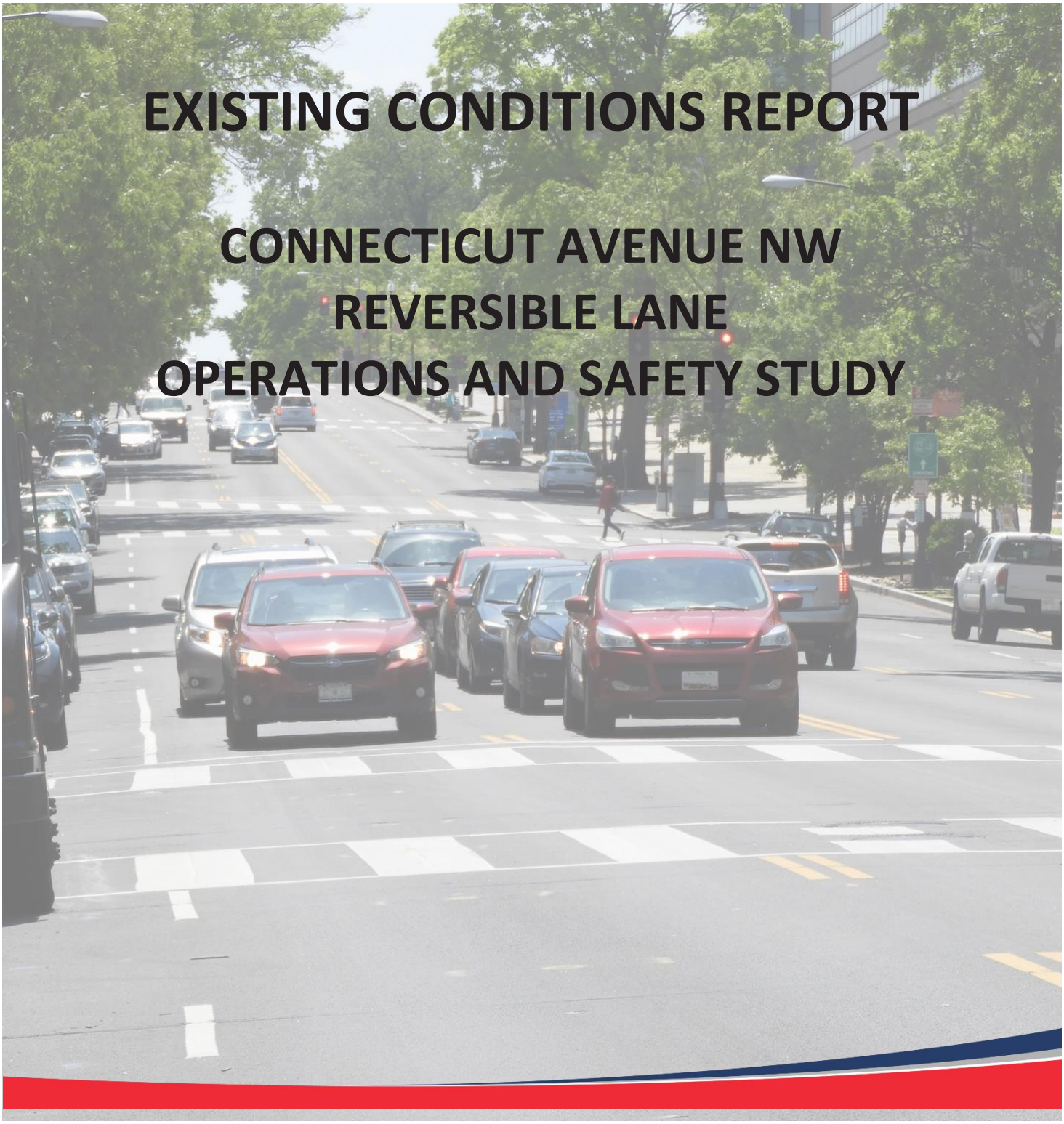

EXISTING CONDITIONS REPORT

CONNECTICUT AVENUE NW REVERSIBLE LANE OPERATIONS AND SAFETY STUDY

JUNE 2020

GOVERNMENT OF THE DISTRICT OF COLUMBIA
MURIEL BOWSER, MAYOR

A. MORTON THOMAS
AND ASSOCIATES, INC.

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BACKGROUND

A two-lane reversible lane system operates in the two middle of six (6) total travel lanes along Connecticut Avenue NW, from Legation Street NW (to the north) to Calvert Street NW (to the south), a distance of approximately 2.7 miles. Four lanes are dedicated to southbound traffic and two lanes are dedicated to northbound traffic during the AM peak hour. The reverse occurs during the PM peak hour with four lanes operating outbound and two lanes operating inbound. During non-peak periods, Connecticut Avenue NW maintains two (2) lanes in each direction with the outside lanes allocated for bus stops, parking and commercial loading. **Figure 1** represents the location of the project with respect to the DC Regional Area. The reversible lane system operates during the 7:00-9:30 AM and 4:00-6:30 PM peak periods and traverses the neighborhoods of Chevy Chase, Cleveland Park, and Woodley Park.

Poll mounted dynamic and static signing is provided adjacent to the outside lanes to instruct motorists on how to utilize the reversible lane system and the correct lanes of travel in each direction when in operation. During peak periods, parking and commercial loading is prohibited; however, bus stops remain in service.

During the AM peak hour, Connecticut Avenue maintains approximately 1,220 to 2,490 vehicles and 470 to 710 vehicles per hour in the southbound peak and northbound non-peak directions, respectively. During the PM peak hour, Connecticut Avenue maintains approximately 500 to 730 vehicles and 1,240 to 2,250 vehicles per hour in the northbound peak and southbound non-peak directions, respectively.

STUDY HISTORY

The Connecticut Avenue corridor has been the focus of several past District Department of Transportation (DDOT) studies, all of which have recommended enhanced safety, access, multimodal improvements along the corridor. Several pedestrian access and safety recommendations stemmed from the 2013 Cleveland Park Transportation Study and resulting Cleveland Park Streetscape Improvement Plan. In addition, Connecticut Avenue has been identified as a priority corridor for protected bike lanes as part of the District's Long-Range Transportation Plan, moveDC.

Studies such as the 2003 Connecticut Avenue Transportation Study and 2011 ITE Reversible Lane Operation article highlight the operational challenges and safety implications of the reversible lane operations. The 2003 Connecticut Avenue Transportation Study indicated that "As a popular tourist destination, the District has a large number of unfamiliar drivers… Reversible lanes can be confusing, especially for unfamiliar drivers, for turning movements, specifically left turns, from and to the side streets. Reversible lanes also restrict the District's ability to provide for protected [signal] phasing in areas where such a strategy can have potential benefits."[1] [2]

In light of past findings, there has been a renewed community interest in considering the removal of the reversible lanes along the corridor. In 2018, ANC's 3C, 3F, and 3G passed supporting resolutions to study the reversible lane operations along the Connecticut Avenue corridor. The three ANC Resolutions are

[1] DDOT, *Connecticut Avenue Transportation Study Final Report.* August 2003.
https://comp.ddot.dc.gov/Documents/Connecticut%20Avenue%20Transportation%20Study.pdf
[2] S.Dey, J.Ma, and Y.Aden, *Reversible Lane Operation for Arterial Roadways: The Washington, DC, USA Experience.* ITE Journal. May 2011.

included in this Report as **Appendix A**. There was an extensive community driven process in helping to craft the RFQ for the 2020 Connecticut Avenue NW Reversible Lane Operations and Safety Study. The study will use a data driven analysis to support the identification of opportunities and alternatives to the current configuration of Connecticut Avenue NW.

STUDY PURPOSE

The District Department of Transportation is studying the feasibility of removing the reversible lane system as part of the District of Columbia's Vision Zero initiative, which aims to eliminate traffic deaths and serious injuries by 2024. The purpose of the Connecticut Avenue NW Reversible Lane Safety and Operations Study is to assess the multimodal (vehicular, transit, bicycle, and pedestrian) operational and safety impacts associated with removing or maintaining/improving the existing reversible lane system. The study will consider: (1) safety enhancements, for motorized and non-motorized access; (2) installation of protected bicycle lanes; (3) inclusion of left and/or right turn-lanes at key intersections; and (4) impacts to adjacent roadways if vehicular capacity is reduced along Connecticut Avenue.

Should the removal of the reversible lanes be recommended for implementation, environmental documentation will be prepared, in accordance with the National Environmental Policy Act of 1969 (NEPA) and associated environmental regulations.

STUDY AREA

The "Primary Study Area" includes twenty-four (24) signalized intersections and encompasses the segment of Connecticut Avenue NW from Legation Street NW to Calvert Street NW. The "Secondary Study Area" incorporates seventeen (17) signalized intersections within an area that is bounded by Massachusetts Avenue NW to the west (including Wisconsin Avenue NW and Reno Road NW), Broad Branch Road NW to the east, Dupont Circle to the south, and Western Avenue to the north.

Figure 1 illustrates the limits of the Primary and Secondary Study Areas**.**

Figure 2 shows the primary and secondary study areas in the context of the Washington, DC region.

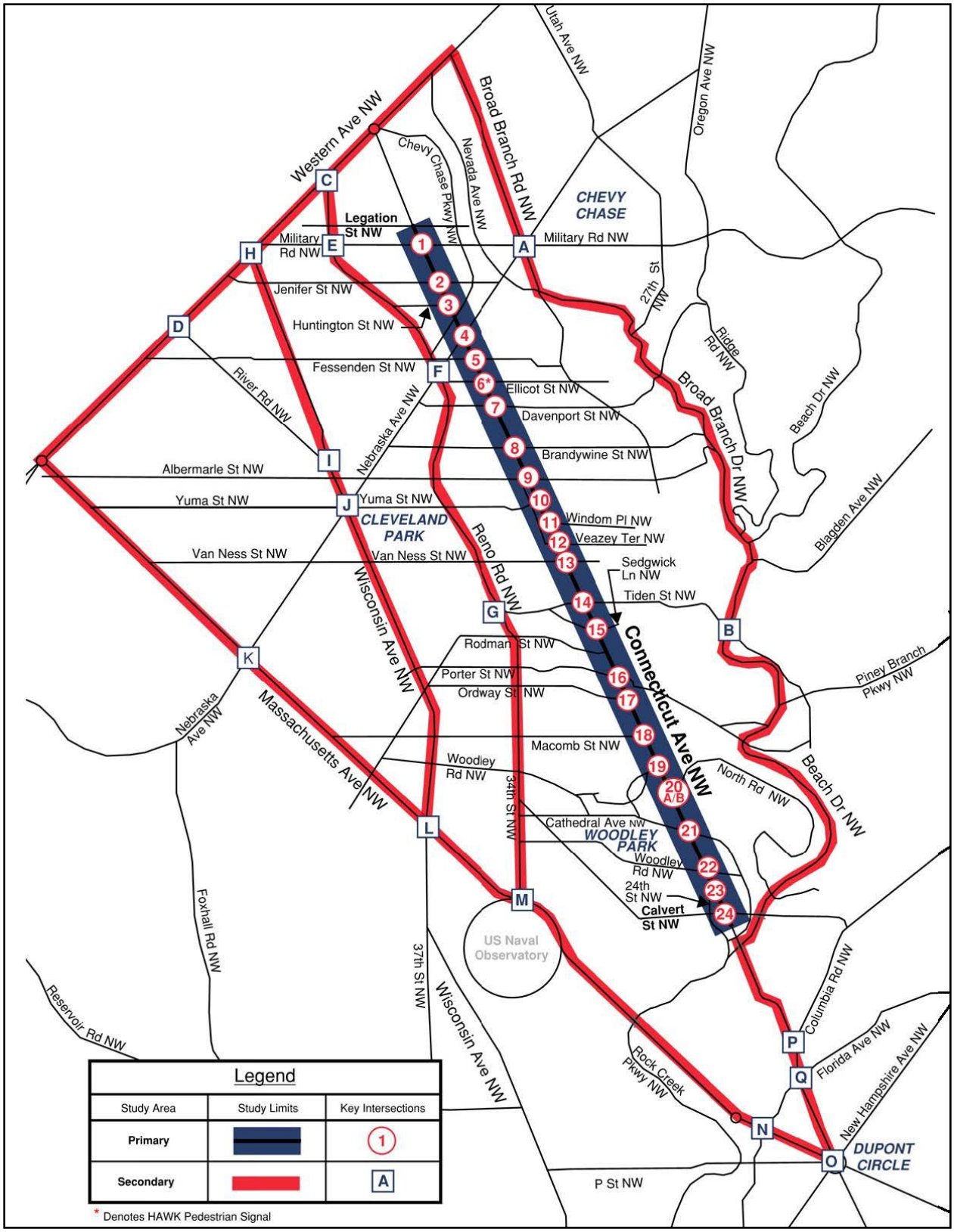


Figure 1: Primary and Secondary Study Area

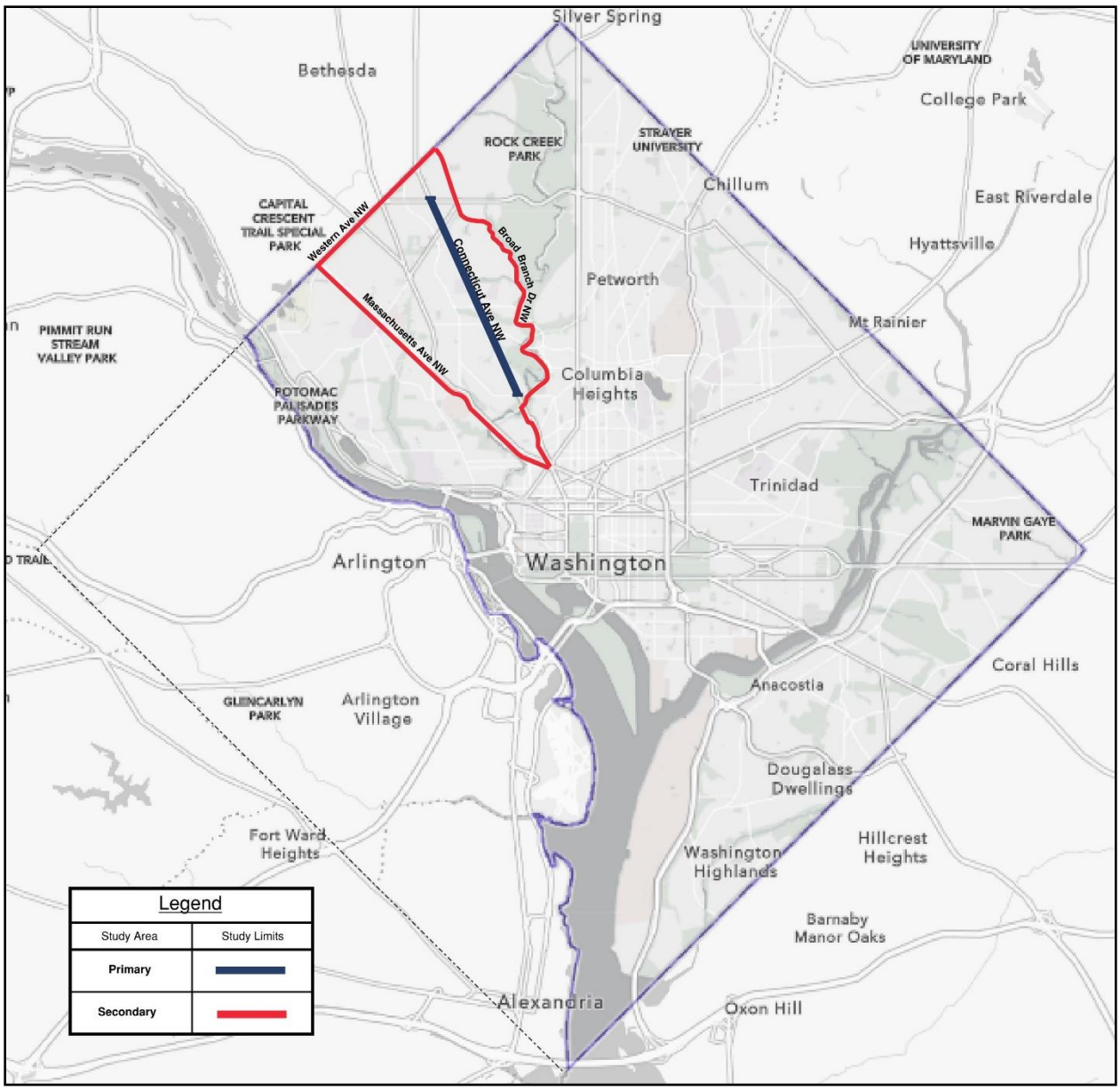


Figure 2: Study Area in Regional Context

MAJOR PROJECTS IN THE STUDY AREA

There are several ongoing District planning and design projects that area located within or nearby the project study area. Projects such as the Cleveland Park Streetscape and Drainage Project and Van Ness Transportation Study are located directly within the boundaries of the project study area. The project team will continue to engage, collaborate, and share findings and recommendations with members of the individual DDOT project teams and the public during the completion of the Connecticut Avenue Safety and Operations project.

Van Ness Commercial Corridor Design Project

The Van Ness Commercial Corridor Design Project will propose design improvements for the Van Ness commercial district, which is located along Connecticut Avenue NW between Van Ness Street and Albemarle Street. The project also includes Van Ness Street NW between Connecticut Avenue and Reno Road, and Windom Place on both sides of Connecticut Avenue. The project is in Ward 3, and within the boundaries of ANC 3F. The project will continue the conceptual planning work that was managed by the DC Office of Planning (OP), as part of the Van Ness Commercial District Action Strategy and the Connecticut Avenue Green Infrastructure Strategy. The project is currently being scoped.

