



## MEMORANDUM

**TO:** Peter Rice, Director of Public Works  
**FROM:** Deborah Finnigan, PE  
**SUBJECT:** On-Street Bicycle Facility Improvements Evaluation  
Middle Street (Cabot Street to Lincoln Avenue), Portsmouth, New  
**DATE:** Hampshire May 10, 2022

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WSP has performed an independent engineering evaluation and review of the Middle Street corridor from Cabot Street to Lincoln Avenue. The City Council approved a directive on March 15, 2021, to complete an assessment to determine the feasibility of the existing configuration.

### CONDITION INVENTORY AND ENGINEERING EVALUATION

WSP evaluated bid plans, the revised plans, crash data, bicycle counts, parked vehicle counts, speed data, and existing conditions/photographs.

### STUDY CORRIDOR CONDITIONS

The post-construction layout of the study corridor was a defined bicycle lane heading inbound from Andrew Jarvis Drive to Highland Street, then shared lane markings to Islington Street/Congress Street. The outbound side of Middle Street shared lane markings from Islington Street/Congress Street to Highland Street, then from Highland to Andrew Jarvis Drive, had a defined curbside bicycle lane, buffer zone, and defined parking spaces. The project also included bollards to help define the edge bicycle lane buffer.

Some of the bollards were removed from the roadway in 2019.

In 2021, additional modifications to the study corridor were completed, including covering pavement markings, adding a crosswalk and Rectangular Rapid Flashing Beacons (RRFB), and additional signs. See Figure 1.

The existing layout of the study corridor is a defined bicycle lane with a buffer zone heading inbound from Andrew Jarvis Drive to Highland Street, then shared lane markings to Islington Street/Congress Street without bollards. On the outbound side of Middle Street from Islington Street/Congress Street to Lincoln Avenue, there aren't defined parking, bicycle lanes with a buffer, or shared lane pavement markings due to being previously covered with black paint, and no bollards are present, from Lincoln Avenue to Andrew Jarvis Drive there is bike lane with a buffer, and from Andrew Jarvis Drive there is a bike lane without a buffer until Highland Avenue.



Figure 1: Middle Street looking inbound

## CRASH DATA

The Portsmouth Police Department supplied crash data for the study corridor from April 15 to October 14, 2020. The information is as follows:

- 1) Middle Street at Wibird Street – hit and run between two vehicles.
- 2) Middle Street at Wibird Street – involved two vehicles, one turning from Wibird Street onto Middle Street and struck by a vehicle on Middle Street.
- 3) Middle Street at Cass Street – involved two vehicles, hit and run
- 4) Middle Street at Aldrich Road – a vehicle hit a parked car.

The accident data provided shows that no reported pedestrian or bicycle involved accidents after the bollards were removed.

## PARKING COUNTS

The City provided vehicle parking counts for the study corridor. The undefined spaces not signed for no parking or drop off/pick up were counted starting August 4, 2021, and ending on August 31, 2021, and the following time periods were counted 9:00 am 1:00 pm, and 5:00 pm. See the Appendix for the data.

The percent occupancy for parking spaces for the am period was between 45 and 53, the mid-day period was between 29 and 58, and the afternoon period was between 13 and 47.



## BICYCLE COUNTS

The City provided 2021 bicycle counts from May 24, 2021, to September 23, 2021. The counts were taken from the camera at Cass Street facing north. See Figure 2 for the seven-day averages for the weeks counted.

The data shows there are between 53 and 96 bicycles on average for this section of the study corridor.

