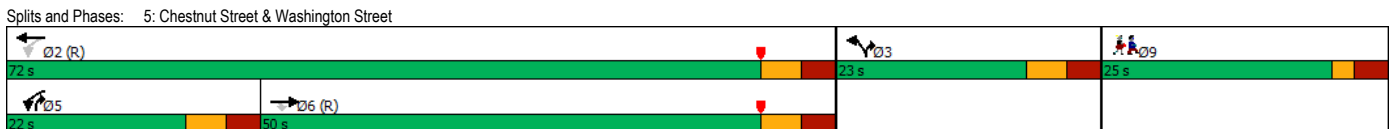
Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 113 (94%), Referenced to phase 12:WBT and 16:EBT, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.75  
 Intersection Signal Delay: 60.0 Intersection LOS: E  
 Intersection Capacity Utilization 75.6% ICU Level of Service D  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Washington Street & Waltham Street & Watertown Street



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø9
Lane Configurations	↑	↑	↑	↑	↑	↑	
Traffic Volume (vph)	505	40	250	415	110	195	
Future Volume (vph)	505	40	250	415	110	195	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		35	0		0	150	
Storage Lanes		1	1		1	1	
Taper Length (ft)			25		25		
Satd. Flow (prot)	1863	1615	1805	1845	1787	1599	
Flt Permitted			0.291		0.950		
Satd. Flow (perm)	1863	1615	553	1845	1787	1599	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)		9				212	
Link Speed (mph)	30			30	30		
Link Distance (ft)	274			584	336		
Travel Time (s)	6.2			13.3	7.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	2%	0%	0%	3%	1%	1%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	549	43	272	451	120	212	
Turn Type	NA	Perm	pm+pt	NA	Prot	pt+ov	
Protected Phases	6		5	2	3	3.5	9
Permitted Phases		6	2				
Detector Phase	6	6	5	2	3	3.5	
Switch Phase							
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		5.0
Minimum Split (s)	12.5	12.5	12.5	12.5	12.5		24.0
Total Split (s)	50.0	50.0	22.0	72.0	23.0		25.0
Total Split (%)	41.7%	41.7%	18.3%	60.0%	19.2%		21%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		2.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0		3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?							
Recall Mode	C-Min	C-Min	None	C-Min	None		None
Act Effct Green (s)	65.4	65.4	84.4	84.4	13.0		29.4
Actuated g/C Ratio	0.54	0.54	0.70	0.70	0.11		0.24
v/c Ratio	0.54	0.05	0.52	0.35	0.62		0.38
Control Delay	18.1	9.8	12.7	10.6	64.9		4.5
Queue Delay	1.5	0.0	0.0	0.3	0.0		0.0
Total Delay	19.6	9.8	12.7	10.9	64.9		4.5
LOS	B	A	B	B	E		A
Approach Delay	18.9			11.6	26.3		
Approach LOS	B			B	C		
Queue Length 50th (ft)	150	4	45	84	90		0
Queue Length 95th (ft)	#578	19	158	278	150		36
Internal Link Dist (ft)	194			504	256		
Turn Bay Length (ft)		35			150		
Base Capacity (vph)	1015	884	557	1298	245		585
Starvation Cap Reductn	278	0	0	0	0		0
Spillback Cap Reductn	0	0	0	340	0		0
Storage Cap Reductn	0	0	0	0	0		0
Reduced v/c Ratio	0.74	0.05	0.49	0.47	0.49		0.36

**Intersection Summary**  
 Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 7 (6%), Referenced to phase 2:WBTL and 6:EBT, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.62  
 Intersection Signal Delay: 17.2 Intersection LOS: B  
 Intersection Capacity Utilization 62.8% ICU Level of Service B  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.