Cleveland Park Streetscape and Drainage Project

The Cleveland Park Streetscape and Drainage Project stemmed from the 2013 Cleveland Park Transportation Study. This project will address the local recurring flooding problem near the Cleveland Park Metro Station and includes drainage improvements and pedestrian safety, access, and visibility improvements at study area intersections. The project will introduce public realm improvements along Connecticut Avenue from Macomb Street NW to Quebec Street, NW. The overall project includes, but is not limited to, drainage improvements, streetscape and streetlight modifications, and paving and stormwater management. The project is currently in the final design stages.

Connecticut Avenue Deck Over Project

DDOT aims to provide a new, multi-modal streetscape along Connecticut Avenue, starting on the north side of Dupont Circle and continuing north to California Street NW that will help enhance mobility, safety and repurpose unused existing spaces through innovative design solutions. Additional streetscape improvements along Connecticut Avenue NW will enhance pedestrian, bicycle, transit and vehicular traffic along the corridor by rebuilding curbs, gutters, sidewalks and pedestrian ramps, and provide intersection improvements to enhance operations and safety for all roadway users.

As a part of this project, DDOT has designed a plaza over the Connecticut Avenue underpass to create a new, multi-use public space between Dupont Circle and Q Street NW. The plaza will continue to allow vehicles on Connecticut Avenue NW under the circle and connect the east and west sides of Connecticut Avenue NW through a pedestrian-only crossing. The project is currently in the final design stages.

2011 ITE Reversible Lane Study

A 2011 article and associated study in the ITE (Institute of Transportation Engineers) Journal (May 2011) entitled, *Reversible Lane Operation for Arterial Roadways: The Washington, DC, USA Experience*, evaluated the operations of reversible lanes in the District of Columbia. The Connecticut Avenue arterial (containing reversible lanes) was compared with two proximate arterials without reversible lanes, Massachusetts Avenue and Wisconsin Avenue. The study found that Connecticut Avenue had three times as many crashes as Massachusetts Avenue, though it carries only 40 percent more traffic. In addition, 35 percent of the crashes on Connecticut Avenue occur during reversible lane operations, a significantly higher percentage than other arterials included in the study. Connecticut Avenue had a higher propensity of head-on and sideswipe crashes than along Massachusetts Avenue and Wisconsin Avenue. These two accident types can be attributed to reversible lane operation. The study concludes by stating that "the higher crash rate can… be attributed to the District's tradition of not using mast arms for overhead reversible lane control signals due to aesthetic reasons".

Cleveland Park Service Lanes Parking Removal During COVID-19

In response to the COVID-19 pandemic, District officials and DDOT have begun expanding sidewalks throughout the City in order to provide adequate space for pedestrians and helping to facilitate social distancing policies during the pandemic. The District has identified and implementing expansions in several locations throughout the City, including a full closure of the Connecticut Avenue NW service lane between Macomb Street NW and Ordway Street NW. The full closure was installed on April 23, 2020.

CONNECTICUT AVENUE NW ROADWAY GEOMETRY

TYPICAL SECTIONS

DDOT's Right-of-Way (ROW) inventory indicates that the Connecticut Avenue has a consistent 110 to 140-foot ROW within the project boundary, which includes the landscaped public parking zone, sidewalk, and roadway elements. The existing curb-to-curb roadway width is 60 feet and consists of six (6) 10-foot wide travel and parking lanes**.** The project scope of work is limited to the 60 feet curb-to-curb width.

Figures 3 through 7 show the Connecticut Avenue roadway typical section in five areas of the study corridor.

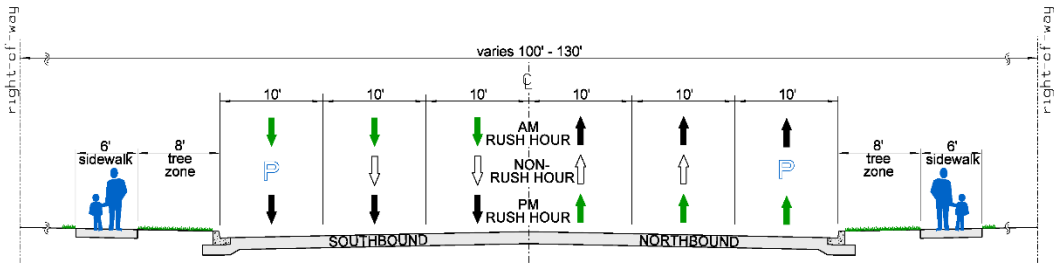


Figure 3: Typical Section (Chevy Chase Circle NW to Legation Street NW; Woodley Road NW to Calvert Street NW)

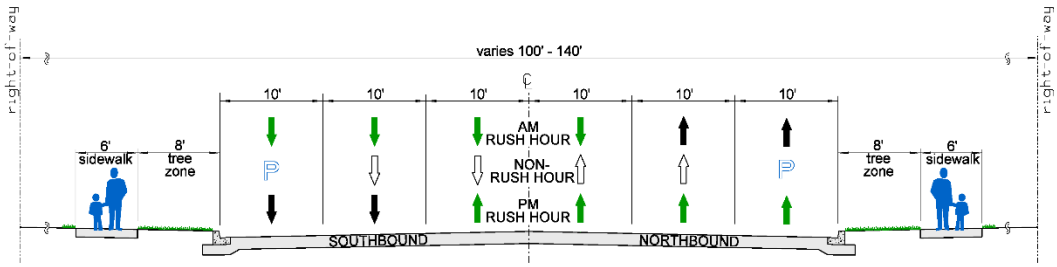


Figure 4: Typical Section (Legation Street NW to Ordway Street NW; Devonshire Place NW to Woodley Road NW)

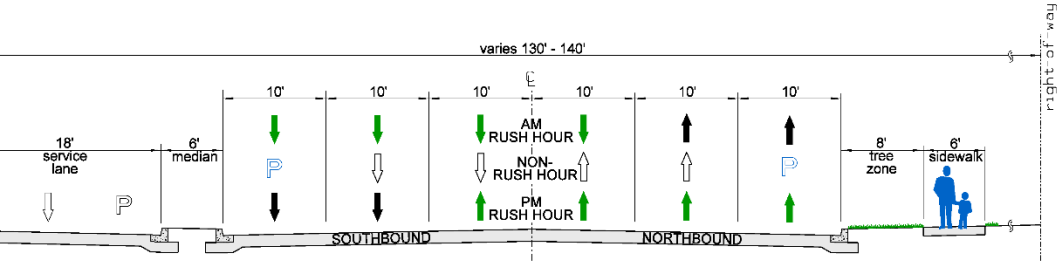


Figure 5: Typical Section (Ordway Street NW to Macomb Street NW)

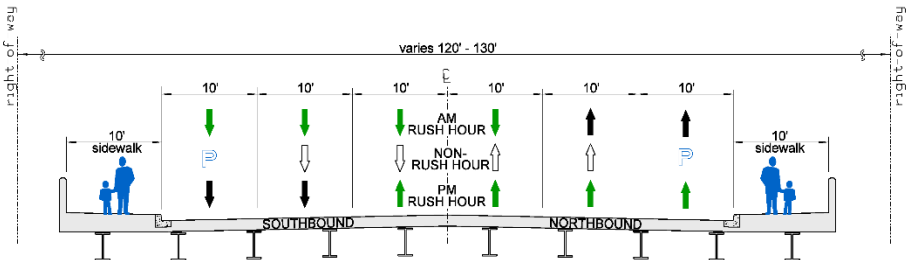


Figure 6: Typical Section (Macomb Street NW to Devonshire Place NW)

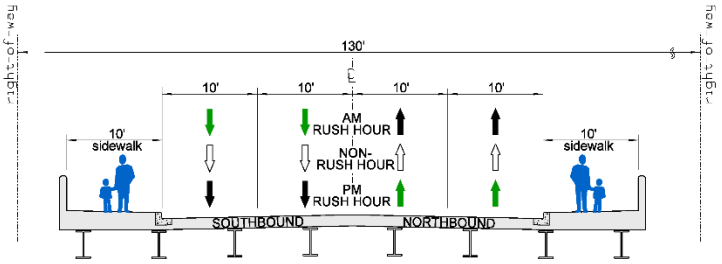


Figure 7: Typical Section (South of Calvert Street NW (Howard Taft Bridge))

CONNECTICUT AVENUE NW TRAFFIC OPERATIONS AND REVERSIBLE LANES

Figure 8 through **Figure 11** provide the traffic control, operational signage and lane geometry associated with the study area corridor.

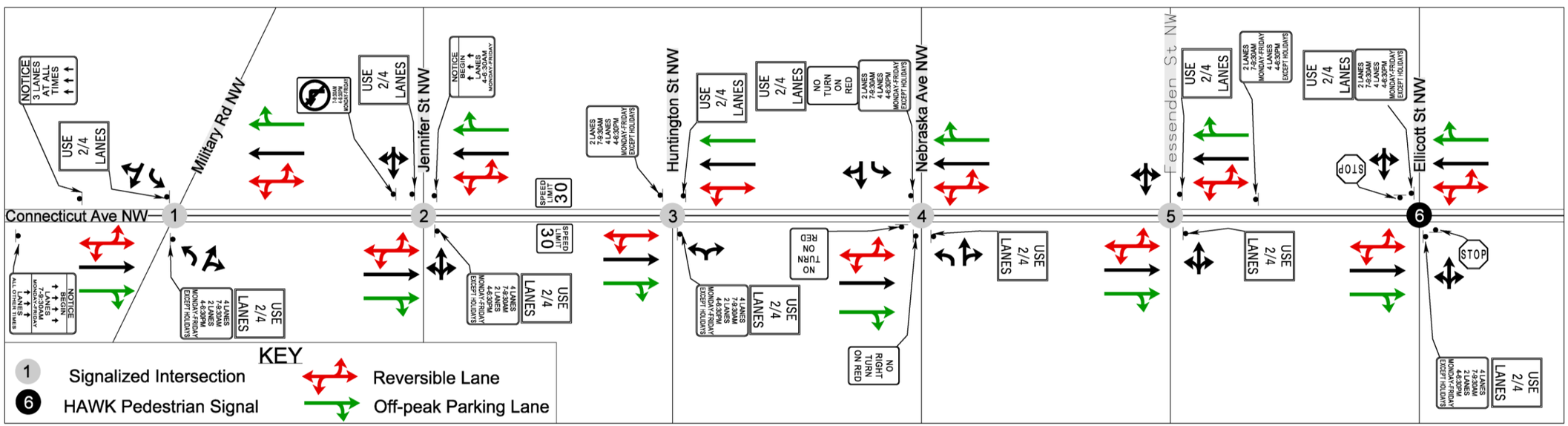


Figure 8: Traffic Control, Operational Signage, Parking, and Lane Geometry from Military Road NW to Ellicott Street NW

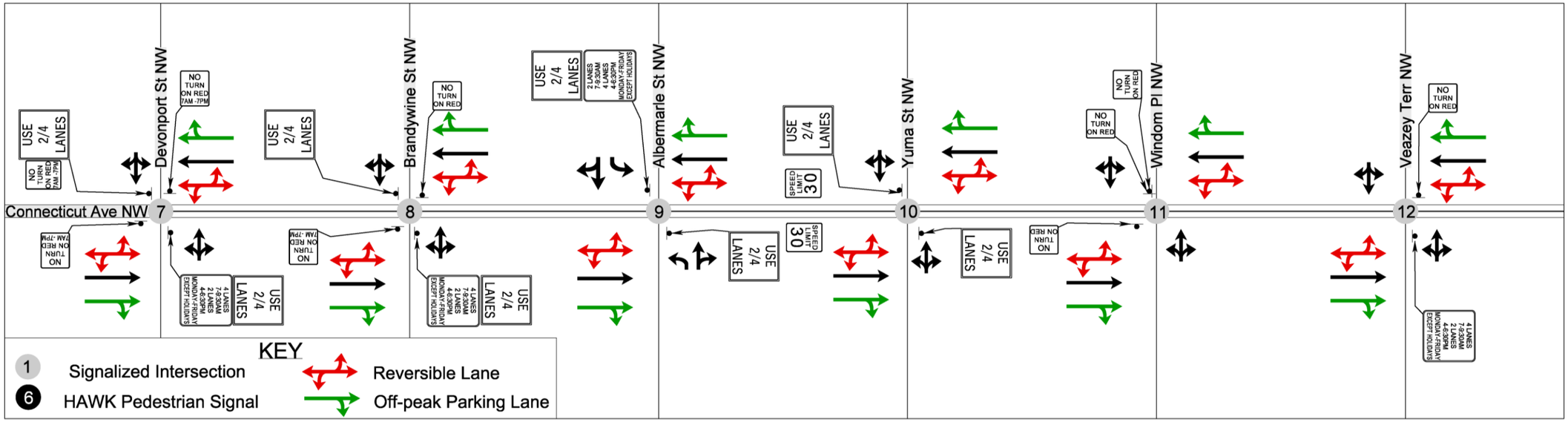


Figure 9: Traffic Control, Operational Signage, Parking, and Lane Geometry from Devonport Street NW to Veazey Terrace NW

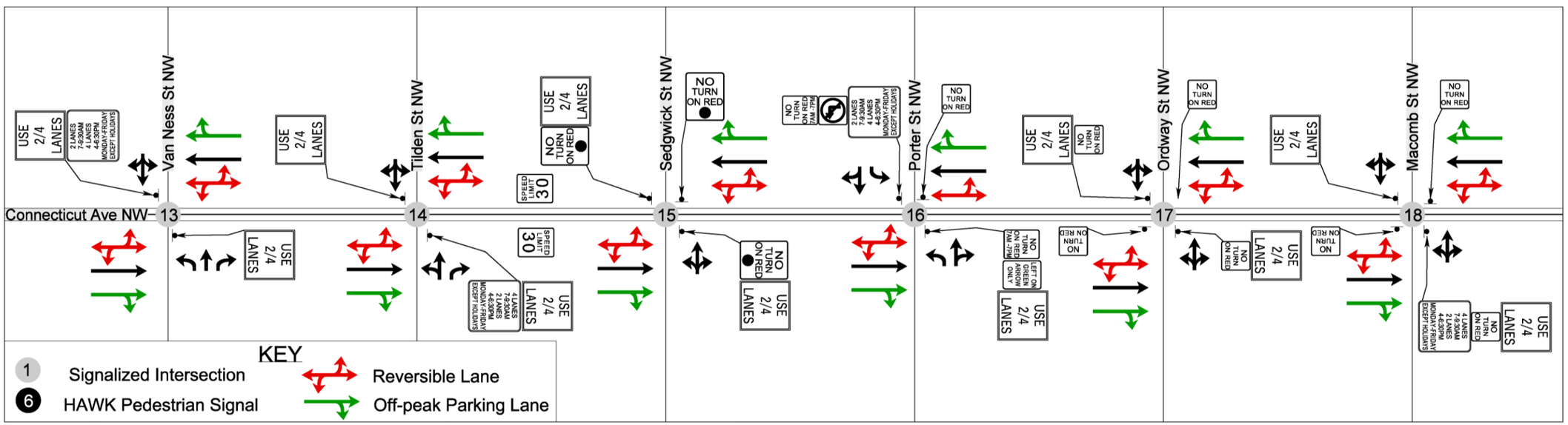


Figure 10: Traffic Control, Operational Signage, Parking, and Lane Geometry from Devonshire Place NW to Calvert Street NW

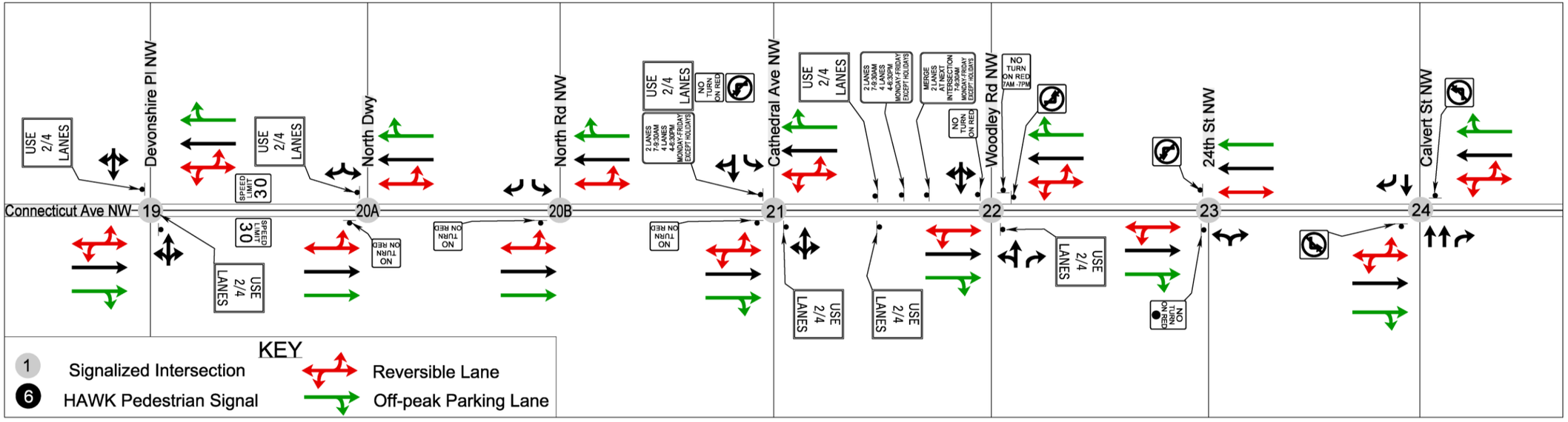


Figure 11: Traffic Control, Operational Signage, Parking, and Lane Geometry from Van Ness Street NW to Macomb Street NW

TRAFFIC OPERATIONS

AVERAGE DAILY TRAFFIC VOLUMES

Figure 12 shows the Average Daily Traffic (ADT) volumes within the study area. ADTs were obtained by conducting 48-hour speed, volume and classification counts in 15-minute increments. Video processing was utilized along Connecticut Avenue NW to determine volume and classification counts by lane and direction. All other locations were completed using traditional road tubes. The summary sheets from this data collection activity can be found in **Appendix B.**

Within the study area, in **Figure 12**, Connecticut Avenue NW, from just south of Western Avenue to south of Tilden Street NW, has approximately 30,000 to 32,000 vehicles per day traveling along this section of the roadway. The section of Connecticut Avenue in the vicinity of Calvert Street NW has an ADT volume of approximately 23,600 vehicles per day.