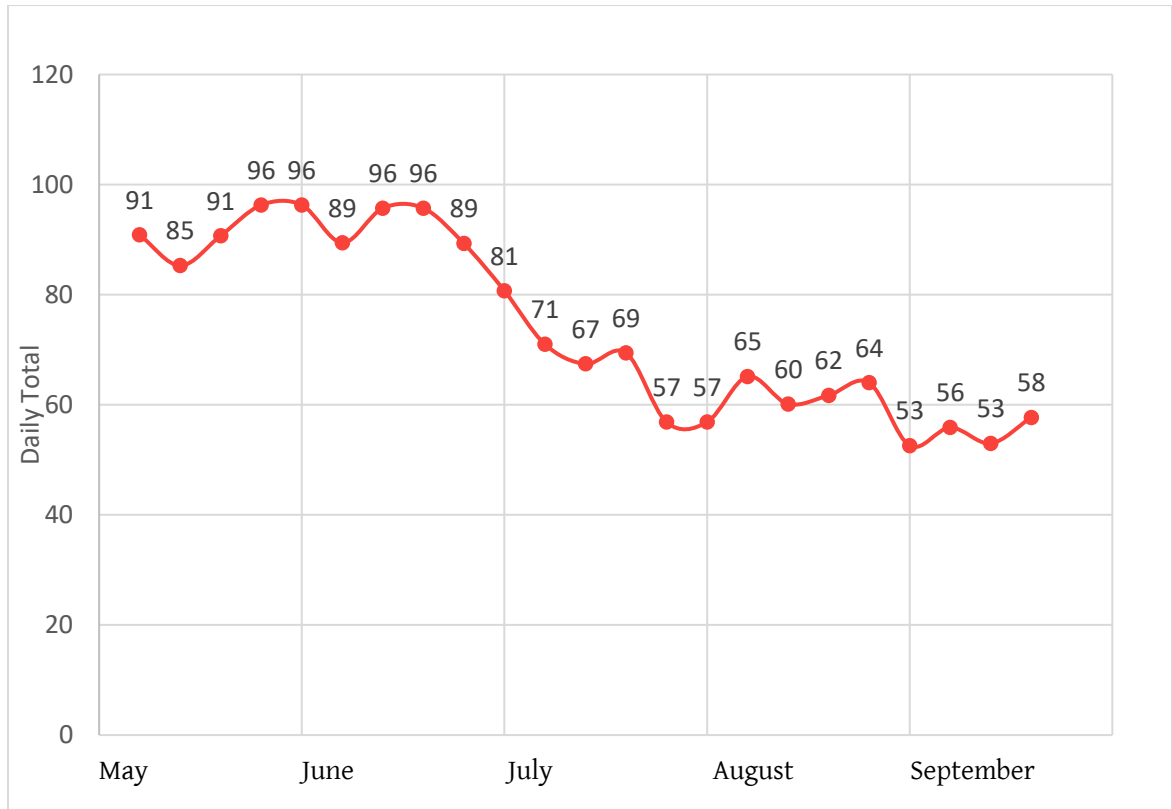


Figure 2: 2021 Middle Street at Cass Street – Bicycle Counts

## VEHICLE SPEED

The City supplied the average and 85th percentile (85th percentile speed is the speed at which 85 percent of all vehicles travel at or slower) vehicle speed data for various locations along the study corridor. These studies were performed before and after construction, including the bollards, and when the bollards were removed, a speed study was done at the intersection of Aldrich Road and Middle Street only.

The average speed near the intersection of Aldrich Road and Middle Street:

1. Before construction, 29 mph outbound and 29 mph inbound.
2. After construction, 27 mph outbound and 28 mph inbound.
3. After the bollards were removed, 29 mph outbound and 28 mph inbound.

The 85<sup>th</sup> percentile speed near the intersection of Aldrich Road and Middle Street:

1. Before construction, 32 mph outbound and 32 mph inbound.
2. After construction, 31 mph outbound and 32 mph inbound.
3. After the bollards were removed, 33 mph outbound and 32 mph inbound.



## ASSESSMENT AND RECOMMENDATION OF THE STUDY CORRIDOR

The study corridor has been in the current configuration (parking on the curb and a wide travel lane for the outbound side of the roadway without defined bicycle accommodations for more than six months. There has been a minor increase in speed (1 to 2 mph) since removing the bollards, no known bicycle or pedestrian accidents have occurred, and the residents and business owners have expressed minimal concerns since the revisions were made.

WSP recommendations are described below and are presented in Figures 3 and 4. The recommendations are as follows:

1. The existing parking, no parking, and drop-off area in the study corridor remain in its current location next to the sidewalk. The parking spaces, no parking, and drop-off areas shall be defined with an edge line and an end line or crosshatching.
2. WSP recommends installing a shared lane marking due to the current roadway configuration that has been in place for more than six months and the number of cyclists using the corridor. The shared lane markings will be placed at least 11 feet from the curb face due to the parking lane being present and the 85<sup>th</sup> percentile speed is under 35 mph.
  - a. The above recommendation is due to the 85<sup>th</sup> percentile speed being less than 35 mph and the posted speed being 25 mph. These values fall between the two defined bicycle pavement marking scenarios (under 25 mph, use shared lane markings, and over 35 mph, use a bike lane with a buffer if there is room). This information is from the National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide.
3. Install additional bicycles and vehicles sharing the road warning signs. Also, remove the existing signs (bicycle symbol (W11-1) and an arrow (W16-7p)) at Cabot Street, and install them at Lincoln Avenue facing the outbound traffic, as shown in Figure 3.