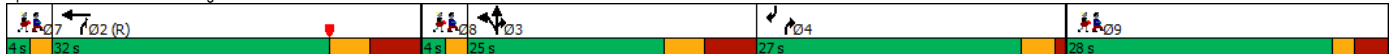


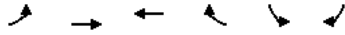
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	Ø7	Ø8	Ø9
Lane Configurations					↕↔			↕↔	↕↔			↕↔			
Traffic Volume (vph)	0	0	0	0	710	55	40	275	915	0	0	250			
Future Volume (vph)	0	0	0	0	710	55	40	275	915	0	0	250			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900			
Satd. Flow (prot)	0	0	0	0	3455	0	0	1849	1583	0	0	1611			
Fit Permitted								0.994							
Satd. Flow (perm)	0	0	0	0	3455	0	0	1846	1583	0	0	1611			
Right Turn on Red			Yes			Yes	Yes		No			Yes			
Satd. Flow (RTOR)					6			164				619			
Link Speed (mph)		30			30			30			30				
Link Distance (ft)		100			336			433			533				
Travel Time (s)		2.3			7.6			9.8			12.1				
Confl. Peds. (#/hr)						17	4								
Confl. Bikes (#/hr)						4									
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92			
Heavy Vehicles (%)	0%	0%	0%	0%	2%	7%	3%	2%	2%	0%	0%	2%			
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	0	0	0	832	0	0	342	995	0	0	272			
Turn Type					NA		Split	NA	custom			Prot			
Protected Phases					2		3	3	2 3 4			4	7	8	9
Permitted Phases															
Detector Phase					2		3	3	2 3 4			4			
Switch Phase															
Minimum Initial (s)					6.0		6.0	6.0			6.0	2.0	2.0	5.0	
Minimum Split (s)					17.5		19.5	19.5			10.0	4.0	4.0	27.0	
Total Split (s)					32.0		25.0	25.0			27.0	4.0	4.0	28.0	
Total Split (%)					26.7%		20.8%	20.8%			22.5%	3%	3%	23%	
Yellow Time (s)					3.5		3.5	3.5			3.0	2.0	2.0	2.0	
All-Red Time (s)					4.5		4.5	4.5			1.0	0.0	0.0	3.0	
Lost Time Adjust (s)					0.0		0.0	0.0			0.0				
Total Lost Time (s)					8.0		8.0	8.0			4.0				
Lead/Lag					Lag		Lag	Lag					Lead	Lead	
Lead-Lag Optimize?															
Recall Mode					C-Min		None	None			None	Min	Min	None	
Act Effct Green (s)					43.6		17.0	87.6			23.0				
Actuated g/C Ratio					0.36		0.14	0.73			0.19				
v/c Ratio					0.66		0.85	0.86			0.34				
Control Delay					30.6		46.2	19.4			1.1				
Queue Delay					4.0		0.0	51.2			0.0				
Total Delay					34.7		46.2	70.6			1.1				
LOS					C		D	E			A				
Approach Delay					34.7		64.3				1.1				
Approach LOS					C		E				A				
Queue Length 50th (ft)					236		139	178			0				
Queue Length 95th (ft)					m#445		#298	#1132			0				
Internal Link Dist (ft)		20			256		353			453					
Turn Bay Length (ft)															
Base Capacity (vph)					1258		402	1155			809				
Starvation Cap Reductn					336		0	0			0				
Spillback Cap Reductn					0		0	601			0				
Storage Cap Reductn					0		0	0			0				
Reduced v/c Ratio					0.90		0.85	1.80			0.34				

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 5 (4%), Referenced to phase 2:WBT, Start of Yellow  
 Natural Cycle: 125  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.86  
 Intersection Signal Delay: 47.2  
 Intersection LOS: D  
 Intersection Capacity Utilization 70.3%  
 ICU Level of Service C  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 1: Washington Street & Elm Street