Roadways within the secondary study area have the following ADTs:

- Wisconsin Avenue: 23,600 to 28,100 vehicles per day (VPD)
- Reno Road: 12,100 VPD
- Massachusetts Avenue: 28,400 VPD
- Broad Branch Road: 3,200 VPD
- Beach Drive: 19,900 VPD

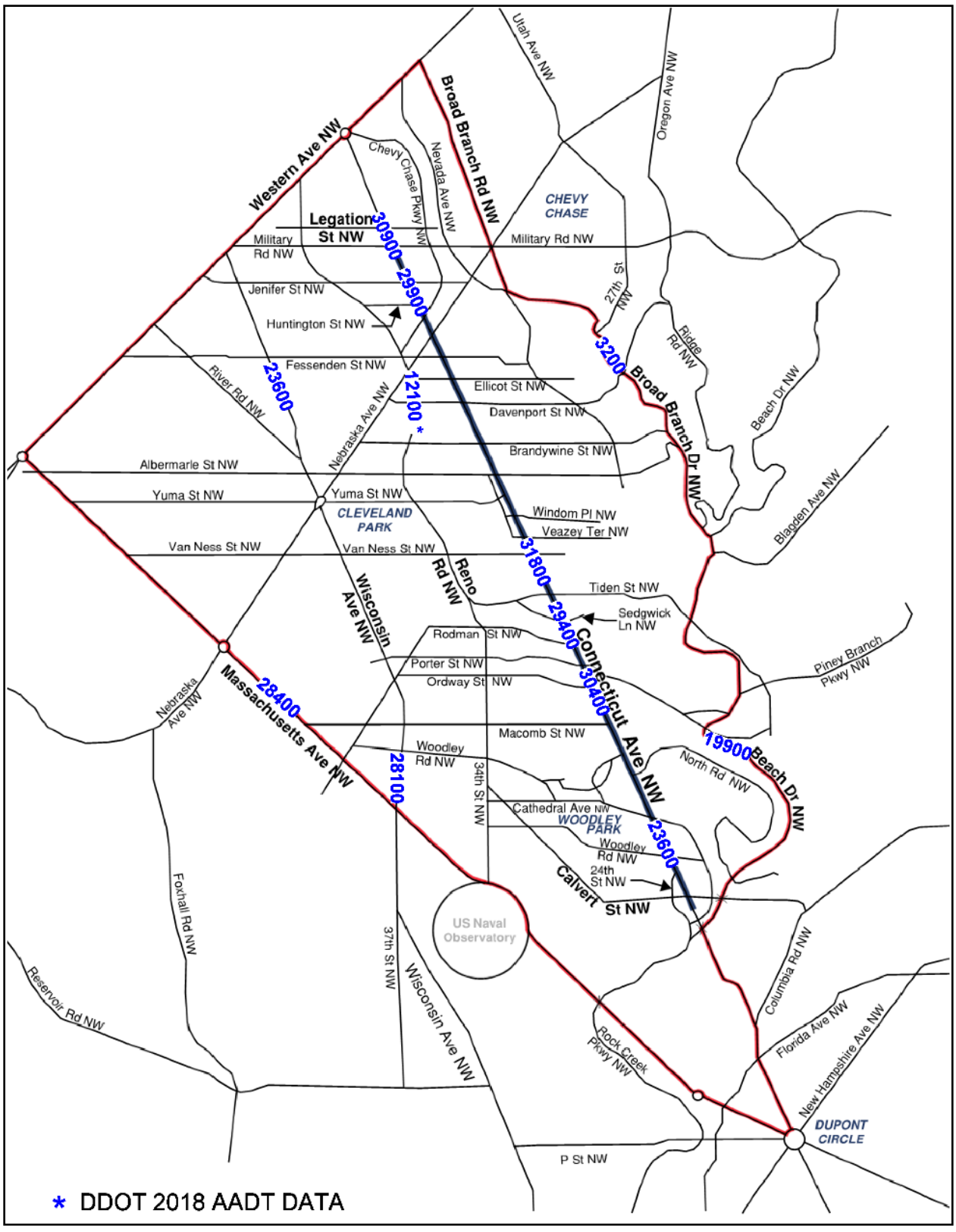


Figure 12: Average Daily Traffic Volumes

CONNECTICUT AVENUE NW PEAK HOUR SEGMENT VOLUMES

Table 1 provides a range of morning (AM), mid-day (MD), and evening (PM) volumes along Connecticut Avenue NW. Existing segment ADT volumes indicate the following:

- During the AM peak hour, the highest traffic volume is within the segment of Albemarle Street NW and Cathedral Avenue NW.
- During the mid-day peak hour, the highest traffic volume is within the segment of Military Road NW and Fessenden Road NW.
- During the PM peak hour, the highest traffic volume is within the segment of Albemarle Street NW and Cathedral Avenue NW.

Road Segment	AM Peak Hour		PM Peak Hour	
	Southbound	Northbound	Southbound	Northbound
Military Road NW to Fessenden Road NW	1,730-1,860	545-710	640-670	1,350-1,670
Fessenden Road NW to Albemarle St NW	1,890-2,260	540-580	610-680	1,680-1,920
Albemarle St NW to Cathedral Ave NW	2,050-2,490	530-640	500-730	1,840-2,250
Cathedral Ave NW to Calvert St NW	1,220-1,530	470-710	500-700	1,240-1,500

Road Segment	Mid-day Peak Hour	
	Southbound	Northbound
Military Road NW to Fessenden Road NW	600-780	670-880
Fessenden Road NW to Albemarle St NW	630-660	630-720
Albemarle St NW to Cathedral Ave NW	490-890	600-860
Cathedral Ave NW to Calvert Street NW	560-730	490-600

Table 1: Summary of AM, Mid-day, and PM Peak Hour Volumes

CONNECTICUT AVENUE NW LANE UTILIZATION

Lane utilization data was collected for the AM peak, PM peak and Mid-day off-peak periods along four (4) segments of Connecticut Avenue NW (within the Primary Study Area) to determine the balance of vehicles using each lane in the northbound and southbound directions, respectively. **Table 2** provides a range of morning (AM), mid-day (MD), and evening (PM) lane usage along Connecticut Avenue NW. Existing lane utilization data indicates the following based upon an averaging of the four (4) collected segments:

- AM Peak Period Lane Utilization
  - In the peak 4-Lane southbound direction, 64% of vehicles utilize the two (2) center lanes (i.e. Lanes 2 & 3) and only 36% utilize the two (2) outside lanes (i.e. Lanes 1 & 4).
  - In the off-peak 2-lane northbound direction, 62% of vehicles utilize the inside lane (i.e. Lane 1) and only 38% utilize the outside lane (i.e. Lane 2).
- PM Peak Period Lane Utilization
  - In the off-peak 2-lane southbound direction, 57% of vehicles utilize the inside lane (i.e. Lane 2) and only 43% utilize the outside lane (i.e. Lane 1).
  - In the peak 4-Lane northbound direction, 74% of vehicles utilize the two (2) center lanes (i.e. Lanes 2 & 3) and only 26% utilize the two (2) outside lanes (i.e. Lanes 1 & 4).

- Mid-day Peak Period Lane Utilization
  - In the 2-Lane southbound direction, 58% of vehicles utilize the outside lane (i.e. Lane 1) and only 36% utilize the inside lane (i.e. Lane 2). 6% of the total volume utilized the parking lane for travel (in areas where parked cars were not present).
  - In the 2-lane northbound direction, 58% of vehicles utilize the outside lane (i.e. Lane 2) and only 41% utilize the inside lane (i.e. Lane 1). 1% of the total volume utilized the parking lane for travel (in areas where parked cars were not present).

Road Segment	AM Peak Hour					
	Southbound				Northbound	
	Lane 1 ↓	Lane 2 ↓	Lane 3 ↓	Lane 4 ↓	Lane 1 ↑	Lane 2 ↑
Military Road NW and Nebraska Avenue NW	21%	28%	28%	23%	69%	31%
Van Ness Street NW and Tiden Street NW	13%	32%	37%	18%	53%	47%
Tiden Street NW and Porter Street NW	14%	28%	37%	21%	62%	38%
Macomb Street NW and Devonshire Place NW	12%	33%	33%	22%	62%	38%

Road Segment	PM Peak Hour					
	Southbound		Northbound			
	Lane 1 ↓	Lane 2 ↓	Lane 1 ↑	Lane 2 ↑	Lane 3 ↑	Lane 4 ↑
Military Road NW and Nebraska Avenue NW	37%	63%	11%	40%	42%	7%
Van Ness Street NW and Tiden Street NW	40%	60%	21%	35%	34%	10%
Tiden Street NW and Porter Street NW	57%	43%	21%	38%	35%	6%
Macomb Street NW and Devonshire Place NW	36%	64%	22%	36%	35%	7%

Road Segment	Mid-Day Peak Hour					
	Southbound			Northbound		
	P	Lane 1 ↓	Lane 2 ↓	Lane 1 ↑	Lane 2 ↑	P
Military Road NW and Nebraska Avenue NW	9%	64%	27%	41%	58%	1%
Van Ness Street NW and Tiden Street NW	5%	59%	36%	40%	59%	1%
Tiden Street NW and Porter Street NW	4%	52%	45%	42%	57%	1%
Macomb Street NW and Devonshire Place NW	5%	58%	37%	40%	57%	3%

5 % *Parking Lane used for travel during non-peak periods*

Table 2: Lane Utilization during AM, Mid-day, and PM Peak Periods

TURNING MOVEMENT COUNTS

Turning movement counts (TMCs) from the District's 2018 Citywide Signal Optimization Synchro models serve as the foundation of the traffic volume data used in this study.

Traffic counts along the primary Connecticut Avenue NW corridor were collected during typical weekdays in the spring and fall of 2019. Traffic counts for the secondary study intersections were collected in 2018 and 2019 on a typical weekday (Wednesday or Thursday) in April and May 2018 and April through December 2019 and March 2020.

Existing intersection TMCs for the primary study area are provided on **Figure 13** to **Figure 16**. **Figure 17** and **Figure 18** provide the detailed TMCs for the secondary study area.