Figure 3: Lincoln Avenue to Cass Street Recommendations



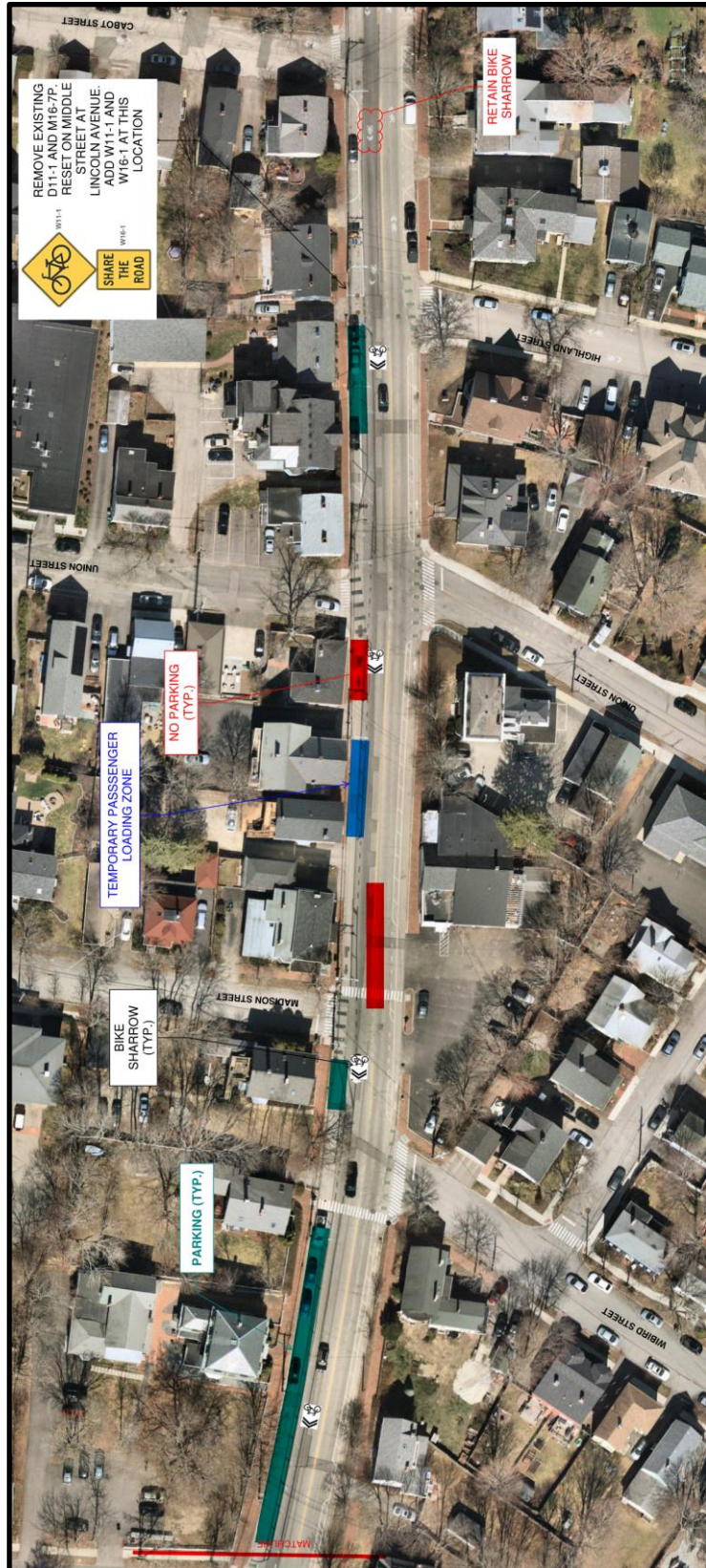


Figure4: Cass Street to Cabot Recommendations

# MIDDLE STREET CORRIDOR APPENDIX

1. PARKED VEHICLE COUNTS
2. SPEED DATA SUMMARY
3. VOLUME DATA



# APPENDIX

## 1. PARKED VEHICLE COUNTS



# MIDDLE STREET BIKE LANE - PARKED VEHICLE COUNTS

August, 2021

	8.4.21	9a	9a	9a	1p	1p	1p	5p	5p	5p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	23	15	61%		no count	0%		no count	0%

	8.5.21	9a	9a	9a	130p	130p	130p	5p	5p	5p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	24	14	63%	15	23	39%	5	33	13%

	8.6.21	5a	5a	5a	11a	11a	11a	4p	4p	4p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	24	14	63%		no count	0%		no count	0%

	8.7.21	5a	5a	5a	230p	230p	230p	6p	6p	6p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	18	20	47%	20	18	53%		no count	0%

	8.8.21	5a	5a	5a	1230p	1230p	1230p	615p	615p	615p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	17	21	45%	11	27	29%		no count	0%

	8.9.21	5a	5a	5a	1130p	1130p	1130p	4p	4p	4p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	20	18	53%		no count	0%		no count	0%

	8.10.21	5a	5a	5a	12p	12p	12p	4p	4p	4p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	22	16	58%		no count	0%		no count	0%

	8.11.21	5a	5a	5a	1215p	1215p	1215p	6p	6p	6p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	21	17	55%		no count	0%		no count	0%

	8.12.21	4a	4a	4a	130p	130p	130p	7p	7p	7p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	22	16	58%		no count	0%		no count	0%

	8.13.21	4a	4a	4a	1p	1p	1p	5p	5p	5p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	24	14	63%	14	24	37%	15	23	39%

	8.14.21	4a	4a	4a	1245p	1245p	1245p	715p	715p	715p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	22	16	58%	20	18	53%	6	32	16%

	8.15.21	4a	4a	4a	1p	1p	1p	445p	445p	445p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	22	16	58%	14	24	37%	16	22	42%

	8.17.21	4a	4a	4a	1130a	1130a	1130a	530p	530p	530p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	21	17	55%	15	23	39%	16	22	42%

	8.17.21	5am	5am	5am	1215p	1215p	1215p	4p	4p	4p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	23	15	61%	15	23	39%	16	22	42%

	8.18.21	5am	5am	5am	-	-	-	-	-	-
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	19	19	50%		no count	0%		no count	0%

	8.19.21	5am	5am	5am	145p	145p	145p	530p	530p	530p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	24	14	63%	17	21	45%	18	20	47%

	8.20.21	5am	5am	5am	12p	12p	12p	630p	630p	630p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	21	17	55%	12	26	32%	13	25	34%

	8.21.21	5am	5am	5am	1230p	1230p	1230p	7p	7p	7p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	24	14	63%	13	25	34%	15	23	39%

	8.22.21	5am	5am	5am	130p	130p	130p	5p	5p	5p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	24	14	63%	15	23	39%	17	21	45%

	8.23.21	5am	5am	5am	12p	12p	12p	6p	6p	6p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	22	16	58%	17	21	45%	23	15	61%

	8.24.21	5am	5am	5am	1p	1p	1p	5p	5p	5p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	24	14	63%	22	16	58%	20	18	53%

	8.25.21	5am	5am	5am	145p	145p	145p	7p	7p	7p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	25	13	66%	16	22	42%	13	25	34%