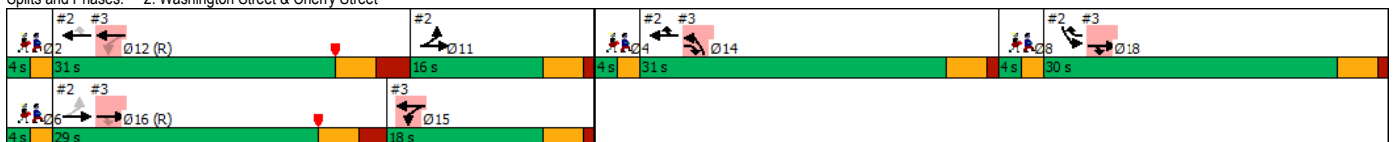
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR	Ø2	Ø4	Ø6	Ø8	Ø12	Ø14	Ø15	Ø16
Lane Configurations														
Traffic Volume (vph)	175	740	660	265	400	105								
Future Volume (vph)	175	740	660	265	400	105								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900								
Storage Length (ft)	200				100	0								
Storage Lanes	1			1	1	0								
Taper Length (ft)	25				25									
Satd. Flow (prot)	1787	1863	1845	1599	3373	0								
Flt Permitted	0.174				0.962									
Satd. Flow (perm)	327	1863	1845	1519	3373	0								
Right Turn on Red				Yes		Yes								
Satd. Flow (RTOR)				288	26									
Link Speed (mph)		30	30		30									
Link Distance (ft)		336	185		438									
Travel Time (s)		7.6	4.2		10.0									
Confl. Peds. (#/hr)				7		18								
Confl. Bikes (#/hr)				3										
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92								
Heavy Vehicles (%)	1%	2%	3%	1%	0%	0%								
Shared Lane Traffic (%)														
Lane Group Flow (vph)	190	804	717	288	549	0								
Turn Type	custom	NA	NA	custom	Prot									
Protected Phases	11	11 16	12 14	14 18	18		2	4	6	8	12	14	15	16
Permitted Phases	16			12										
Detector Phase	11	11 16	12 14	14 18	18									
Switch Phase														
Minimum Initial (s)	8.0				8.0		2.0	2.0	2.0	2.0	8.0	8.0	8.0	8.0
Minimum Split (s)	12.5				20.0		4.0	4.0	4.0	4.0	15.0	19.0	12.5	16.5
Total Split (s)	16.0				30.0		4.0	4.0	4.0	4.0	31.0	31.0	18.0	29.0
Total Split (%)	13.3%				25.0%		3%	3%	3%	3%	26%	26%	15%	24%
Yellow Time (s)	3.5				3.5		2.0	2.0	2.0	2.0	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0				1.0		0.0	0.0	0.0	0.0	3.0	1.0	1.0	2.5
Lost Time Adjust (s)	0.0				0.0									
Total Lost Time (s)	4.5				4.5									
Lead/Lag					Lag		Lead	Lead	Lead	Lead	Lag	Lag		Lag
Lead-Lag Optimize?														
Recall Mode	None				None		Min	Min	Min	Min	C-Min	None	None	C-Min
Act Effct Green (s)	36.0	36.0	49.0	78.5	25.5									
Actuated g/C Ratio	0.30	0.30	0.41	0.65	0.21									
v/c Ratio	0.80	1.44	0.95	0.26	0.74									
Control Delay	61.5	235.9	17.4	1.7	49.2									
Queue Delay	0.0	1.1	43.9	0.9	4.1									
Total Delay	61.5	237.0	61.4	2.7	53.3									
LOS	E	F	E	A	D									
Approach Delay		203.5	44.5		53.3									
Approach LOS		F	D		D									
Queue Length 50th (ft)	107	~704	266	20	197									
Queue Length 95th (ft)	m128	m#944	m191	m15	260									
Internal Link Dist (ft)		256	105		358									
Turn Bay Length (ft)	200				100									
Base Capacity (vph)	238	558	753	1127	737									
Starvation Cap Reductn	0	24	185	582	0									
Spillback Cap Reductn	0	72	88	0	119									
Storage Cap Reductn	0	0	0	0	0									
Reduced v/c Ratio	0.80	1.65	1.26	0.53	0.89									

Intersection Summary

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 12:WBT and 16:EBTL, Start of Yellow  
 Natural Cycle: 110  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.44  
 Intersection Signal Delay: 108.4 Intersection LOS: F  
 Intersection Capacity Utilization 72.4% ICU Level of Service C  
 Analysis Period (min) 15

- ~ Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.
- m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 2: Washington Street & Cherry Street



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø2	Ø4	Ø6	Ø8	Ø11	Ø12	Ø16	Ø18
Lane Configurations	↑↑	↑	↓	↑	↓	↓								
Traffic Volume (vph)	910	230	110	660	265	45								
Future Volume (vph)	910	230	110	660	265	45								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900								
Storage Length (ft)		85	0		0	0								
Storage Lanes		1	1		1	0								
Taper Length (ft)			25		25									
Satd. Flow (prot)	3539	1615	1787	1845	1749	0								
Flt Permitted			0.163		0.959									
Satd. Flow (perm)	3539	1511	307	1845	1749	0								
Right Turn on Red		Yes				Yes								
Satd. Flow (RTOR)		175			7									
Link Speed (mph)	30			30	30									
Link Distance (ft)	185			301	145									
Travel Time (s)	4.2			6.8	3.3									
Confl. Peds. (#/hr)		11				6								
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92								
Heavy Vehicles (%)	2%	0%	1%	3%	2%	0%								
Shared Lane Traffic (%)														
Lane Group Flow (vph)	989	250	120	717	337	0								
Turn Type	NA	custom	custom	NA	Prot									
Protected Phases	16 18	14 18	15	12 15	14		2	4	6	8	11	12	16	18
Permitted Phases		16	12											
Detector Phase	16 18	14 18	15	12 15	14									
Switch Phase														
Minimum Initial (s)			8.0		8.0		2.0	2.0	2.0	2.0	8.0	8.0	8.0	8.0
Minimum Split (s)			12.5		19.0		4.0	4.0	4.0	4.0	12.5	15.0	16.5	20.0
Total Split (s)			18.0		31.0		4.0	4.0	4.0	4.0	16.0	31.0	29.0	30.0
Total Split (%)			15.0%		25.8%		3%	3%	3%	3%	13%	26%	24%	25%
Yellow Time (s)			3.5		3.5		2.0	2.0	2.0	2.0	3.5	3.5	3.5	3.5
All-Red Time (s)			1.0		1.0		0.0	0.0	0.0	0.0	1.0	3.0	2.5	1.0
Lost Time Adjust (s)			0.0		0.0									
Total Lost Time (s)			4.5		4.5									
Lead/Lag					Lag		Lead	Lead	Lead	Lead		Lag	Lag	Lag
Lead-Lag Optimize?														
Recall Mode			None		None		Min	Min	Min	Min	None	C-Min	C-Min	None
Act Effct Green (s)	47.0	76.5	40.0	36.0	26.5									
Actuated g/C Ratio	0.39	0.64	0.33	0.30	0.22									
v/c Ratio	0.71	0.23	0.45	1.30	0.86									
Control Delay	19.1	2.3	45.8	177.4	66.1									
Queue Delay	31.0	0.8	0.0	1.1	7.6									
Total Delay	50.1	3.2	45.8	178.5	73.8									
LOS	D	A	D	F	E									
Approach Delay	40.6			159.5	73.8									
Approach LOS	D			F	E									
Queue Length 50th (ft)	148	21	63	-580	248									
Queue Length 95th (ft)	m117	m17	m88	#800	#410									
Internal Link Dist (ft)	105			221	65									
Turn Bay Length (ft)		85												
Base Capacity (vph)	1386	1071	268	553	391									
Starvation Cap Reductn	446	554	0	31	0									
Spillback Cap Reductn	388	0	0	73	33									
Storage Cap Reductn	0	0	0	0	0									
Reduced v/c Ratio	1.05	0.48	0.45	1.49	0.94									