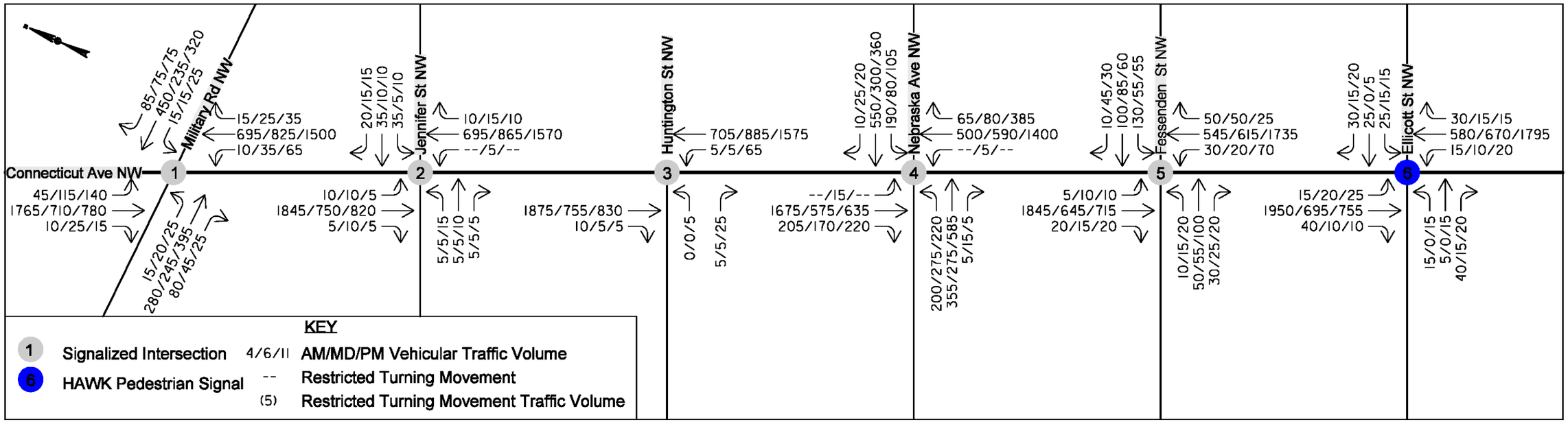


Figure 13: Primary Study Area Turning Movement Counts

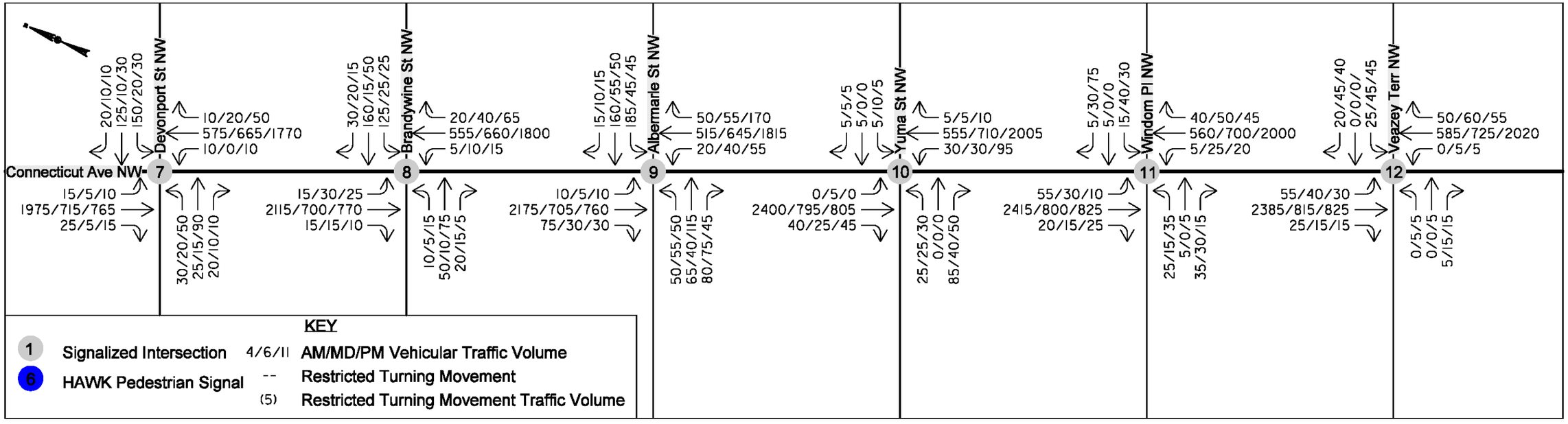


Figure 14: Primary Study Area Turning Movement Counts

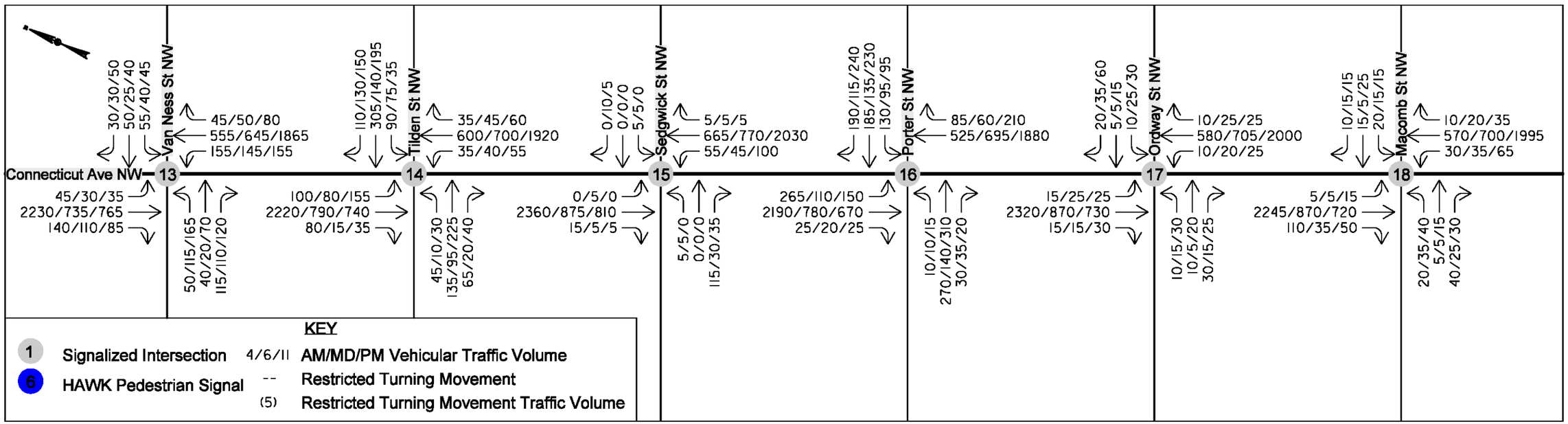


Figure 15: Primary Study Area Turning Movement Count

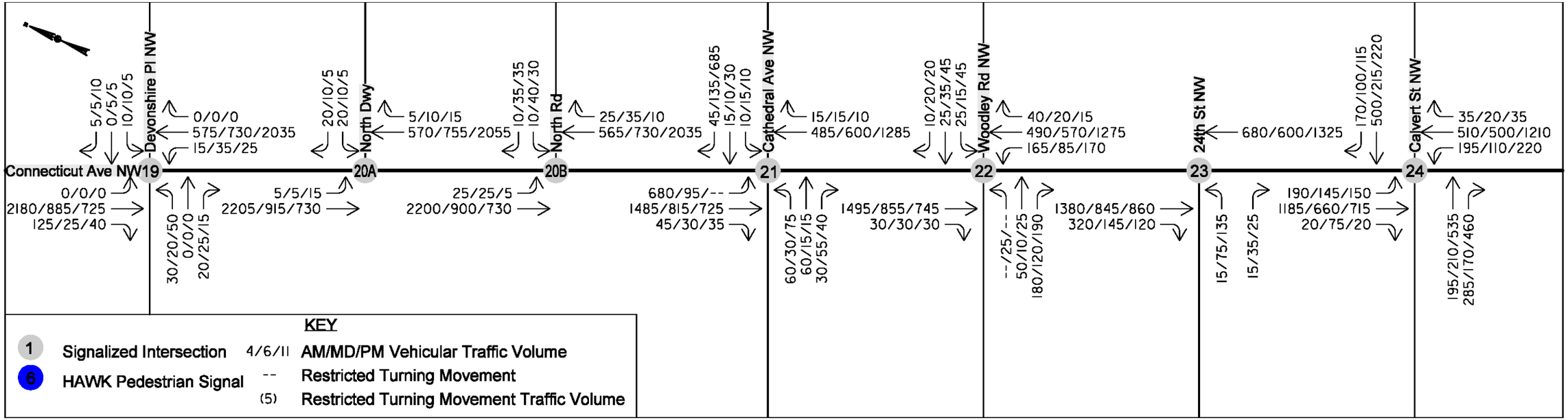
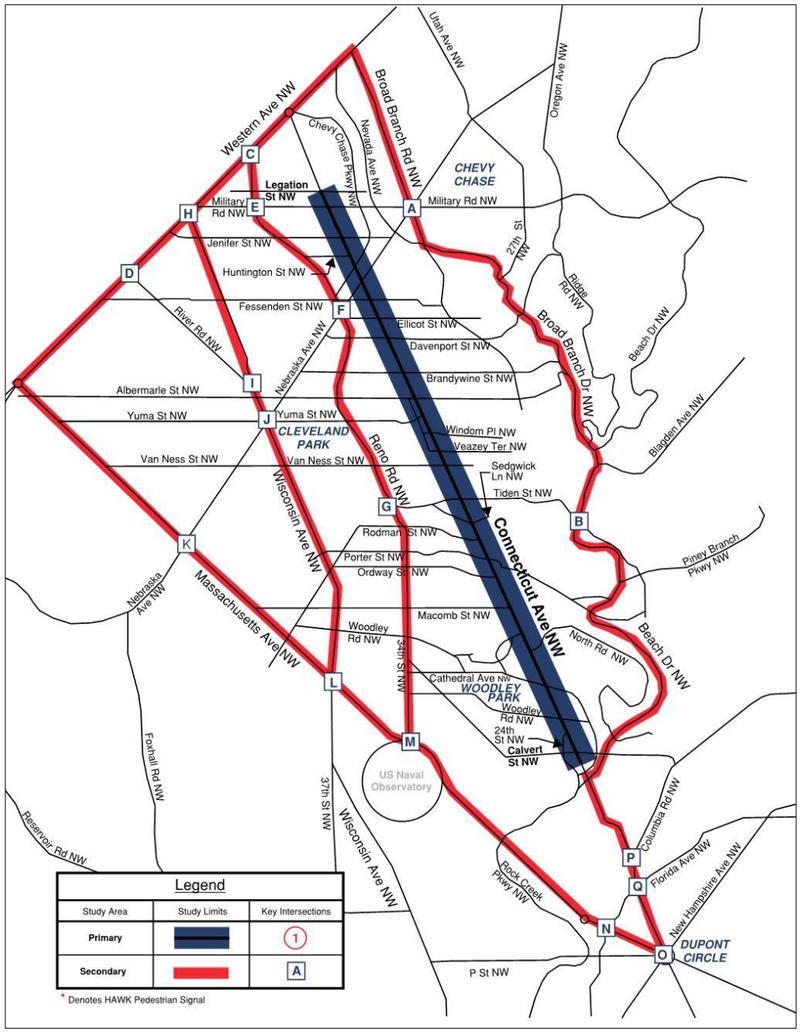


Figure 16: Primary Study Area Turning Movement Counts



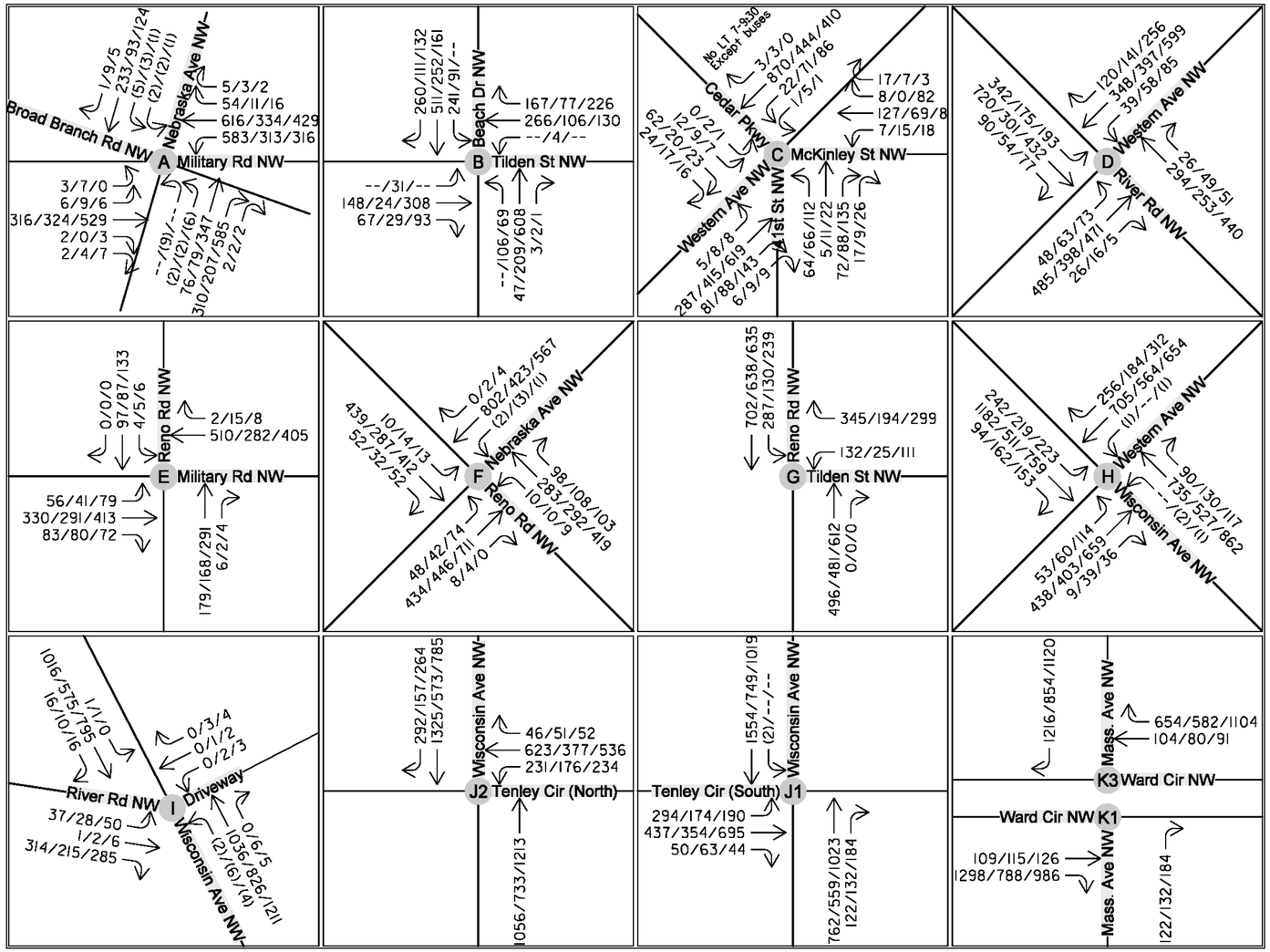
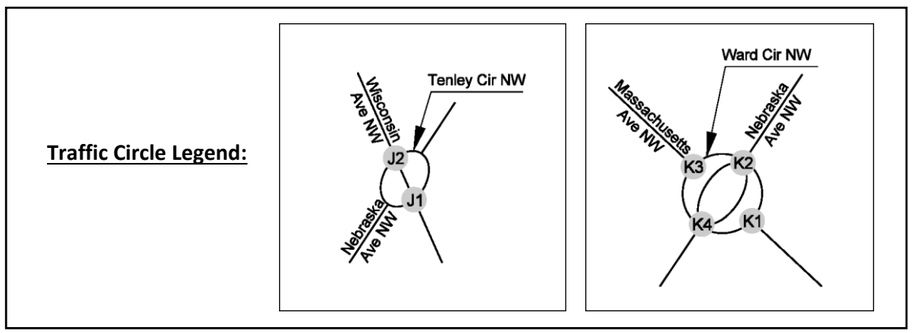
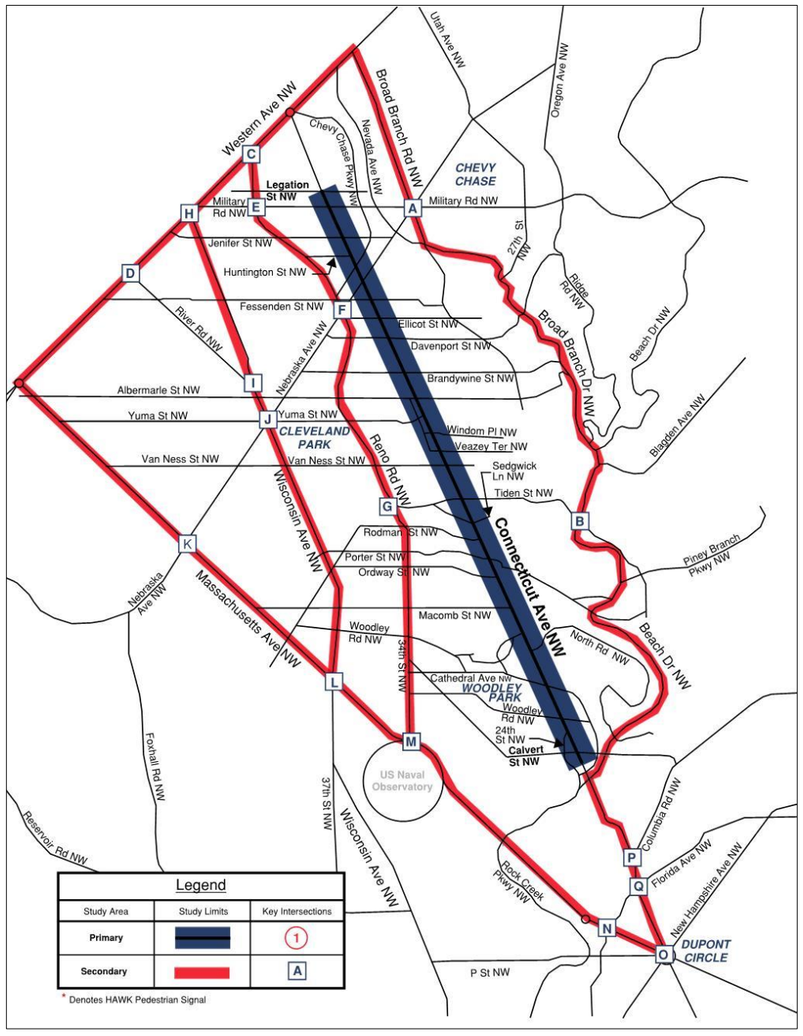


Figure 17: Secondary Study Area Turning Movement Counts





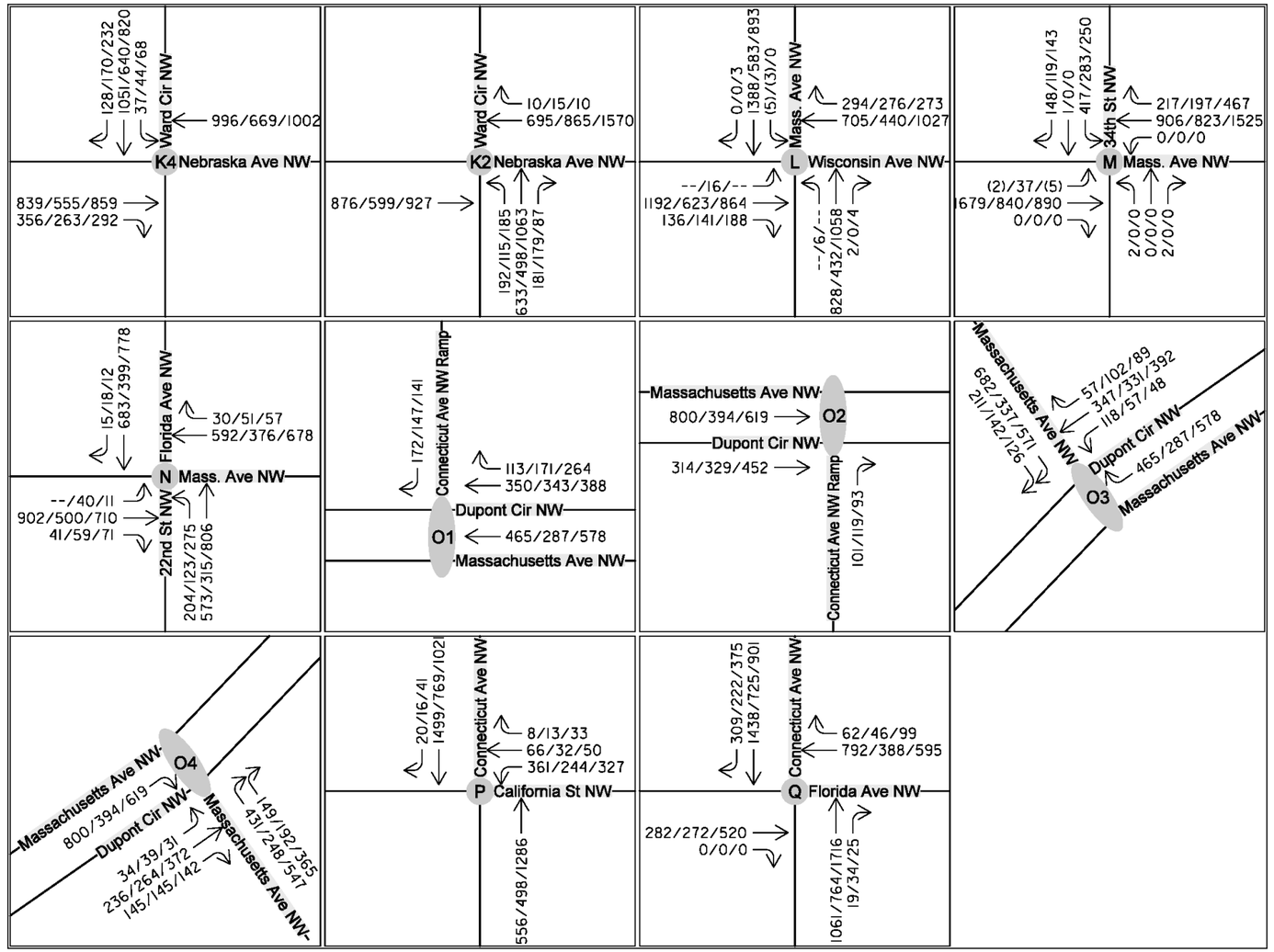
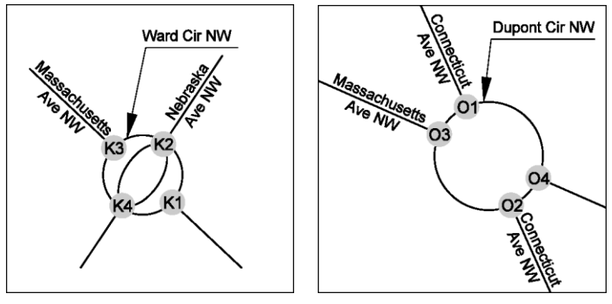


Figure 18: Secondary Study Area Turning Movement Counts

Traffic Circle Legend:



VEHICLE OPERATIONS AND METRICS

Table 5 and **Table 6** provide a breakdown of AM, PM and Midday Level of Service (LOS), Delay and Volume to Capacity Ratio (V/C) for each of the primary and secondary study area intersections, respectively. **Table 3** provides intersection level of service and the range of control delay per vehicle (in seconds per vehicle). **Table 4** provides an assessment of how Volume-to-Capacity ratios are evaluated.

LOS	Control Delay per vehicle (seconds per vehicle)
A	≤ 10
B	> 10-20
C	> 20-35
D	> 35-55
E	> 55-80
F	> 80

Table 3: Level of Service and Control Delay Per Vehicle (HCM Methodology)

Critical Volume-to-Capacity Ratio	Assessment
< 0.85	Intersection is operating under capacity. Excessive delays are not experienced.
0.85-0.95	Intersection is operating near its capacity. Higher delays may be expected, but continuously increasing queues should not occur.
0.95-1.0	Unstable flow results in a wide range of delay. Intersection improvements will be required soon to avoid excessive delays.
> 1.0	The demand exceeds the available capacity of the intersection. Excessive delays and queuing are anticipated.