	8.26.21	5am	5am	5am	1230p	1230p	1230p	5p	5p	5p
	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
MS Bike Lane	38	22	16	58%	18	20	47%	18	20	47%

	8.27.21	5am	5am	5am	2p	2p	2p	6p	6p	6p
MS Bike Lane	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
	38	18	20	47%	12	26	32%	10	28	26%

	8.28.21	5am	5am	5am	11a	11a	11a	715p	715p	715p
MS Bike Lane	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
	38	23	15	61%	12	26	32%	14	24	37%

	8.30.21	5am	5am	5am	130p	130p	130p	630p	630p	630p
MS Bike Lane	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
	38	18	20	47%		no count	0%		no count	0%

	8.31.21	5am	5am	5am	12p	12p	12p	6p	6p	6p
MS Bike Lane	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
	38	20	18	53%	14	24	37%	14	24	37%

	-	5am	5am	5am	12p	12p	12p	4p	4p	4p
MS Bike Lane	INVENTORY	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ	Cars	Open Sp	% Occ
	38		no count	0%		no count	0%		no count	0%

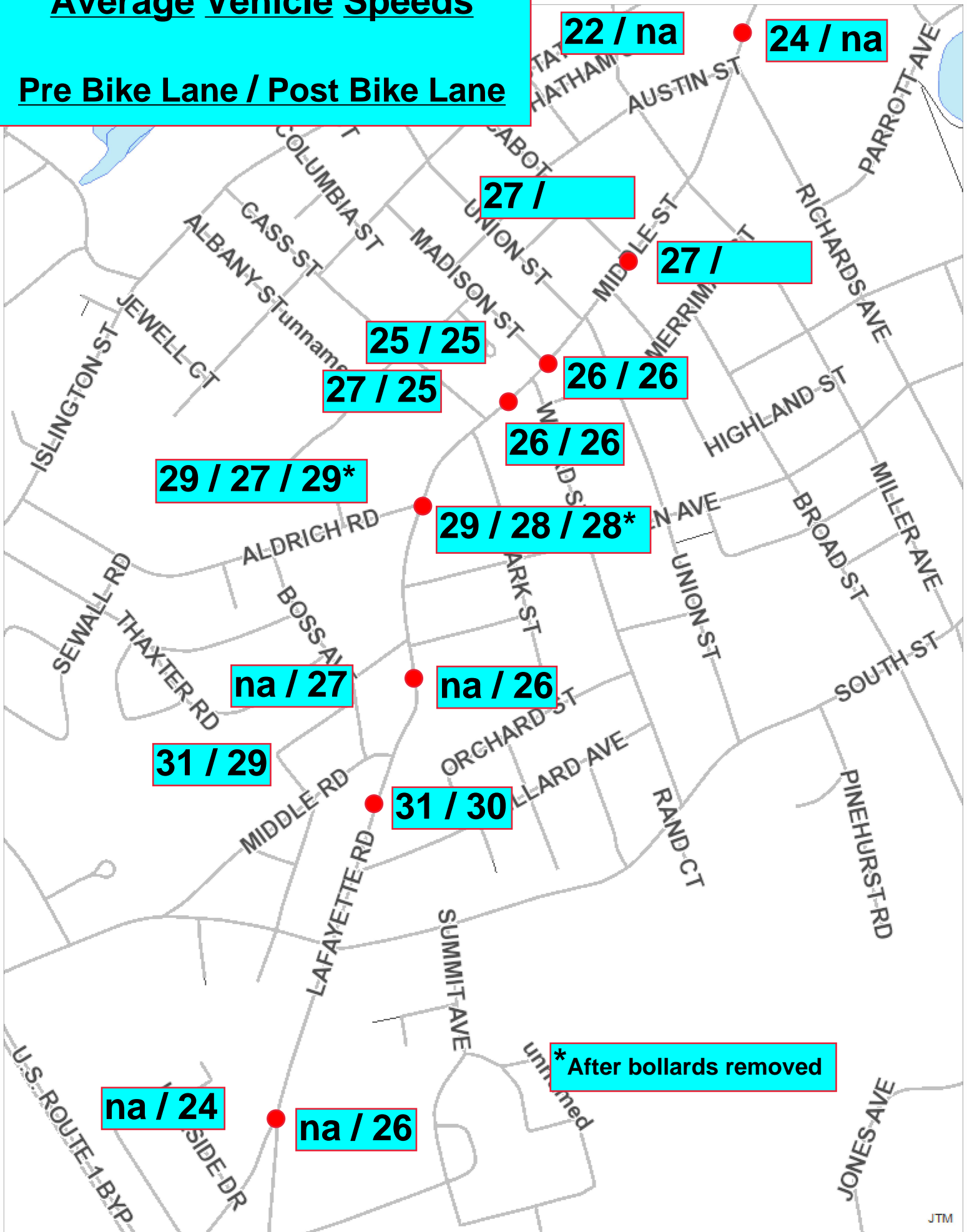
# APPENDIX

## 2. SPEED DATA SUMMARY



# Average Vehicle Speeds

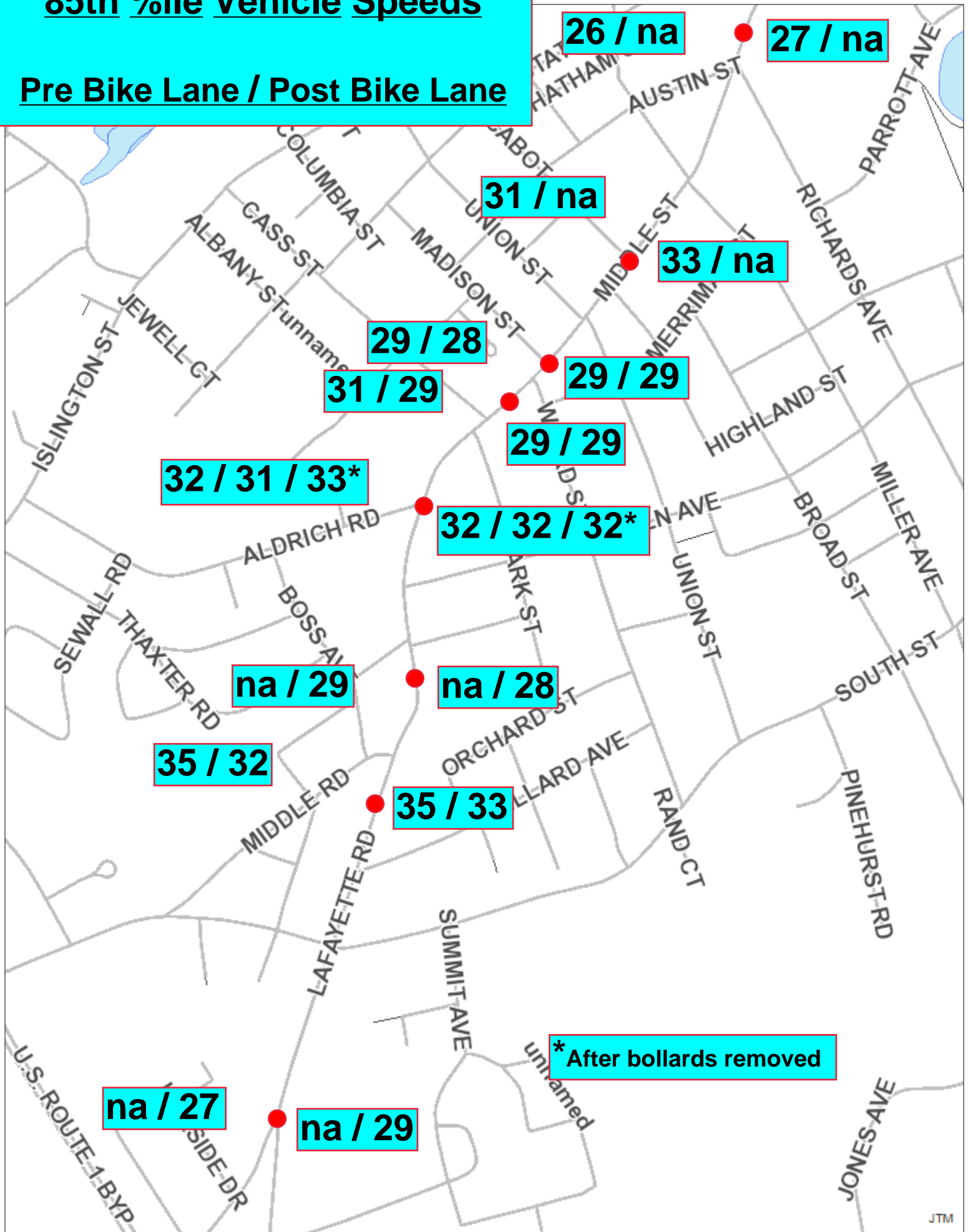
Pre Bike Lane / Post Bike Lane



\* After bollards removed

# 85th %ile Vehicle Speeds

Pre Bike Lane / Post Bike Lane



\* After bollards removed

# APPENDIX

## 3. VOLUME DATA



6/7/2021	6/7/2021		6/8/2021		6/9/2021		6/10/2021		6/11/2021		Weekday Average		6/12/2021		6/13/2021		
Time	Outbound , Lane 1	Inbound, Lane 2	Outbound , Lane 1	Inbound, Lane 2	Outbound , Lane 1	Inbound, Lane 2	Outbound , Lane 1	Inbound, Lane 2	Outbound , Lane 1	Inbound, Lane 2	Outbound , Lane 1	Inbound, Lane 2	Outbound , Lane 1	Inbound, Lane 2	Outbound , Lane 1	Inbound, Lane 2	