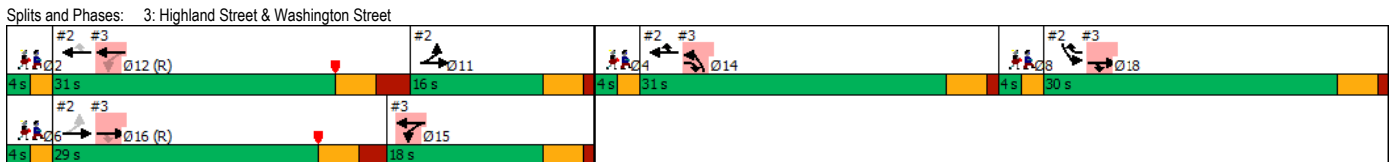
**Intersection Summary**

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 0 (0%), Referenced to phase 12:WBT and 16:EBTL, Start of Yellow  
 Natural Cycle: 110  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.44  
 Intersection Signal Delay: 86.5  
 Intersection Capacity Utilization 61.8%  
 Analysis Period (min) 15  
 Intersection LOS: F  
 ICU Level of Service B

- Volume exceeds capacity, queue is theoretically infinite.  
 Queue shown is maximum after two cycles.

# 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



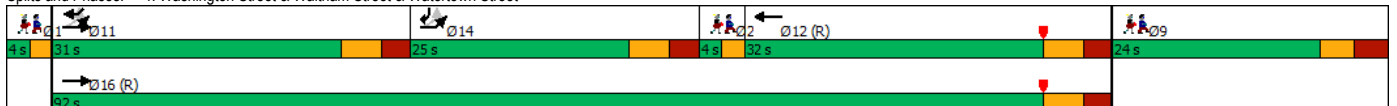


Lane Group	EBL2	EBL	EBT	WBT	WBR	WBR2	SBL	SBR	SWL	SWR	SWR2	Ø1	Ø2	Ø9	Ø16
Lane Configurations		↔	↕	↕				↕		↕					
Traffic Volume (vph)	5	405	545	300	220	5	0	160	0	310	45				
Future Volume (vph)	5	405	545	300	220	5	0	160	0	310	45				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900				
Satd. Flow (prot)	0	1770	1863	3041	0	0	0	1627	0	1615	0				
Fit Permitted		0.996													
Satd. Flow (perm)	0	1856	1863	3041	0	0	0	1627	0	1615	0				
Right Turn on Red						Yes		Yes			No				
Satd. Flow (RTOR)				1				414							
Link Speed (mph)		30	30				30		30						
Link Distance (ft)		301	274				478		461						
Travel Time (s)			6.8	6.2			10.9		10.5						
Confl. Peds. (#/hr)						17					25				
Confl. Bikes (#/hr)					1	1					3				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92				
Heavy Vehicles (%)	0%	2%	2%	4%	1%	0%	0%	1%	0%	2%	0%				
Shared Lane Traffic (%)															
Lane Group Flow (vph)	0	445	592	570	0	0	0	174	0	386	0				
Turn Type	custom	Prot	NA	NA				Prot		Over					
Protected Phases		11 14	11 16	12				14		11		1	2	9	16
Permitted Phases	11 14														
Detector Phase	11 14	11 14	11 16	12				14		11					
Switch Phase															
Minimum Initial (s)				6.0				6.0		6.0		2.0	2.0	5.0	6.0
Minimum Split (s)				12.5				12.0		15.5		4.0	4.0	23.0	12.0
Total Split (s)				32.0				25.0		31.0		4.0	4.0	24.0	92.0
Total Split (%)				26.7%				20.8%		25.8%		3%	3%	20%	77%
Yellow Time (s)				3.5				3.5		3.5		2.0	2.0	3.0	3.5
All-Red Time (s)				2.5				2.5		2.5		0.0	0.0	3.0	2.5
Lost Time Adjust (s)				0.0				0.0		0.0					
Total Lost Time (s)				6.0				6.0		6.0					
Lead/Lag				Lag				Lag		Lead				Lead	
Lead-Lag Optimize?															
Recall Mode				C-Min				None		None		Min	Min	None	C-Min
Act Effct Green (s)		55.4	98.3	30.1				10.7		38.7					
Actuated g/C Ratio		0.46	0.82	0.25				0.09		0.32					
v/c Ratio		0.52	0.39	0.75				0.33		0.74					
Control Delay		49.5	6.3	49.3				1.7		48.8					
Queue Delay		44.7	2.2	53.5				0.9		17.0					
Total Delay		94.2	8.4	102.8				2.6		65.8					
LOS		F	A	F				A		E					
Approach Delay			45.2	102.8			2.6		65.8						
Approach LOS			D	F			A		E						
Queue Length 50th (ft)		354	119	216				0		241					
Queue Length 95th (ft)		m391	m145	#323				0		#546					
Internal Link Dist (ft)			221	194			398		381						
Turn Bay Length (ft)															
Base Capacity (vph)		985	1526	762				606		520					
Starvation Cap Reductn		569	762	222				0		0					
Spillback Cap Reductn		0	106	307				229		125					
Storage Cap Reductn		0	0	0				0		0					
Reduced v/c Ratio		1.07	0.77	1.25				0.46		0.98					