Table 4: Volume-to-Capacity Ratio Assessment (HCM Methodology)

For the primary study area, the vehicle operations analysis indicates that two (2) of the 24 intersections operate an overall LOS "E" (Connecticut Avenue NW@ Nebraska Avenue NW during the AM Peak hour and Connecticut Avenue NW@ Cathedral Avenue during the PM peak hour). The remaining 22 intersections operate at an overall LOS "D" or better.

For the secondary study area, the vehicle operations analysis indicates that six (6) of the 20 intersections operate an overall LOS "E" or "F" (Nebraska Avenue NW @ Broad Branch Road NW during the AM Peak hour; Beach Drive NW @ Park Road NW/Tilden Street NW during the AM Peak hour; Western Avenue NW @ River Road NW during the AM/Mid-day/PM Peak hours; Reno Road NW @ Military Road NW during the PM Peak hour; Nebraska Avenue NW @ Fessenden Street NW during the PM Peak hour; Reno Road NW @ Tilden Street NW during the AM/PM Peak hours;). The remaining 14 intersections operate at an overall LOS "D" or better.

Queues are reported by the 95th percentile, which demonstrates the worst-case scenario (e.g., queues have a 5-percent probability of being exceeded during a peak analysis period). This is a conservative estimate and does not necessarily reflect what a user may experience on an average day. **Table 3** and **Table 4** also show the intersection approaches that exhibit queues ≥100-feet during each of the peak hours. The typical length of a car is approximately 15 feet; there a 100-foot queue represents about 6 to 7 vehicles.

InT #	Cross Street	Peak Hour	LOS	Delay (Sec)	VC	Q95 ≥ 100'			
						NB	SB	EB	WB
1	**MILITARY RD**	**AM**	D	38.5	0.87		X	X	X
		MD	C	26.3	0.73	X	X	X	X
		PM	D	42.7	1.04	X		X	X
2	**JENNIFER RD**	**AM**	A	3	0.51			X	
		MD	A	1.9	0.38				
		PM	A	3.6	0.36				
3	**HUNTINGTON ST**	**AM**	A	0.9	0.4			X	
		MD	A	1.2	0.39				
		PM	A	2.7	0.44		X		
4	**NEBRASKA**	**AM**	E	69.5	0.99	X	X	X	X
		MD	D	35.1	0.79	X	X	X	X
		PM	D	50.4	0.96	X	X	X	X
5	**FESSENDEN ST**	**AM**	B	13.7	0.68	X		X	X
		MD	B	12	0.47	X			X
		PM	B	15.7	0.6	X		X	X
7	**DAVENPORT ST**	**AM**	C	24.4	0.77	X	X		X
		MD	B	13.9	0.36	X	X		
		PM	A	6.9	0.58		X	X	
8	**BRANDYWINE ST**	**AM**	B	12.9	0.79				X
		MD	A	5.3	0.38				
		PM	A	6.2	0.54		X	X	X
9	**ALBEMARLE ST**	**AM**	B	18.3	0.79	X	X	X	X
		MD	B	14	0.44	X		X	
		PM	B	11.6	0.67		X	X	
10	**YUMA ST**	**AM**	A	7.9	0.61		X	X	
		MD	A	8	0.4				
		PM	A	4.3	0.59				
11	**WINDOM PL**	**AM**	A	9	0.67				
		MD	A	5.7	0.45				
		PM	A	5.1	0.56				

Table 5: Primary Study Area Intersections – Summary of Level of Service, Delay (sec), v/C Ratio, and Queues

Int #	Cross Street	Peak Hour	LOS	Delay (Sec)	VC	Q95 ≥ 100'			
						NB	SB	EB	WB
12	**VEAZEY TER**	**AM**	A	4.5	0.64				
		MD	B	11	0.5		X		
		PM	A	9.3	0.61	X	X		X
13	**VAN NESS ST**	**AM**	B	17.7	0.76	X			X
		MD	B	19.1	0.66	X	X	X	
		PM	B	16.3	0.8		X	X	X
14	**TILDEN ST**	**AM**	D	35.3	1.02	X	X	X	X
		MD	B	16.8	0.71		X	X	X
		PM	C	28.6	1.01		X	X	X
15	**SEDGWICK ST**	**AM**	B	17.6	0.65	X	X	X	
		MD	A	3.4	0.42				
		PM	B	17.7	0.67	X	X		
16	**PORTER ST**	**AM**	C	20.1	0.88	X	X	X	
		MD	D	45.3	0.83	X	X	X	
		PM	C	28.3	0.9		X	X	X
17	**ORDWAY ST**	**AM**	B	12.3	0.63	X	X		
		MD	C	23.5	0.52	X	X		
		PM	B	16.2	0.63	X	X	X	
18	**MACOMB ST**	**AM**	A	5.6	0.62	X			
		MD	A	6.1	0.45				
		PM	A	8.5	0.63			X	
19	**DEVONSHIRE**	**AM**	A	1.7	0.53				
		MD	A	3.3	0.4				
		PM	A	3.5	0.52				
20A	**NORTH DRIVEWAY**	**AM**	A	2	0.61				
		MD	A	8.6	0.52		X		
		PM	A	3.6	0.48		X		
20B	**NORTH ROAD**	**AM**	A	0.6	0.56				
		MD	A	2.7	0.47				
		PM	A	1.5	0.5				

Table 5: Primary Study Area Intersections – Summary of Level of Service, Delay (sec), v/C Ratio, and Queues (continued)

Int #	Cross Street	Peak Hour	LOS	Delay (Sec)	VC	Q95 ≥ 100'			
						NB	SB	EB	WB
21	**CATHEDRAL AVE NW**	**AM**	C	30.9	0.94	X	X	X	
		MD	B	19	0.59	X	X		
		PM	E	77	0.94			X	X
22	**WOODLEY RD NW**	**AM**	B	14.8	0.73	X	X	X	
		MD	B	15.6	0.59		X		
		PM	C	29.9	0.69	X	X	X	X
23	**24TH STREET NW**	**AM**	A	3.4	0.56				
		MD	A	6.4	0.58				
		PM	A	4.2	0.49			X	
24	**CALVERT ST NW**	**AM**	D	54.8	1.01	X	X	X	X
		MD	C	24.6	0.77	X	X		X
		PM	D	50	0.98	X	X	X	X

Table 5: Primary Study Area Intersections – Summary of Level of Service, Delay (sec), v/C Ratio, and Queues (continued)

Int #	Intersection	Peak Hour	LOS	Delay (Sec)	VC	Q95 ≥ 100'			
						NB	SB	EB	WB
A.	**Nebraska Ave NW & Broad Branch Rd NW**	**AM**	E	64.7	1.09	X	X	X	X
		MD	C	31.5	0.7	X	X	X	X
		PM	C	30.9	0.89	X	X	X	X
B.	**Beach Dr NW & Park Rd NW/Tilden St NW**	**AM**	F	91.1	1.09	X	X		X
		MD	B	15.3	0.52	X	X	X	
		PM	C	31	0.78	X	X	X	X
C.	**Western Ave NW & 41st St NW**	**AM**	C	26.9	0.61	X	X	X	X
		MD	C	28.7	0.56	X	X	X	X
		PM	D	41	0.76	X		X	X
D.	**Western Ave NW & River Rd NW**	**AM**	E	62.3	1	X	X	X	X
		MD	E	67	0.93	X	X	X	X
		PM	E	72.5	1.02	X	X	X	X
E.	**Reno Rd NW & Military Rd NW**	**AM**	C	23.2	0.78	X	X	X	
		MD	B	14.4	0.57	X	X		
		PM	F	117.5	1.22	X	X	X	X
F.	**Nebraska Ave NW & Fessenden St NW**	**AM**	B	17.6	0.6		X	X	X
		MD	B	13.1	0.56			X	X
		PM	F	117.5	1.22			X	X
G.	**Reno Rd NW & Tilden St NW**	**AM**	E	61.8	0.95		X		X
		MD	C	28.1	0.83		X		
		PM	E	57.5	0.97	X	X		X
H.	**Western Ave NW & Military Rd NW**	**AM**	C	21	0.51		X		X
		MD	B	16.9	0.36				X
		PM	B	17.1	0.48				X
I.	**Wisconsin Ave NW & River Rd NW**	**AM**	B	10.2	0.74			X	
		MD	A	5.1	0.48				
		PM	B	10.1	0.63			X	
J2.	**Wisconsin Ave NW & Tenley Cir NW (North)**	**AM**	B	14.5	0.92	X			X
		MD	B	17.9	0.78		X		X
		PM	B	13.2	0.76		X		X

Table 6: Secondary Study Area Intersections – Summary of Level of Service, Delay (sec), v/C Ratio, and Queues

Int #	Intersection	Peak Hour	LOS	Delay (Sec)	VC	Q95 ≥ 100'			
						NB	SB	EB	WB
J1.	**Wisconsin Ave NW & Tenley Cir NW (South)**	**AM**	B	17.4	0.87	X		X	
		MD	B	18	0.76	X		X	
		PM	C	22.5	0.87	X	X	X	
K1.	**Nebraska Ave NW & Ward Cir NW (North)**	**AM**	B	15.5	0.69		X		
		MD	B	11.9	0.55		X		
		PM	B	17.6	0.83		X		
K2.	**Nebraska Ave NW & Ward Cir NW (South)**	**AM**	C	29.9	0.87	X	X		
		MD	B	13.5	0.65	X			
		PM	C	34.8	0.82	X	X		
L.	**Wisconsin Ave NW & Massachusetts Ave NW**	**AM**	B	13.6	0.95			X	X
		MD	A	8.7	0.56		X		
		PM	B	10.1	0.72			X	X
M.	**Massachusetts Ave NW & 34th St NW**	**AM**	D	42.2	1.15		X	X	X
		MD	C	23.1	0.68		X		X
		PM	C	20.7	0.9	X	X	X	
N.	**Massachusetts Ave NW & Florida Ave NW**	**AM**	C	32.3	0.81		X	X	X
		MD	C	23	0.56		X	X	X
		PM	D	45	1.01		X	X	X
O1.	**Mass Ave NW & Dupont Cir NW (West)**	**AM**	B	14.5	0.49		X	X	
		MD	C	21.1	0.33		X		
		PM	B	13.3	0.44		X		
O2.	**Mass Ave NW & Dupont Cir NW (East)**	**AM**	B	14.5	0.39	X			
		MD	B	17.5	0.31	X			
		PM	B	16.4	0.44	X			X
P.	**Connecticut Ave NW & California St NW**	**AM**	A	9.9	0.6				X
		MD	B	10.9	0.59				X
		PM	B	12.5	0.72	X			X
Q.	**Connecticut Ave NW & Florida Ave NW**	**AM**	C	33.5	0.96		X		X
		MD	B	16.1	0.49		X		X
		PM	C	21.1	0.81		X	X	

Table 6: Secondary Study Area Intersections – Summary of Level of Service, Delay (sec), v/C Ratio, and Queues (continued)

ORIGIN-DESTINATION PATTERNS

Streetlight Data was used to provide a more comprehensive snapshot of existing travel behaviors throughout the study area and to capture the origin and destinations of vehicle trips. This analysis helps to set the baseline for forecasting potential trip diversions to/from the Connecticut Avenue NW corridor based on existing trip behaviors. Streetlight Data was used to supplement the regional model data, from Metropolitan Washington Council of Government (MWCOG), and the data will also assist in developing Average Annual Daily Traffic (AADT) estimates at screen line locations where counts are unavailable.

Origins and Destinations Districts were developed in Streetlight for the Primary and Secondary Study Areas to determine the percentage of trips going from and to each District within the Metropolitan Washington DC area. The five (5) assigned Origin Districts include:

1. Study Area North (boundaries include Western Ave, Broad Branch Rd NW, Military Rd NW, 27th St NW, Albemarle St NW, Nebraska Ave NW, and Wisconsin Ave NW).
2. Study Area North Central (boundaries include Albemarle St NW, Linnean Ave NW, Broad Branch Rd NW, Tilden St NW, Park Rd NW, Beach Dr NW, Porter St NW, and Reno Rd NW).
3. Study Area South Central (boundaries include Porter St NW, Klingle Rd NW, Adams Mill Rd NW, Harward St NW, 18th St NW, Lanier Pl NW, Calvert St NW, Cleveland Ave NW, and 34th St NW).
4. Study Area South (boundaries include Calvert St NW, 18th St NW, New Hampshire Ave NW, Dupont Cir NW, Massachusetts Ave NW, 34th St NW, and Cleveland Ave NW).
5. Study Area West (boundaries include Western Ave, Wisconsin Ave NW, Nebraska Ave NW, Albemarle St NW, Reno Rd NW, 34th St NW, and Massachusetts Ave NW).

The trips tables generated by Streetlight were then examined to establish the Destinations Districts that included the highest percentage of trips from/to the Origin Districts described above. According to this data, **Table 7** provides the percentage of trips between the Study Area Origin Districts and the most prevalent Destinations throughout the Metropolitan Washington DC area.

Origin Districts	Destination Districts (From/To)						
	All Study Area Districts	DC Total (Core, NE, NW, E,S)	*DC Core*	*DC Other (NE, NW, E, S)*	Montgomery County	Other	Total
1) Study Area - North	34%	34%	*9%*	*25%*	25%	9%	100%
2) Study Area - North Central	31%	39%	*17%*	*22%*	15%	15%	100%
3) Study Area - South Central	31%	44%	*22%*	*22%*	11%	14%	100%
4) Study Area - South	16%	63%	*42%*	*21%*	8%	15%	100%
5) Study Area - West	32%	36%	*11%*	*25%*	22%	11%	100%
Averages of all Origin Districts	**29%**	**43%**	20%	23%	**16%**	**13%**	**100%**

Table 7: Distribution of Trip Between Origin and Destination Districts

The following findings are based upon on the Averages of all Origin Districts shown on Table 7:

- Approximately 30 percent of trips that originate in the study area have destinations within the study area boundaries.
- Approximately 40 percent of all Study Area District trips have destinations within the District of Columbia.
    - 20 percent of the trips have destinations to the DC Core while 23 percent have destinations in DC Northeast, DC Northwest, DC East and DC South.

- 16% all Study Area District trips have destinations in Montgomery County.

TRAVEL TIME AND TRAVEL SPEEDS

SPEEDS BY SECTION

Documenting vehicle travel times and speeds provides a baseline for model calibration and for future metrics for Measures of Effectiveness. Six (6) travel time runs, using Global Positioning System (GPS) technology, were conducted for the during weekday peak and off-peak periods, in both directions, along the entire length of the Connecticut Avenue NW Study corridor.

The average speeds were calculated from the four runs performed during each AM, Mid-day, and PM peak hour study periods.

KEY FINDINGS- OVERALL VEHICLE SPEEDS SOUTHBOUND

AM Southbound

During the AM peak hour, the average southbound travel time from Legation Street NW to Calvert Street NW is 12.5 minutes. The average speed traversing the corridor is 14.2 miles per hour (mph). **Table 8** provides the overall vehicle speeds in the southbound direction for the AM peak hour using the following range of speeds: 0-10MPH; 11-20MPH; and 21-30MPH.

Mid-day Southbound

During the Mid-day peak hour, the average southbound travel time from Legation Street NW to Calvert Street NW is 9.2 minutes. The average speed traversing the corridor is 19.1 miles per hour (mph). **Table 9** provides the overall vehicle speeds in the southbound direction for the Mid-day peak hour using the following range of speeds: 0-10MPH; 11-20MPH; and 21-30MPH.

PM Southbound

During the PM peak hour, the average southbound travel time from Legation Street NW to Calvert Street NW is 15.4 minutes. The average speed traversing the corridor is 11.5 miles per hour (mph). **Table 10** provides the overall vehicle speeds in the southbound direction for the PM peak hour using the following range of speeds: 0-10MPH; 11-20MPH; and 21-30MPH.