12:00 AM	*	*	*	*	*	*	*	*	16	19	16	19	58	40	47	47	
1:00	*	*	*	*	*	*	*	*	16	9	16	9	45	18	52	29	
2:00	*	*	*	*	*	*	*	*	8	9	8	9	11	16	20	10	
3:00	*	*	*	*	*	*	*	*	6	7	6	7	11	22	14	11	
4:00	*	*	*	*	*	*	*	*	6	19	6	19	8	6	2	4	
5:00	*	*	*	*	*	*	*	*	32	62	32	62	14	35	7	14	
6:00	*	*	*	*	*	*	*	*	85	90	85	90	62	48	31	29	
7:00	*	*	*	*	*	*	*	*	166	228	166	228	94	96	77	89	
8:00	*	*	*	*	*	*	*	*	332	458	332	458	188	215	118	179	
9:00	*	*	*	*	*	*	*	*	272	382	272	382	226	323	192	269	
10:00	*	*	*	*	*	*	*	*	290	451	290	451	282	450	222	327	
11:00	*	*	*	*	*	*	*	*	346	431	346	431	304	460	250	416	
12:00 PM	*	*	*	*	*	*	*	*	365	568	365	568	302	437	271	424	
1:00	*	*	*	*	*	*	*	*	336	572	336	572	277	453	250	381	
2:00	*	*	*	*	*	*	*	316	456	354	465	335	460	302	458	243	328
3:00	*	*	*	*	*	*	*	424	521	385	517	404	519	296	442	327	358
4:00	*	*	*	*	*	*	*	399	455	378	519	388	487	266	384	269	373
5:00	*	*	*	*	*	*	*	379	536	391	499	385	518	259	382	282	316
6:00	*	*	*	*	*	*	*	282	438	238	431	260	434	197	363	219	308
7:00	*	*	*	*	*	*	*	244	332	236	334	240	333	237	295	166	236
8:00	*	*	*	*	*	*	*	205	215	183	249	194	232	198	198	178	197
9:00	*	*	*	*	*	*	*	167	163	175	164	171	164	172	176	157	134
10:00	*	*	*	*	*	*	*	99	97	98	99	98	98	137	113	66	63
11:00	*	*	*	*	*	*	*	65	53	81	66	73	60	100	78	37	25
Total	0	0	0	0	0	0	0	2580	3266	4795	6648	4824	6610	4046	5508	3497	4567
Day	0	0	0	0	0	0	0	5846		11443		11434		9554		8064	
AM Peak										11:00	8:00	11:00	8:00	11:00	11:00	11:00	11:00
Volume										346	458	346	458	304	460	250	416
PM Peak								3:00	5:00	5:00	1:00	3:00	1:00	12:00 PM	2:00	3:00	12:00 PM
Volume								424	536	391	572	404	572	302	458	327	424