**Intersection Summary**

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 113 (94%), Referenced to phase 12:WBT and 16:EBT, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.75  
 Intersection Signal Delay: 60.6 Intersection LOS: E  
 Intersection Capacity Utilization 75.9% ICU Level of Service D  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.  
 m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 4: Washington Street & Waltham Street & Watertown Street



Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø9
Lane Configurations	↑	↑	↑	↑	↑	↑	
Traffic Volume (vph)	505	40	255	415	110	195	
Future Volume (vph)	505	40	255	415	110	195	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Storage Length (ft)		35	0		0	150	
Storage Lanes		1	1		1	1	
Taper Length (ft)			25		25		
Satd. Flow (prot)	1863	1615	1805	1845	1787	1599	
Flt Permitted			0.290		0.950		
Satd. Flow (perm)	1863	1615	551	1845	1787	1599	
Right Turn on Red		Yes				Yes	
Satd. Flow (RTOR)		9				212	
Link Speed (mph)	30			30	30		
Link Distance (ft)	274			584	336		
Travel Time (s)	6.2			13.3	7.6		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Heavy Vehicles (%)	2%	0%	0%	3%	1%	1%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	549	43	277	451	120	212	
Turn Type	NA	Perm	pm+pt	NA	Prot	pt+ov	
Protected Phases	6		5	2	3	3.5	9
Permitted Phases		6	2				
Detector Phase	6	6	5	2	3	3.5	
Switch Phase							
Minimum Initial (s)	6.0	6.0	6.0	6.0	6.0		5.0
Minimum Split (s)	12.5	12.5	12.5	12.5	12.5		24.0
Total Split (s)	50.0	50.0	22.0	72.0	23.0		25.0
Total Split (%)	41.7%	41.7%	18.3%	60.0%	19.2%		21%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5		2.0
All-Red Time (s)	3.0	3.0	3.0	3.0	3.0		3.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0		
Total Lost Time (s)	6.5	6.5	6.5	6.5	6.5		
Lead/Lag	Lag	Lag	Lead				
Lead-Lag Optimize?							
Recall Mode	C-Min	C-Min	None	C-Min	None		None
Act Effct Green (s)	65.3	65.3	84.4	84.4	13.0		29.5
Actuated g/C Ratio	0.54	0.54	0.70	0.70	0.11		0.25
v/c Ratio	0.54	0.05	0.53	0.35	0.62		0.38
Control Delay	18.4	10.1	12.9	10.6	64.9		4.5
Queue Delay	1.5	0.0	0.0	0.3	0.0		0.0
Total Delay	19.8	10.1	12.9	10.9	64.9		4.5
LOS	B	B	B	B	E		A
Approach Delay	19.1			11.7	26.3		
Approach LOS	B			B	C		
Queue Length 50th (ft)	150	4	46	84	90		0
Queue Length 95th (ft)	#577	19	161	278	150		36
Internal Link Dist (ft)	194			504	256		
Turn Bay Length (ft)		35			150		
Base Capacity (vph)	1013	882	556	1298	245		585
Starvation Cap Reductn	277	0	0	0	0		0
Spillback Cap Reductn	0	0	0	340	0		0
Storage Cap Reductn	0	0	0	0	0		0
Reduced v/c Ratio	0.75	0.05	0.50	0.47	0.49		0.36