Connecticut Ave NW at Legation St NW To:	Speed (mph)		
	0 to 10	11 to 20	21 to 30
Military Rd NW	10.9		
Jennifer St NW			26.7
Huntington St NW		15.3	
Nebraska Ave NW	5.9		
Fessenden St NW			28.1
Ellicott St NW			26.7
Davenport St NW		19.4	
Brandywine St NW			23.9
Albemarle St NW		13.8	
Yuma St NW		18.2	
Windom Pl NW			21.8
Veazey Terr NW		19.1	
Van Ness St NW		11.6	
Tilden St NW			26.6
Sedgwick St NW			29.8
Rodman St NW			28.4
Porter St NW			24.4
Ordway St NW	8.8		
Macomb St NW			24.6
Devonshire Pl NW			29.6
North St NW			29.6
Cathedral Ave NW		17.5	
Woodley Rd NW	5.3		
24th St NW	10.4		
Calvert St NW	6.8		

Table 8: Overall Vehicle Speeds - Southbound AM Peak Hour

Connecticut Ave NW at Legation St NW To:	Speed (mph)		
	0 to 10	11 to 20	21 to 30
Military Rd NW		13.2	
Jennifer St NW			25.9
Huntington St NW			28.7
Nebraska Ave NW		11.2	
Fessenden St NW			29.8
Ellicott St NW			
Davenport St NW			30.0
Brandywine St NW			32.3
Albemarle St NW			33.5
Yuma St NW			35.0
Windom Pl NW			32.4
Veazey Terr NW		11.3	
Van Ness St NW		15.3	
Tilden St NW			23.5
Sedgwick St NW			26.6
Rodman St NW			
Porter St NW		12.7	
Ordway St NW		12.3	
Macomb St NW		16.7	
Devonshire Pl NW			30.0
North St NW		11.1	
Cathedral Ave NW		19.4	
Woodley Rd NW		13.5	
24th St NW			24.2
Calvert St NW		19.8	

Table 9: Overall Vehicle Speeds - Southbound Mid-day Peak Hour

Connecticut Ave NW at Legation St NW To:	Speed (mph)		
	0 to 10	11 to 20	21 to 30
Military Rd NW			23.9
Jennifer St NW		20.8	
Huntington St NW		11.2	
Nebraska Ave NW		11.7	
Fessenden St NW			26.5
Ellicott St NW		14.6	
Davenport St NW	9.0		
Brandywine St NW		20.4	
Albemarle St NW	10.8		
Yuma St NW			21.6
Windom Pl NW		16.2	
Veazey Terr NW	10.8		
Van Ness St NW	7.6		
Tilden St NW	10.4		
Sedgwick St NW		19.3	
Rodman St NW			26.1
Porter St NW	6.4		
Ordway St NW	6.0		
Macomb St NW			24.1
Devonshire Pl NW			28.7
North St NW		13.4	
Cathedral Ave NW		14.7	
Woodley Rd NW	8.8		
24th St NW	6.7		
Calvert St NW	3.1		

Table 10: Overall Vehicle Speeds - Southbound PM Peak Hour

KEY FINDINGS- OVERALL VEHICLE SPEEDS NORTHBOUND

Morning (AM) Northbound

During the AM peak hour, the average northbound travel time from Calvert Street NW to Legation Street NW is 14.2 minutes. The average speed traversing the corridor is 12.6 miles per hour (mph). **Table 11** provides the overall vehicle speeds in the northbound direction for the AM peak hour using the following range of speeds: 0-10MPH; 11-20MPH; and 21-30MPH.

Mid-day Northbound

During the Mid-day peak hour, the average northbound travel time from Calvert Street NW to Legation Street NW is 9.3 minutes. The average speed traversing the corridor is 18.8 miles per hour (mph). **Table 12** provides the overall vehicle speeds in the northbound direction for the Mid-day peak hour using the following range of speeds: 0-10MPH; 11-20MPH; and 21-30MPH.

Evening (PM) Northbound

During the PM peak hour, the average northbound travel time from Calvert Street NW to Legation Street NW is 10.2 minutes. The average speed traversing the corridor is 17.2 miles per hour (mph). **Table 13** provides the overall vehicle speeds in the northbound direction for the PM peak hour using the following range of speeds: 0-10MPH; 11-20MPH; and 21-30MPH.

Connecticut Ave NW at Calvert St NW To:	Speed (mph)		
	0 to 10	11 to 20	21 to 30
24th St NW			23.8
Woodley Rd NW			28.4
Cathedral Ave NW	7.9		
North St NW			23.5
Devonshire Pl NW			29.6
Macomb St NW	8.1		
Ordway St NW		14.8	
Porter St NW	5.6		
Rodman St NW			22.2
Sedgwick St NW		12.5	
Tilden St NW		11.2	
Van Ness St NW	8.6		
Veazey Terr NW			20.9
Windom Pl NW			23.9
Yuma St NW		16.8	
Albemarle St NW	8.9		
Brandywine St NW			25.5
Davenport St NW		13.3	
Ellicott St NW		13.5	
Fessenden St NW		10.8	
Nebraska Ave NW	9.7		
Huntington St NW			26.0
Jennifer St NW			28.5
Military Rd NW	7.5		
Legation St NW			21.4

Table 11: Overall Vehicle Speeds - Northbound AM Peak Hour

Connecticut Ave NW at Calvert St NW To:	Speed (mph)		
	0 to 10	11 to 20	21 to 30
24th St NW			27.1
Woodley Rd NW			28.0
Cathedral Ave NW			24.4
North St NW			25.8
Devonshire Pl NW			26.0
Macomb St NW			23.3
Ordway St NW	10.2		
Porter St NW			27.8
Rodman St NW			
Sedgwick St NW			28.4
Tilden St NW			26.7
Van Ness St NW		20.4	
Veazey Terr NW	8.0		
Windom Pl NW			28.1
Yuma St NW		12.2	
Albemarle St NW		18.8	
Brandywine St NW		14.6	
Davenport St NW			21.7
Ellicott St NW			
Fessenden St NW		19.3	
Nebraska Ave NW			23.5
Huntington St NW			28.3
Jennifer St NW			29.0
Military Rd NW	8.4		
Legation St NW			21.4

Table 12: Overall Vehicle Speeds - Northbound Mid-day Peak Hour

Connecticut Ave NW at Calvert St NW To:	Speed (mph)		
	0 to 10	11 to 20	21 to 30
24th St NW		19.4	
Woodley Rd NW		18.8	
Cathedral Ave NW		20.8	
North St NW		18.4	
Devonshire Pl NW			26.9
Macomb St NW		14.5	
Ordway St NW	7.5		
Porter St NW		18.0	
Rodman St NW			25.7
Sedgwick St NW			26.1
Tilden St NW			23.0
Van Ness St NW			22.4
Veazey Terr NW		11.2	
Windom Pl NW			23.4
Yuma St NW			23.6
Albemarle St NW		12.6	
Brandywine St NW			27.7
Davenport St NW			27.7
Ellicott St NW			27.5
Fessenden St NW		15.4	
Nebraska Ave NW	5.4		
Huntington St NW			25.9
Jennifer St NW			24.6
Military Rd NW		20.1	
Legation St NW		20.9	

Table 13: Overall Vehicle Speeds - Northbound PM Peak Hour

TRANSIT SERVICE / TRANSIT FACILITIES

DC CIRCULATOR

The District Department of Transportation (DDOT) operates the DC Circulator shuttle, servicing Woodley Park- Adams Morgan- McPherson Square Metro Station. Daily service starts at 6:00AM on weekdays and 7:00AM on weekends until midnight on most days (Fridays and Saturday until 3:30am). The Circulator runs on 10-minute headways along the route. **Figure 19** provides the DC Circulator Bus Route network in the immediate proximity of the primary and secondary study corridors.

The Woodley Park DC Circulator bus stop is located in front of the Woodley Park Metrorail Red Line Station along Connecticut Avenue. Circulator buses run along Calvert Street, turn onto 24th Street, and then onto Connecticut Avenue NW to access the Metrorail Station entrance on Connecticut Avenue. The curbside along Connecticut Avenue in front the Metrorail Station is dedicated for the Circulator curbside lay-by.

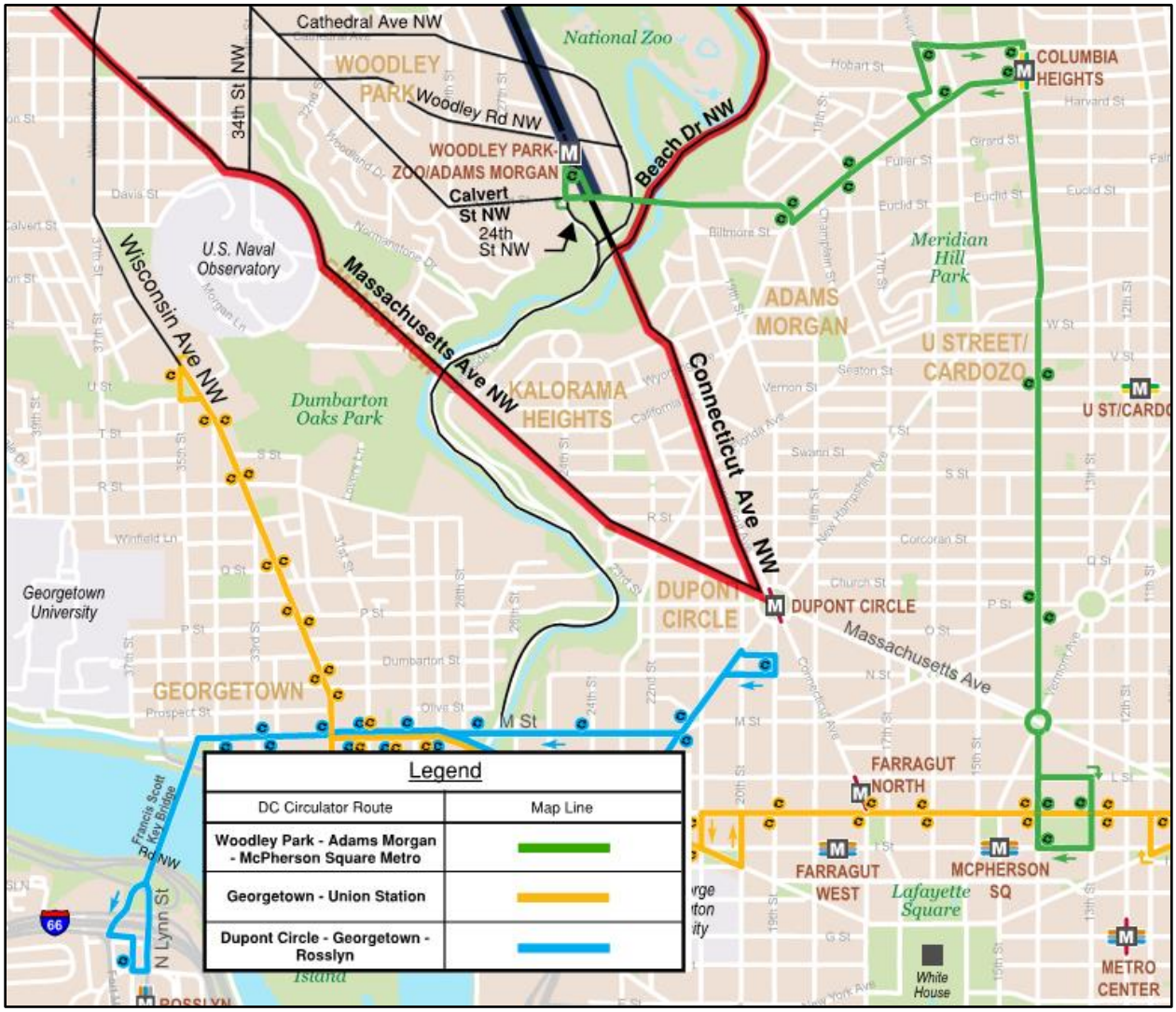


Figure 19: DC Circulator Shuttle Route

WMATA METRORAIL

The Connecticut Avenue NW corridor is served by three WMATA Metrorail Red Line Stations (**Figure 20**): Van Ness-UDC, Cleveland Park, and Woodley Park Metrorail Stations, all of which are located along the Connecticut Avenue NW corridor.

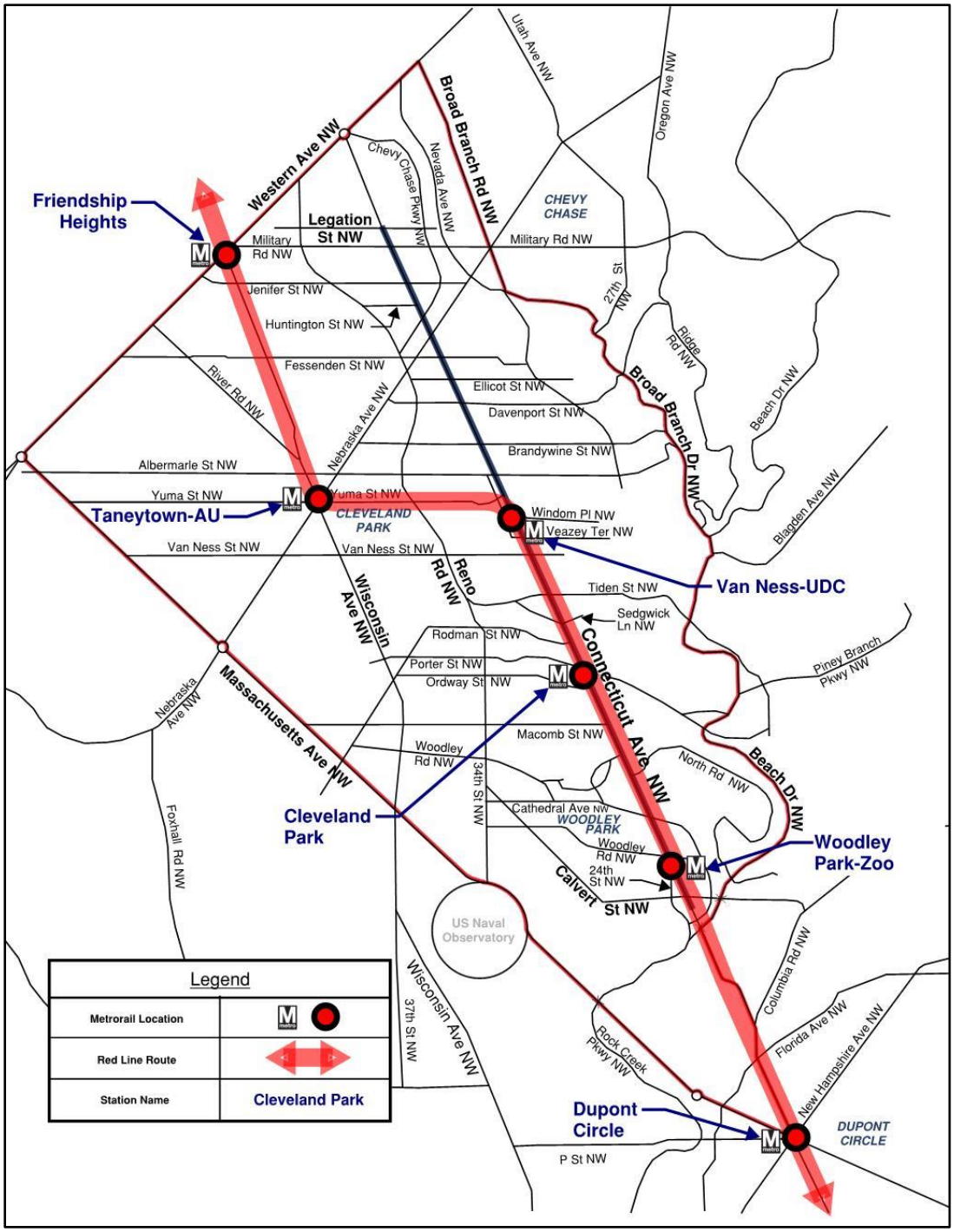


Figure 20: WMATA Metrorail Stations

WMATA METROBUS

Metrobus Routes L1 and L2

WMATA Metrobus L1 and L2 routes operate on Connecticut Avenue NW in the northbound and southbound directions.

The L1 begins at the Potomac Park apartments at 18th and C Streets NW and the L2 starts at Farragut Square. The two routes continue north with the L1 crossing Rock Creek Park via the Taft Bridge, while the L2 detours into Adams Morgan via Columbia Road, Calvert Street, and the Duke Ellington Bridge. Following Connecticut Avenue northbound, the routes serve multiple stations of the Red Line – namely, Woodley Park, Cleveland Park, and Van Ness, until the Metrorail Red Line diverts from Connecticut Avenue. The routes also pass through the Woodley Park and Cleveland Park neighborhoods, of which the former also includes the National Zoological Park. In the Forest Hills neighborhood, the routes also provide access to the Van Ness Campus of the University of the District of Columbia. Both routes terminate at Chevy Chase Circle, just south of Western Avenue and the Maryland state line.

Figure 21 provides the WMATA Bus Route network in the immediate proximity of the primary and secondary study corridors. As shown, the transit routes crossing Connecticut Avenue NW include the H3/H4 crossing at Porter Street, the H2 intersects at Porter Street and then turns onto Van Ness Street, the M4 crosses at Nebraska Avenue NW and the 96 crosses at Calvert Street NW.