6/7/2021	6/7/2021		6/8/2021		6/9/2021		6/10/2021		6/11/2021		Weekday Average		6/12/2021		6/13/2021		
Time	Outbound , Lane 1	Inbound, Lane 2	Outbound , Lane 1	Inbound, Lane 2	Outbound , Lane 1	Inbound, Lane 2	Outbound , Lane 1	Inbound, Lane 2	Outbound , Lane 1	Inbound, Lane 2	Outbound , Lane 1	Inbound, Lane 2	Outbound , Lane 1	Inbound, Lane 2	Outbound , Lane 1	Inbound, Lane 2	
12:00 AM	*	*	*	*	*	*	*	*	16	19	16	19	58	40	47	47	
1:00	*	*	*	*	*	*	*	*	16	9	16	9	45	18	52	29	
2:00	*	*	*	*	*	*	*	*	8	9	8	9	11	16	20	10	
3:00	*	*	*	*	*	*	*	*	6	7	6	7	11	22	14	11	
4:00	*	*	*	*	*	*	*	*	6	19	6	19	8	6	2	4	
5:00	*	*	*	*	*	*	*	*	32	62	32	62	14	35	7	14	
6:00	*	*	*	*	*	*	*	*	85	90	85	90	62	48	31	29	
7:00	*	*	*	*	*	*	*	*	166	228	166	228	94	96	77	89	
8:00	*	*	*	*	*	*	*	*	332	458	332	458	188	215	118	179	
9:00	*	*	*	*	*	*	*	*	272	382	272	382	226	323	192	269	
10:00	*	*	*	*	*	*	*	*	290	451	290	451	282	450	222	327	
11:00	*	*	*	*	*	*	*	*	346	431	346	431	304	460	250	416	
12:00 PM	*	*	*	*	*	*	*	*	365	568	365	568	302	437	271	424	
1:00	*	*	*	*	*	*	*	*	336	572	336	572	277	453	250	381	
2:00	*	*	*	*	*	*	*	316	456	354	465	335	460	302	458	243	328
3:00	*	*	*	*	*	*	*	424	521	385	517	404	519	296	442	327	358
4:00	*	*	*	*	*	*	*	399	455	378	519	388	487	266	384	269	373
5:00	*	*	*	*	*	*	*	379	536	391	499	385	518	259	382	282	316
6:00	*	*	*	*	*	*	*	282	438	238	431	260	434	197	363	219	308
7:00	*	*	*	*	*	*	*	244	332	236	334	240	333	237	295	166	236
8:00	*	*	*	*	*	*	*	205	215	183	249	194	232	198	198	178	197
9:00	*	*	*	*	*	*	*	167	163	175	164	171	164	172	176	157	134
10:00	*	*	*	*	*	*	*	99	97	98	99	98	98	137	113	66	63
11:00	*	*	*	*	*	*	*	65	53	81	66	73	60	100	78	37	25
Total	0	0	0	0	0	0	2580	3266	4795	6648	4824	6610	4046	5508	3497	4567	
Day	0	0	0	0	0	0	5846		11443		11434		9554		8064		
AM Peak									11:00	8:00	11:00	8:00	11:00	11:00	11:00	11:00	11:00
Volume									346	458	346	458	304	460	250	416	
PM Peak							3:00	5:00	5:00	1:00	3:00	1:00	12:00 PM	2:00	3:00	12:00 PM	
Volume							424	536	391	572	404	572	302	458	327	424	