**Intersection Summary**

Area Type: Other  
 Cycle Length: 120  
 Actuated Cycle Length: 120  
 Offset: 7 (6%), Referenced to phase 2:WBT and 6:EBT, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.62  
 Intersection Signal Delay: 17.3      Intersection LOS: B  
 Intersection Capacity Utilization 63.1%      ICU Level of Service B  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

**Splits and Phases: 5: Chestnut Street & Washington Street**



Response to Comments  
Ref: 15636.00  
September 22, 2022



## Sheets A1 and A2



**1314  
WASHINGTON  
STREET**  
WEST NEWTON, MA

**OWNER**  
**MARK  
DEVELOPMENT**

MARK DEVELOPMENT  
275 GROVE STREET, SUITE 2-150  
NEWTON, MA 02466  
617.614.9149

**DESIGN ARCHITECT**  
**DAVID M.  
SCHWARZ  
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**CIVIL ENGINEER**  
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**LANDSCAPE ARCHITECT**  
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Tighe&Bond STUDIO**

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PROFESSIONAL SEAL



REVISIONS

#	DATE	DESCRIPTION

**SPECIAL PERMIT / ZONE  
CHANGE PLANS**

NOT FOR  
CONSTRUCTION  
**ISSUED: AUG 19, 2022**

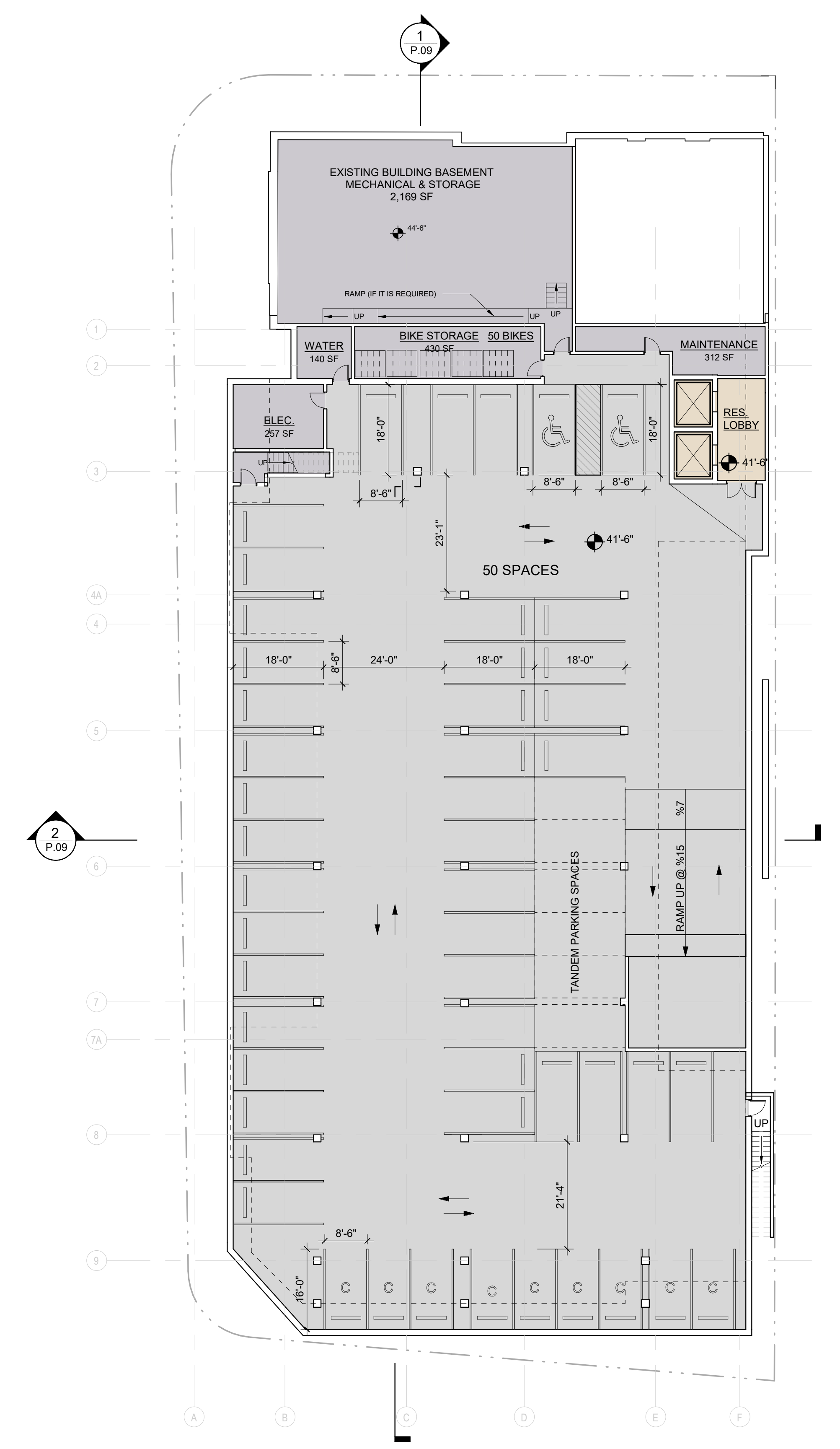
SHEET TITLE:  
P1 LEVEL

SHEET NO.:

**A1**

D

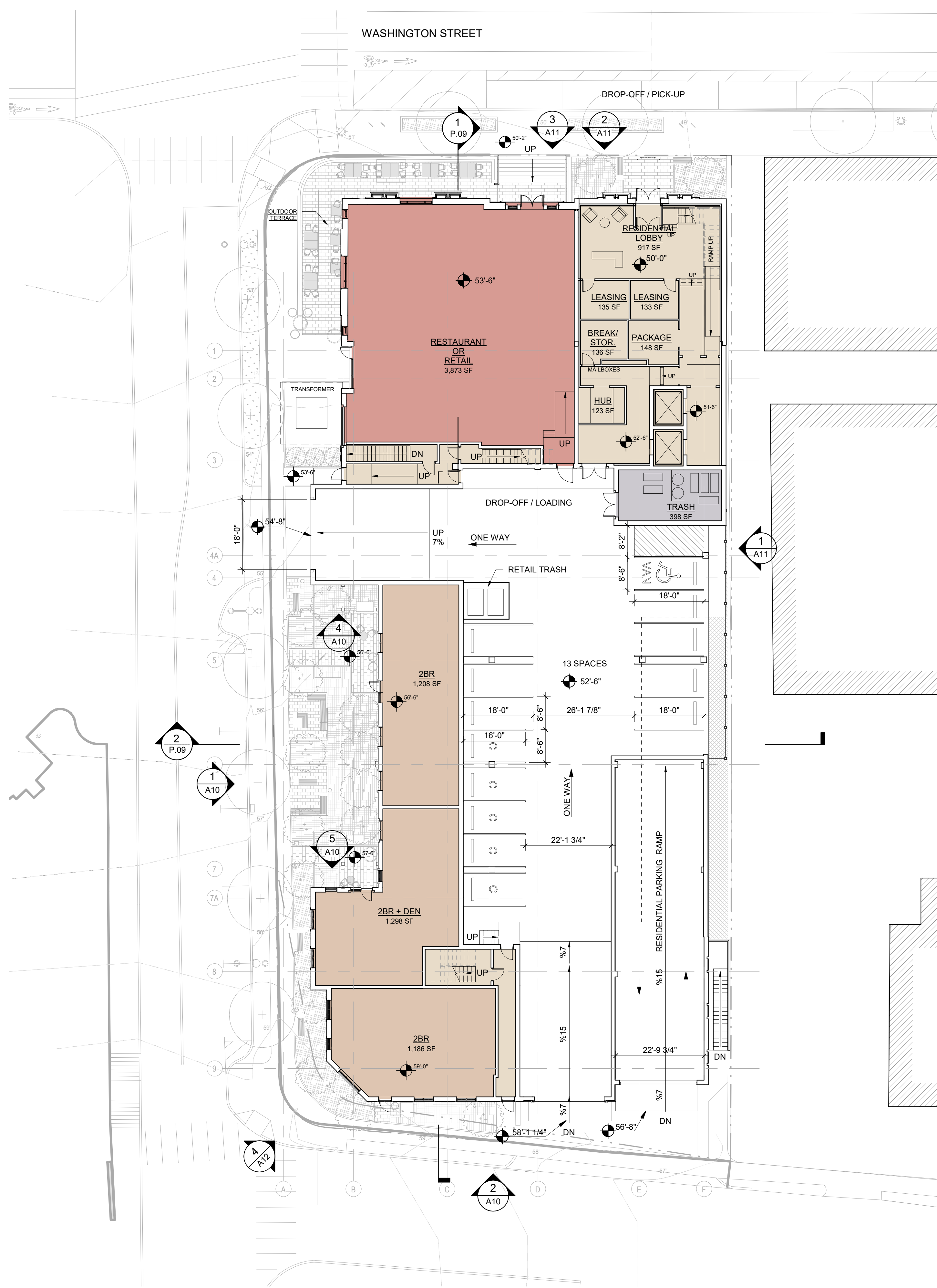
C



**RESIDENT PARKING LEVEL** (1/A1)  
SCALE: 1/16" = 1'-0"

D

C



**LEVEL 1** 1  
 SCALE: 1/16" = 1'-0" A2

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 STREET**  
 WEST NEWTON, MA