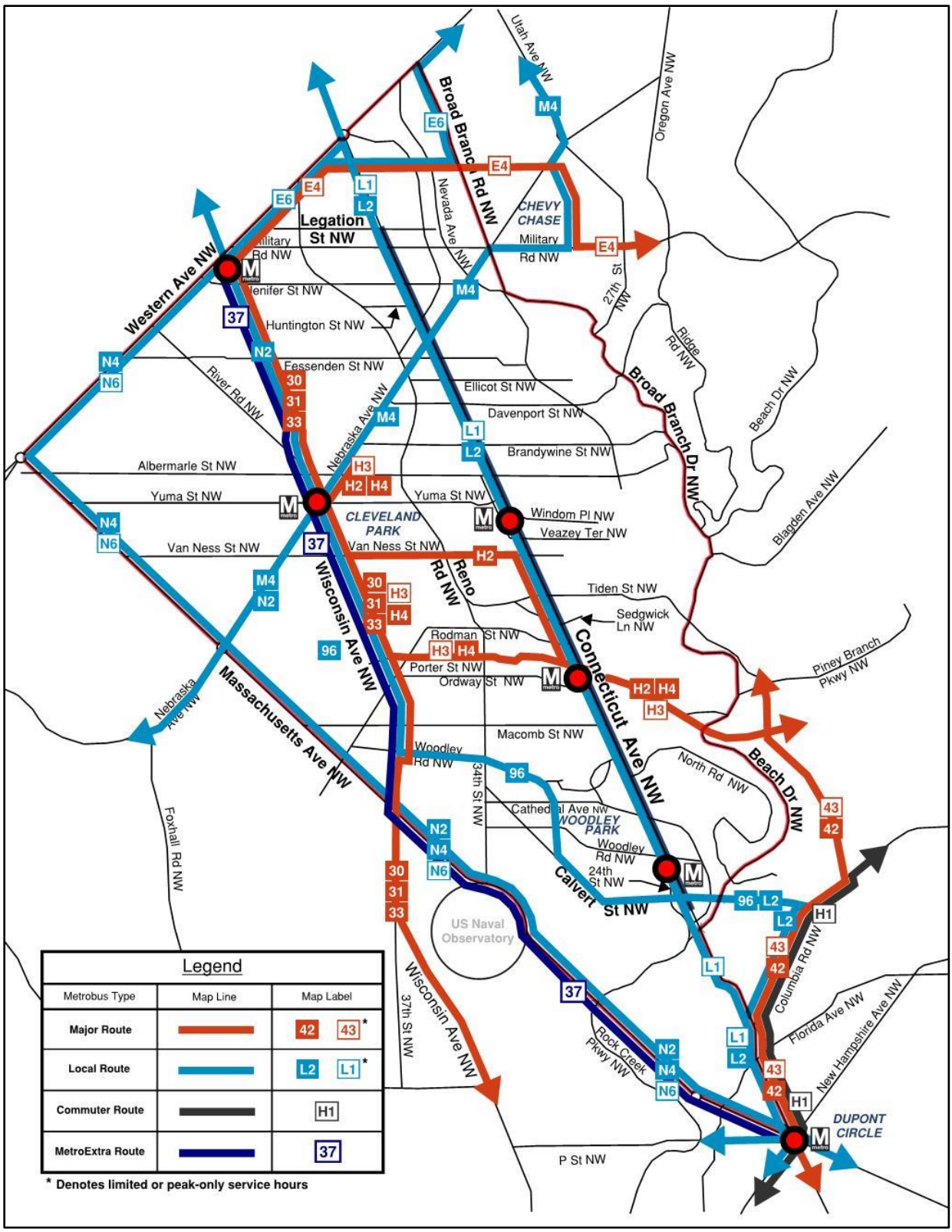


Figure 21: WMATA Metrobus Routes

Metrobus Frequency and Headways

Metrobus Routes L1 and L2 operate with more frequency in the peak hour/peak direction, with buses every eight (8) minutes in the AM peak southbound and every four (4) to five (5) minutes in the PM peak northbound, as shown in **Table 14.**

Southbound			Northbound		
Time Period	**# Trips Per Hour**	**Average Headway (min)**	**Time Period**	**# Trips Per Hour**	**Average Headway (min)**
AM Peak	7.5	8	AM Peak	3	20
Mid-day	3	20	Mid-day	3	20
PM Peak	3	20	PM Peak	10	6
Saturday	3	22.5	Saturday	3	22.5
Sunday	2.5	27.5	Sunday	2.5	27

Table 14 : L1/L2 Trips Per Hour and Headway[3]

Out of the twenty-five (25) signalized intersections in the study corridor, twenty-one (21) have bus stops either on the northbound or southbound side of Connecticut Avenue. Unsignalized intersections also accommodate bus stops; however, this data is not included in this study.

Metrobus Boardings and Alightings

Table 15 shows the study area intersections with the number of all boardings and alightings for all stops (either the northbound or southbound bus stops) and the proximity to Metro stations. The total boardings and alightings by intersection were ranked to understand which signalized intersections have the "most" transit activity in the primary study corridor. Key findings include:

- The Veazey Terrace/Connecticut Avenue intersection has over 1,200 boardings and alightings (at all stops) and ranks 1 in the corridor for the highest transit activity;
- Other corridor intersections that have approximately 250 to 300 boardings and alightings include: Military Road, Nebraska Avenue, Davenport Street, and Van Ness Street NW;
- Average daily ridership for the weekday L1 and L2 ridership is 723 and 3,409, respectively; and
- For Saturday and Sunday, the L2 Average Daily Ridership is 2,330 and 1,610, respectively.[4]

[3] WMATA Timetable, dated 12/8/16 and Metrobus Service Evaluation Study, Mount Pleasant Line (42/43) and Connecticut Avenue Line(L1/L2).
[4] WMATA Productivity Report, June 2017 and Metrobus Service Evaluation Study, Mount Pleasant Line (42/43) and Connecticut Avenue Line(L1/L2).

Int #	Intersection: Connecticut Ave NW @	Metro Proximity	Fall 2019 Average Daily Boardings and Alightings at Intersections, All Stops	Rank
1	Military Road NW		295	3
2	Jennifer Street NW		0	22
3	Huntington Street NW		237	6
4	Nebraska Avenue NW		297	2
5	Fessenden Street NW		0	22
6	Ellicott Street NW		156	12
7	Davenport Street NW		284	4
8	Brandywine Street NW		196	10
9	Albemarle Street NW	M	218	8
10	Yuma Street NW	M	61	20
11	Windom Place NW	M	0	22
12	Veazey Terrace NW	M	1229	1
13	Van Ness Street NW	M	282	5
14	Tilden Street NW		94	19
15	Sedgwick Street NW		116	16
16	Porter Street NW	M	222	7
17	Ordway Street NW	M	207	9
18	Macomb Street NW		150	14
19	Devonshire Place NW		109	17
20	North Driveway		0	22
21	North Road (Zoo Entrance)		169	11
22	Cathedral Avenue NW		105	18
23	Woodley Road NW	M	152	13
24	24th Street NW	M	14	21
25	Calvert Street NW	M	125	15

WMATA Bus Stop not present at intersection

Table 15 : Primary Study Area Intersections, Boardings and Alightings, All Bus Stops. Source: WMATA Boarding and Alighting Data Fall 2019

PEDESTRIANS

SIDEWALKS AND CROSSWALKS

The Connecticut Avenue NW corridor provides a continuous network of sidewalks, crosswalks, and streetscape elements that are supportive of a pedestrian environment. Typical sidewalk configurations include a six (6) foot sidewalk and tree strips along both sides of the corridor. In commercial districts, sidewalk widths increase which support additional public space elements, such as awnings and outdoor seating arrangements.

Crosswalks are present at most intersection approaches, with few exceptions to accommodate major side street protected turn phasing. A majority of crosswalks have dedicated signal timing protection; however, other scenarios exist where pedestrian signal phasing must be actuated by the user.

PEDESTRIAN VOLUMES

Pedestrian volumes were collected when the turning movement counts were conducted during the following time periods: April-May, 2018 and throughout 2019 between April and December. **Figure 22** through **Figure 25** provide the existing weekday AM, Mid-day and PM peak period pedestrian intersection volumes along the Connecticut Avenue NW study area corridor.

Table 16 provides the pedestrian intersection volume based on the volumes provided in **Figure 22** through **Figure 25**. Note that the total pedestrian volume metric is an estimate of activity and will not represent unique pedestrians using the intersection. Pedestrians may be double counted as they traverse each crosswalk in an intersection. However, the pedestrian volume on all intersection legs provides a proxy for pedestrian activity.

Pedestrian activity is shown for AM, Mid-day and PM peak hour volumes at each corridor intersection. Each primary study area intersection was ranked against each other for the AM, Mid-day and PM peak hours as well as for the combined AM, Mid-day, and PM total pedestrian volume. The numbers in blue show the top 10 ranked intersections for pedestrian activity within the Connecticut Avenue NW primary study area corridor. The top 10 intersections for pedestrian activity are generally within close proximity to the three corridor Metrorail Stations.

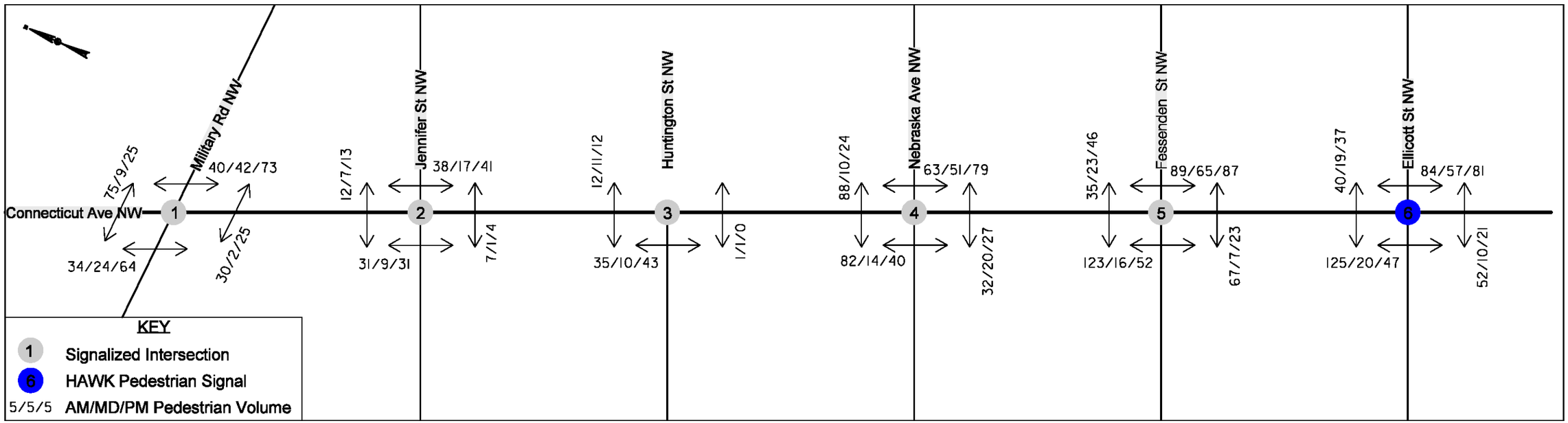


Figure 22: Primary Study Area Pedestrian Counts

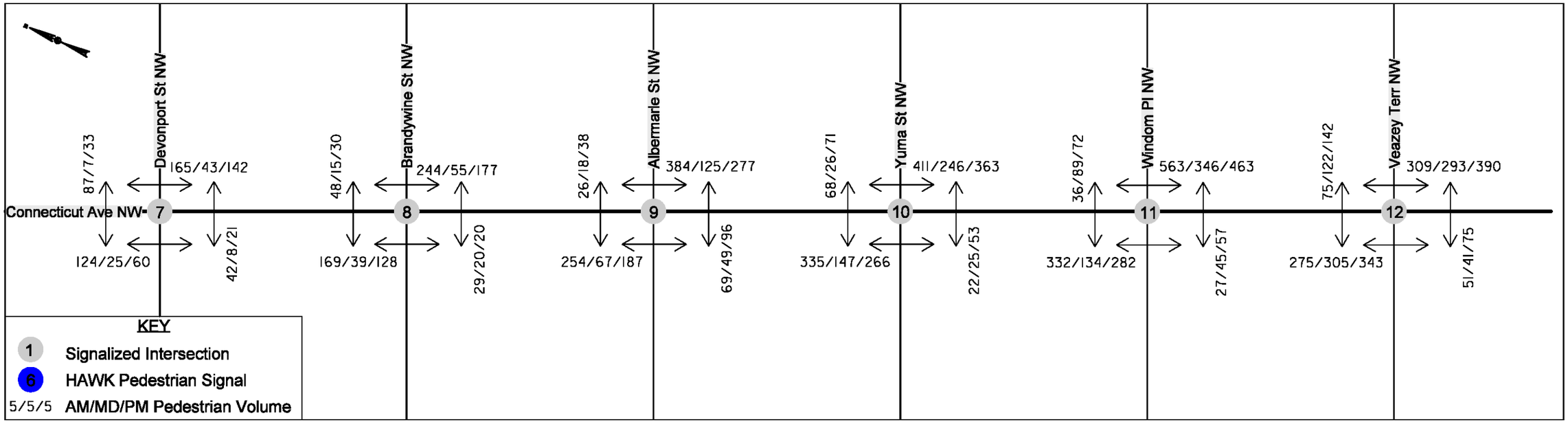


Figure 23: Primary Study Area Pedestrian Counts

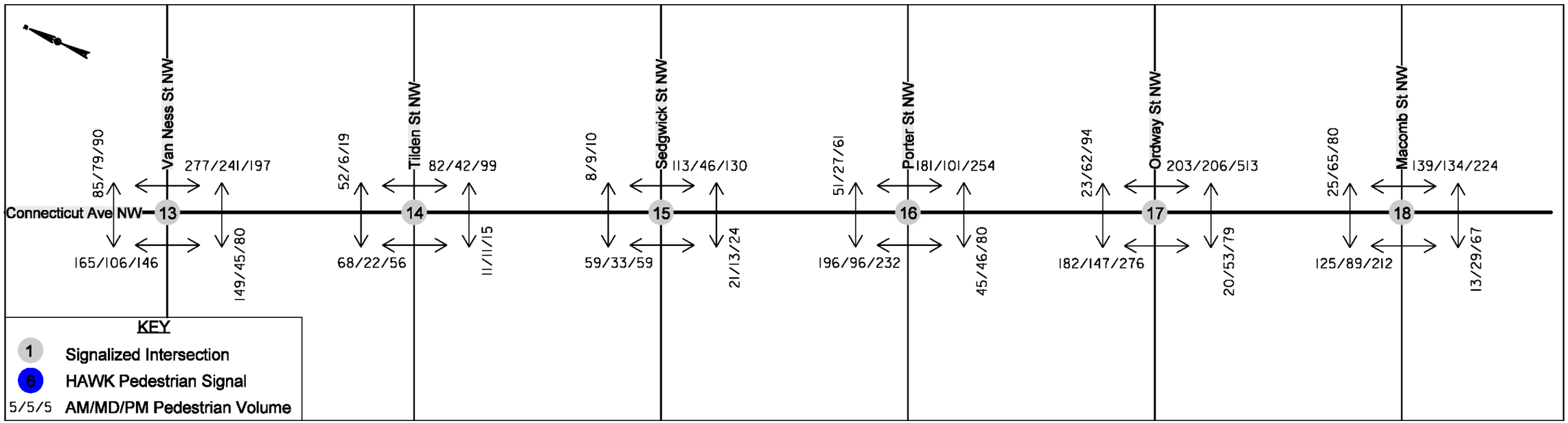


Figure 24: Primary Study Area Pedestrian Counts

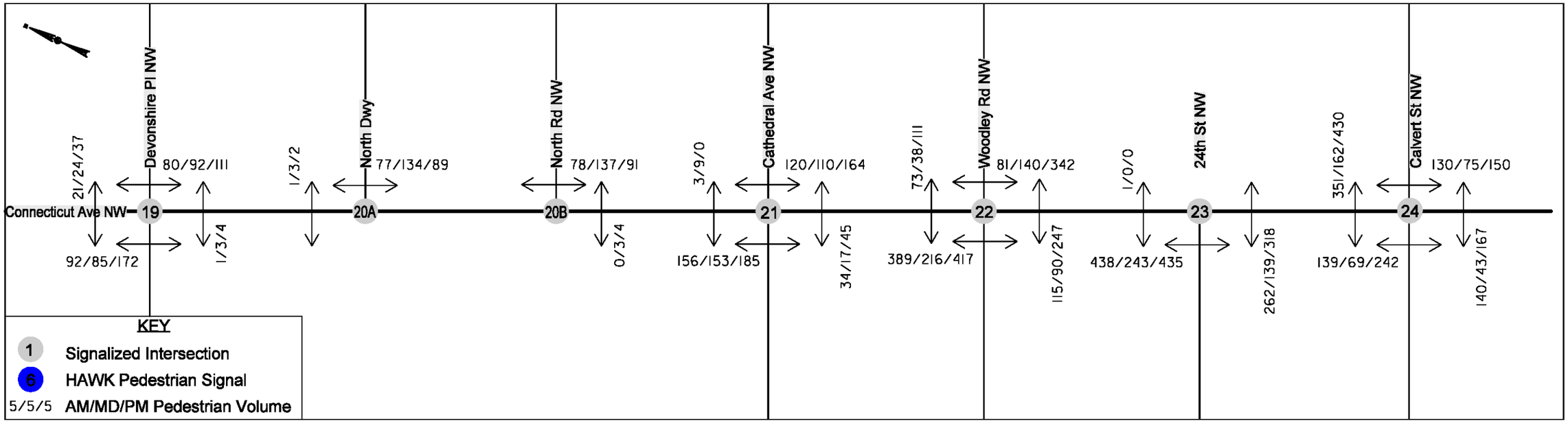


Figure 25: Primary Study Area Pedestrian Counts

Intersection: Connecticut Avenue NW @	Metro Proximity	AM	AM Rank	MD	MD Rank	PM	PM Rank	AM/ MD/ PM Volume	AM/ MD/ PM Rank
1. Military Road NW		179	21	77	23	187	19	443	21
2. Jennifer Street NW		88	22	34	24	89	24	211	24
3. Huntington Street NW		48	25	22	25	55	25	125	25
4. Nebraska Avenue NW		265	17	95	20	170	21	530	18
5. Fessenden Street NW		314	13	111	17	208	17	633	16
6. Ellicott Street NW		301	16	106	18	186	20	593	17
7. Davenport Street NW		418	12	83	21	256	15	757	14
8. Brandywine Street NW		490	9	129	16	355	13	974	13
9. Albemarle Street NW	M	733	4	259	12	598	9	1,590	9
10. Yuma Street NW	M	836	2	444	6	753	6	2,033	5
11. Windom Place NW	M	958	1	614	2	874	5	2,446	1
12. Veazey Terrace NW	M	710	5	761	1	950	4	2,421	2
13. Van Ness NW	M	676	7	471	4	513	11	1,660	8
14. Tilden Street NW		213	18	81	22	189	18	483	20
15. Sedgwick Street NW		185	20	101	19	223	16	509	19
16. Porter Street NW	M	473	10	270	11	627	8	1,370	10
17. Ordway Street NW	M	428	11	468	5	962	3	1,858	6
18. Macomb Street NW		302	15	317	9	583	10	1,202	11
19. Devonshire Place NW		194	19	204	13	324	14	722	15
20A. North Driveway NW		78	23	137	15	91	23	306	23
20B. North Road NW		78	23	140	14	95	22	313	22
22. Cathedral Avenue Road NW		303	14	289	10	394	12	986	12
23. Woodley Road NW	M	658	8	484	3	1117	1	2,259	3
24. 24th Street NW	M	701	6	382	7	753	6	1,836	7
25. Calvert Street NW	M	760	3	349	8	989	2	2,098	4

Rank 1-10

Table 16: Total Pedestrian Volume During AM, Midday and PM Peak Hours

BICYCLES

Connecticut Avenue NW has been identified as a corridor for protected bicycle lanes (PBLs) as part of the District's Long-Range Transportation Plan, moveDC. Existing speeds, narrow lane widths, and the added complication of the reversible lane operations create an environment where "stress" is evident for cyclists. In 2004, DDOT installed bicycle wayfinding signs directing cyclists to parallel streets. **Figures 26** through **29** provide the existing weekday AM, Mid-day and PM bicycle turning movement counts along the Connecticut Avenue NW corridor. **Table 17** provides a summary of the total bicycle volume at all legs of the study area intersections.