Direction: Outbound, Lane 1

6/11/2021 Time	0 - 3 MPH	> 3 - 6 MPH	> 6 - 9 MPH	> 9 - 12 MPH	> 12 - 15 MPH	> 15 - 18 MPH	> 18 - 21 MPH	> 21 - 24 MPH	> 24 - 27 MPH	> 27 - 30 MPH	> 30 - 33 MPH	> 33 - 36 MPH	> 36 - 39 MPH	> 39 MPH	Total
12:00 AM	0	0	0	0	0	0	0	2	3	2	7	1	0	1	16
1:00	0	0	0	0	0	0	1	2	2	6	2	2	1	0	16
2:00	0	0	0	1	0	0	0	0	4	1	0	2	0	0	8
3:00	0	0	0	0	0	0	0	1	1	2	2	0	0	0	6
4:00	0	0	0	0	0	0	1	2	1	1	1	0	0	0	6
5:00	0	0	0	0	0	1	0	3	5	12	6	4	1	0	32
6:00	0	0	0	0	1	0	5	11	19	27	17	2	2	1	85
7:00	0	0	0	0	0	0	9	22	45	47	32	10	0	1	166
8:00	0	0	0	0	0	6	21	62	100	91	43	5	3	1	332
9:00	0	0	0	0	2	2	16	40	100	79	26	6	1	0	272
10:00	0	0	0	0	0	5	12	45	118	71	32	7	0	0	290
11:00	0	0	1	0	2	9	22	62	125	88	25	6	2	4	346
12:00 PM	0	0	0	0	1	6	28	55	119	110	35	8	3	0	365
1:00	0	0	1	0	1	3	23	67	117	101	21	2	0	0	336
2:00	0	0	1	0	1	8	24	62	127	94	28	8	1	0	354
3:00	0	0	0	0	0	7	16	68	132	118	36	7	1	0	385
4:00	0	0	0	0	1	3	19	63	132	116	32	12	0	0	378
5:00	0	0	0	1	1	3	21	65	142	109	36	9	2	2	391
6:00	0	0	0	0	0	0	2	46	98	62	24	4	2	0	238
7:00	0	0	0	1	0	3	15	41	66	64	38	6	2	0	236
8:00	0	0	0	0	0	1	5	35	73	54	13	2	0	0	183
9:00	0	0	1	0	3	1	2	26	62	49	27	3	1	0	175
10:00	0	0	0	0	0	1	3	10	26	33	22	3	0	0	98
11:00	0	0	1	0	0	0	5	9	21	20	17	6	1	1	81
Total	0	0	5	3	13	59	250	799	1638	1357	522	115	23	11	4795

Percentile	15th	50th	85th	95th
Speed	22.9	26	29.7	32.2
Mean Speed (Average)	26.6			
10 MPH Pace Speed	21-30			
Number in Pace	3989			
Percent in Pace	82.5%			
Number > 45 MPH	11			
Percent > 45 MPH	0.2%			



Direction: Outbound, Lane 1

6/12/2021	> 3 - 6	> 6 - 9	> 9 - 12	> 12 - 15	> 15 - 18	> 18 - 21	> 21 - 24	> 24 - 27	> 27 - 30	> 30 - 33	> 33 - 36	> 36 - 39	> 39 MPH	Total	
Time	0 - 3 MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH		
12:00 AM	0	0	0	0	0	0	2	2	15	18	15	4	1	58	
1:00	0	0	0	1	0	0	0	2	6	18	14	4	0	45	
2:00	0	0	0	0	0	1	0	0	0	5	4	1	0	11	
3:00	0	0	0	0	0	1	1	2	4	1	0	1	1	11	
4:00	0	0	0	0	0	0	0	1	2	2	3	0	0	8	
5:00	0	0	0	0	0	1	1	2	4	1	1	0	0	14	
6:00	0	0	0	1	1	0	3	7	19	21	8	1	1	62	
7:00	0	0	0	0	0	1	3	15	33	26	9	5	2	94	
8:00	0	0	1	0	2	3	12	20	58	59	26	6	1	188	
9:00	0	0	0	0	1	14	10	40	66	63	19	12	1	226	
10:00	0	0	1	0	1	3	16	56	100	68	29	6	1	282	
11:00	0	0	0	0	0	2	22	46	112	81	36	2	3	304	
12:00 PM	0	0	0	0	2	2	28	37	96	102	30	4	1	302	
1:00	0	0	0	0	0	4	23	47	104	64	28	4	3	277	
2:00	0	0	0	0	0	4	23	44	98	80	41	10	2	302	
3:00	0	0	4	0	1	5	21	46	89	91	35	3	1	296	
4:00	0	0	0	0	1	1	17	52	93	71	31	0	0	266	
5:00	0	0	1	2	0	0	12	36	104	59	35	8	1	259	
6:00	0	0	0	0	2	0	12	32	56	64	22	5	4	197	
7:00	0	0	0	0	2	0	13	32	75	88	21	3	2	237	
8:00	0	0	0	0	0	2	12	26	79	62	11	6	0	198	
9:00	0	0	0	0	1	2	14	26	57	40	22	6	3	172	
10:00	0	0	0	0	0	0	1	11	38	51	25	7	3	137	
11:00	0	0	0	0	0	0	4	9	28	28	22	9	0	100	
Total	0	0	7	4	14	46	250	591	1336	1166	487	108	31	6	4046

Percentile	15th	50th	85th	95th
Speed	22.9	26.6	30.3	32.2
Mean Speed (Average)	26.6			
10 MPH Pace Speed	21-30			
Number in Pace	3242			
Percent in Pace	80.3%			
Number > 45 MPH	6			
Percent > 45 MPH	0.1%			