**OWNER**  
**MARK  
 DEVELOPMENT**

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SHEET TITLE:  
 LEVEL 1 PLAN

SHEET NO.:

**A2**

1

2

3

4

5

1

2

3

4

5

Response to Comments  
Ref: 15636.00  
September 22, 2022



## **Fire Truck Exhibit**



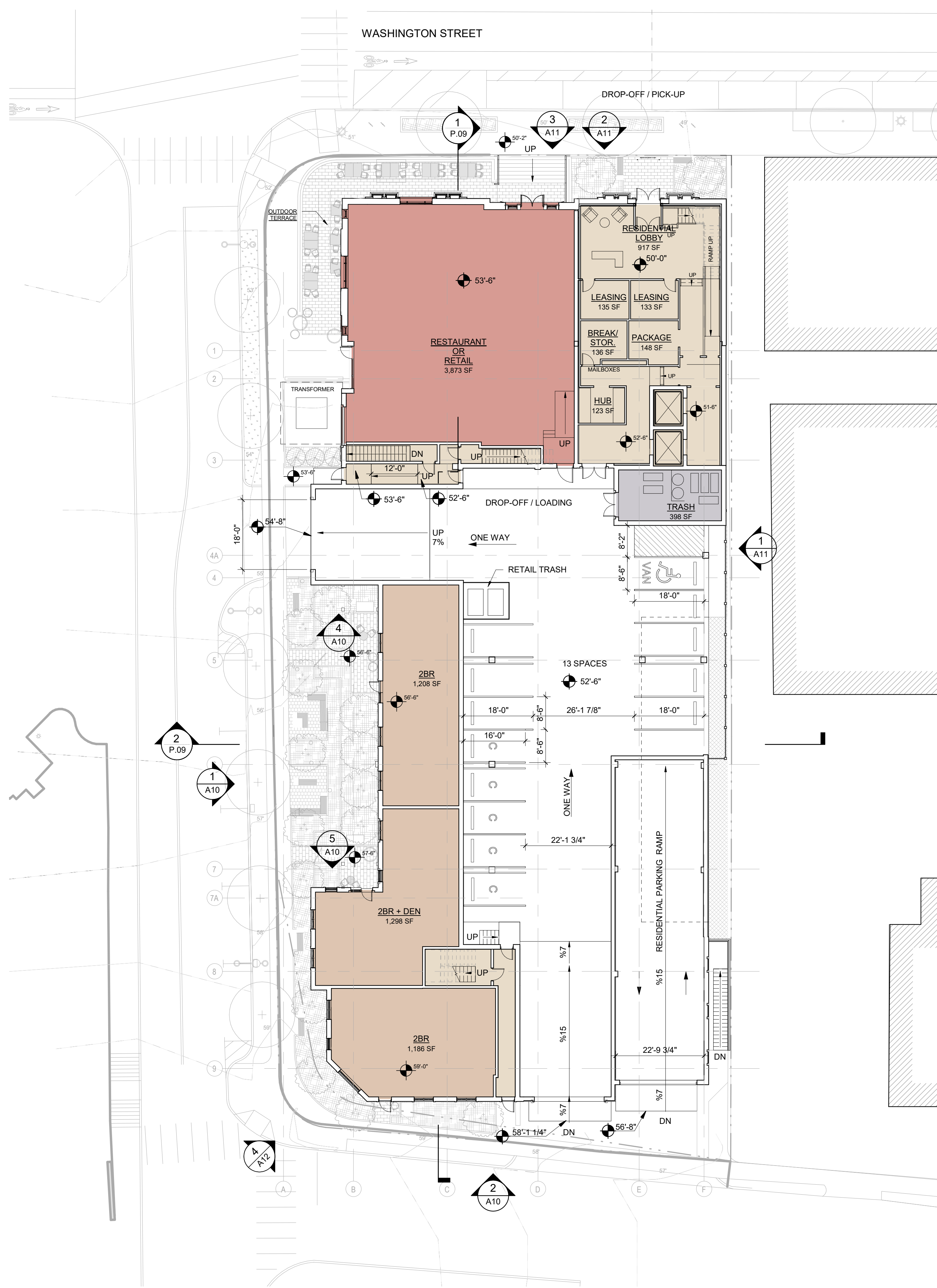
Response to Comments  
Ref: 15636.00  
September 22, 2022



## **Level 1 Plan with Pedestrian Ramp Elevations**

D

C



**LEVEL 1** 1  
 SCALE: 1/16" = 1'-0" A2

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WASHINGTON  
STREET**  
 WEST NEWTON, MA

**OWNER**  
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**REVISIONS**

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SHEET TITLE:  
 LEVEL 1 PLAN

SHEET NO.:

**A2**