Direction: Inbound, Lane 2

6/11/2021	> 3 - 6	> 6 - 9	> 9 - 12	> 12 - 15	> 15 - 18	> 18 - 21	> 21 - 24	> 24 - 27	> 27 - 30	> 30 - 33	> 33 - 36	> 36 - 39	> 39 MPH	Total	
Time	0 - 3 MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH		
12:00 AM	0	0	0	0	0	0	1	2	4	7	3	1	0	1	19
1:00	0	0	0	0	0	0	2	0	3	1	2	1	0	0	9
2:00	0	0	0	0	0	0	0	0	3	6	0	0	0	0	9
3:00	0	0	0	0	0	0	0	0	2	3	0	1	1	0	7
4:00	0	0	0	0	0	0	0	2	2	4	7	2	2	0	19
5:00	0	0	0	0	0	0	3	0	5	21	19	8	4	2	62
6:00	0	0	0	0	0	0	5	2	27	25	22	7	1	1	90
7:00	0	0	1	2	2	1	9	13	65	81	50	1	2	1	228
8:00	0	0	0	0	1	9	16	44	160	169	49	9	1	0	458
9:00	0	0	1	0	0	3	14	33	113	138	66	10	3	1	382
10:00	0	0	0	0	2	1	21	46	152	140	72	13	1	3	451
11:00	0	0	0	0	3	5	15	56	157	125	56	10	4	0	431
12:00 PM	0	0	2	4	8	7	40	83	214	161	40	8	1	0	568
1:00	0	0	0	3	2	7	27	62	225	177	57	11	1	0	572
2:00	0	0	0	1	5	10	21	74	164	132	50	7	1	0	465
3:00	0	0	0	2	0	14	28	54	160	178	59	18	4	0	517
4:00	0	0	0	0	7	9	20	66	200	142	65	9	0	1	519
5:00	0	0	0	0	9	10	32	55	159	151	73	8	2	0	499
6:00	0	0	0	2	3	3	11	51	131	134	80	13	2	1	431
7:00	0	0	0	0	1	6	16	34	111	106	51	9	0	0	334
8:00	0	0	0	0	0	7	19	26	73	70	49	4	1	0	249
9:00	0	0	0	0	0	1	7	17	56	50	20	7	4	2	164
10:00	0	0	0	0	0	1	10	10	27	39	11	0	1	0	99
11:00	0	0	0	0	0	0	2	5	25	22	9	1	2	0	66
Total	0	0	4	14	43	94	319	735	2238	2082	910	158	38	13	6648

Percentile	15th	50th	85th	95th
Speed	23.5	26.6	30.3	32.2
Mean Speed (Average)	27.0			
10 MPH Pace Speed	23-32			
Number in Pace	5487			
Percent in Pace	82.3%			
Number > 45 MPH	12			
Percent > 45 MPH	0.2%			





Direction: Inbound, Lane 2

6/13/2021	> 3 - 6	> 6 - 9	> 9 - 12	> 12 - 15	> 15 - 18	> 18 - 21	> 21 - 24	> 24 - 27	> 27 - 30	> 30 - 33	> 33 - 36	> 36 - 39	> 39 MPH	Total
Time	0 - 3 MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	MPH	
12:00 AM	0	0	0	0	0	1	1	2	14	16	8	4	1	47
1:00	0	0	0	0	0	1	0	3	8	4	6	5	1	29
2:00	0	0	0	0	0	0	0	6	3	1	0	0	0	10
3:00	0	0	0	0	0	0	1	3	2	3	1	1	0	11
4:00	0	0	0	0	0	0	0	1	1	1	0	0	0	4
5:00	0	0	0	0	1	0	1	1	7	3	1	0	0	14
6:00	0	0	0	0	0	0	1	8	7	7	3	2	0	29
7:00	0	0	0	0	1	1	3	27	23	20	9	0	0	89
8:00	0	0	0	0	1	0	5	50	59	40	8	1	0	179
9:00	0	0	0	0	3	4	14	82	83	56	8	1	1	269
10:00	0	0	0	1	2	2	12	98	112	58	18	3	0	327
11:00	0	0	0	0	1	12	32	133	107	77	12	2	1	416
12:00 PM	0	0	0	0	4	6	9	58	115	61	11	3	1	424
1:00	0	0	0	0	3	2	19	32	110	63	12	1	0	381
2:00	0	0	0	1	2	2	15	28	95	71	13	3	1	328
3:00	0	0	1	1	4	11	24	43	94	52	14	4	1	358
4:00	0	0	0	0	4	6	11	46	125	62	10	0	0	373
5:00	0	0	1	0	3	6	13	33	98	48	14	1	0	316
6:00	0	0	0	0	1	4	20	30	90	51	8	3	0	308
7:00	0	0	0	0	1	7	10	28	68	38	8	2	1	236
8:00	0	0	0	0	0	2	5	16	66	32	7	5	0	197
9:00	0	0	0	1	1	1	2	17	56	34	17	2	3	134
10:00	0	0	0	0	0	2	0	4	26	24	6	1	0	63
11:00	0	0	0	0	0	0	1	0	6	7	6	5	0	25
Total	0	0	2	4	32	70	199	439	1421	1395	787	174	37	4567

Percentile	15th	50th	85th	95th
Speed	23.5	27.2	30.3	32.8
Mean Speed (Average)	27.4			
10 MPH Pace Speed	23-32			
Number in Pace	3712			
Percent in Pace	81.8%			
Number > 45 MPH	8			
Percent > 45 MPH	0.2%			