Each primary study area intersection was ranked against each other for the AM, Mid-day and PM peak hours as well as for the combined AM, Mid-day, and PM total bicycle volume. The numbers in blue show the top 10 ranked intersections for bicycle activity within the Connecticut Avenue NW primary study area corridor.

The top 10 intersections for bicycle activity are generally within close proximity to the two of the three corridor Metrorail stations: Cleveland Park and Woodley Park. The intersections exhibiting the greatest bicycle volume include those intersections in the southern section of the Connecticut Avenue study area from Porter Street NW to Calvert Street NW. The bicycle volumes shown were collected when the turning movement counts were conducted during the following time periods: April-May, 2018 and throughout 2019 between April and December.

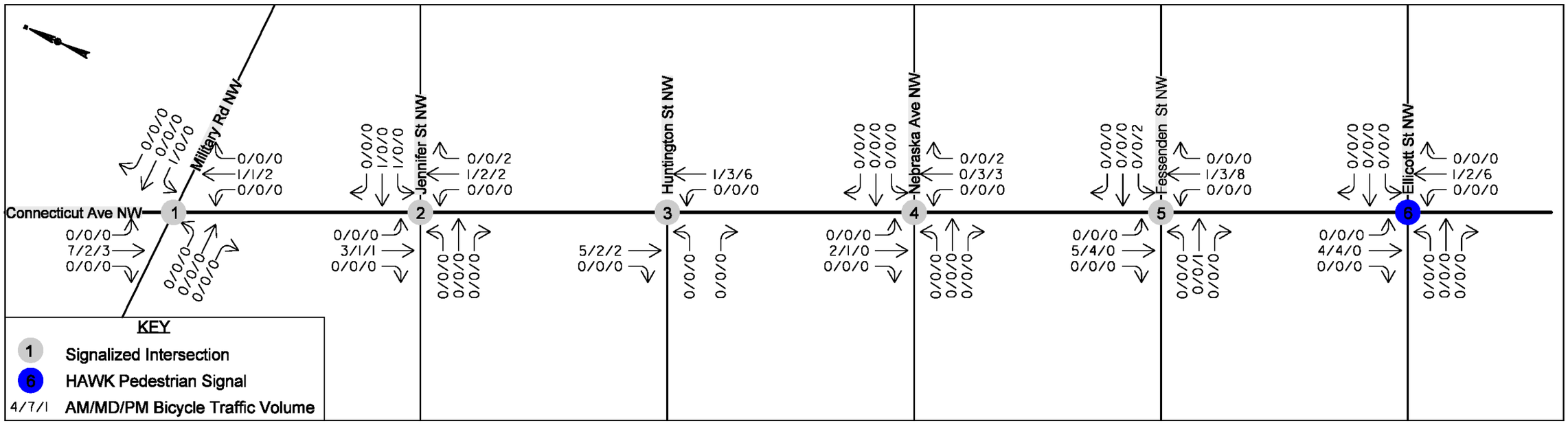


Figure 26: Primary Study Area Bicycle Counts

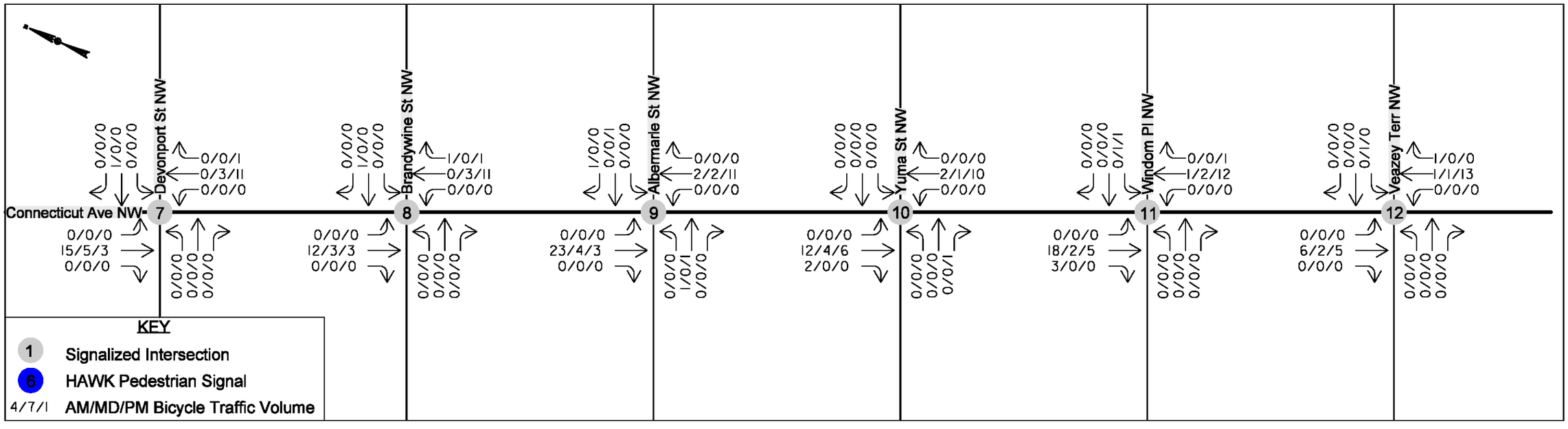


Figure 27: Primary Study Area Bicycle Counts

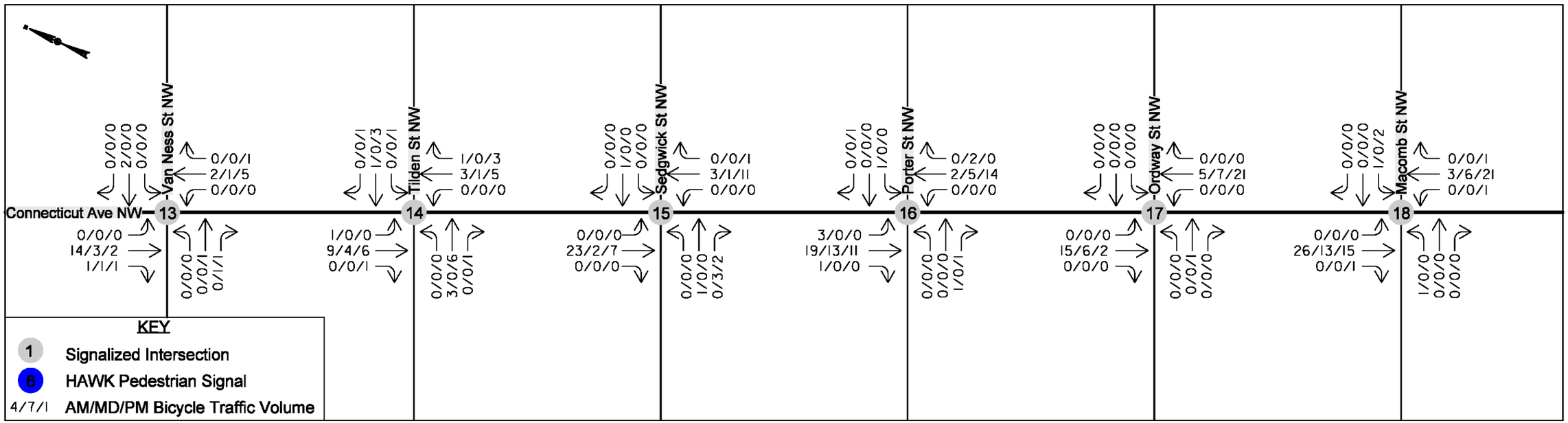


Figure 28: Primary Study Area Bicycle Counts

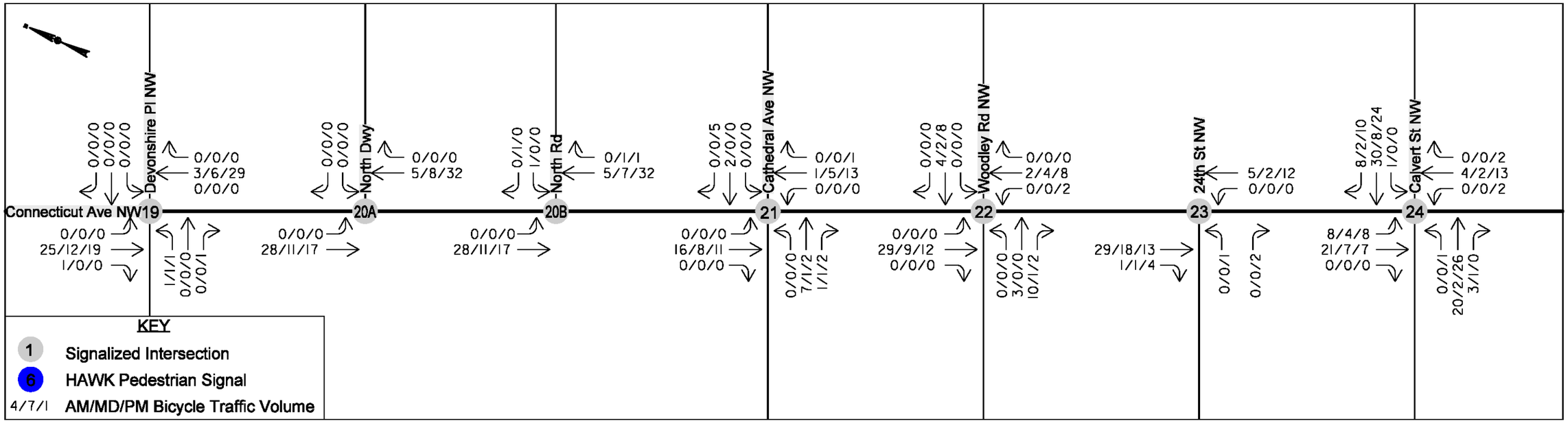


Figure 29: Primary Study Area Bicycle Counts

Intersection: Connecticut Avenue NW @	Metro Proximity	AM	AM Rank	MD	MD Rank	PM	PM Rank	AM/ MD/ PM Volume	AM/ MD/ PM Rank
1. Military Road NW		9	20	3	24	6	22	18	22
2. Jennifer Street NW		6	22	3	24	5	24	14	24
3. Huntington Street NW		11	19	5	18	8	21	24	20
4. Nebraska Avenue NW		2	25	4	22	5	24	11	25
5. Fessenden Street NW		6	22	7	12	11	19	24	20
6. Ellicott Street NW		5	24	6	13	6	22	17	23
7. Davenport Street NW		16	16	8	11	15	17	39	15
8. Brandywine Street NW		14	18	6	13	15	17	35	18
9. Albemarle Street NW	M	27	9	6	13	16	16	49	13
10. Yuma Street NW	M	16	16	5	18	17	15	38	16
11. Windom Place NW	M	22	12	5	18	19	13	46	14
12. Veazey Terrace NW	M	8	21	4	22	18	14	30	19
13. Van Ness NW	M	19	14	6	13	11	19	36	17
14. Tilden Street NW		18	15	5	18	27	9	50	12
15. Sedgwick Street NW		28	8	6	13	21	12	55	11
16. Porter Street NW	M	27	9	20	3	27	9	74	9
17. Ordway Street NW	M	20	13	13	10	24	11	57	10
18. Macomb Street NW		31	6	19	5	41	5	91	6
19. Devonshire Place NW		30	7	19	5	50	2	99	4
20A. North Driveway NW		33	5	19	5	49	4	101	3
20B. North Road NW		34	4	20	3	50	2	104	2
22. Cathedral Avenue Road NW		27	9	15	9	34	6	76	8
23. Woodley Road NW	M	46	2	18	8	32	7	96	5
24. 24th Street NW	M	35	3	21	2	32	7	88	7
25. Calvert Street NW	M	95	1	28	1	93	1	216	1

Rank 1-10

Table 17: Total Bicycle Volume During AM, Midday and PM Peak Hours

FREIGHT AND TRUCKS

Connecticut Avenue NW is a designated truck route within the District of Columbia. As a result, there is a significant presence of curbside facilities that exist along the corridor and on subsequent side streets. These features include parking lay-by areas, delivery and loading zones, as well as truck route restrictions on nearby local streets that bisect the corridor. The need to accommodate freight and truck activity is an important feature of the corridor that must be considered as roadway alternatives advance for Connecticut Avenue NW.

Figure 30 depicts the variety of bus and truck features to be found in the study area.

Based on the ADT counts collected in February 2020 (Appendix B), an average of 2.7% to 3.4% single-unit (FHWA Classes 5-7; delivery, FedEx, UPS, box trucks) and articulated trucks (FHWA Classes 8-13; single- and double-trailer) travel along northbound and southbound Connecticut Avenue NW daily.

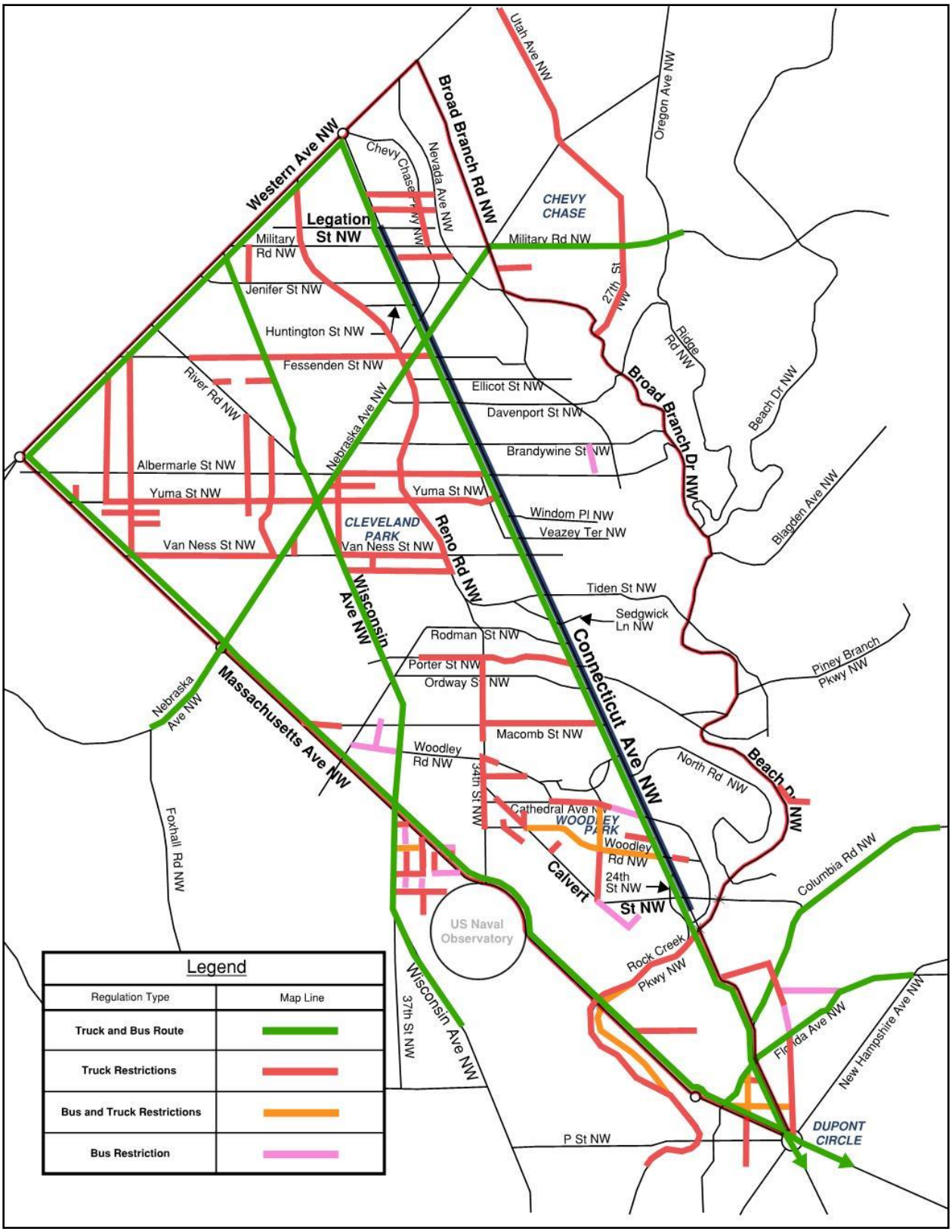


Figure 30: Freight and Truck Features

PARKING AND CURBSIDE USE

Connecticut Avenue's curbside regulations are reflective of the various land uses along the corridor. Overall, during the peak periods, parking and commercial loading is prohibited. Bus stops remain in service. During non-peak periods, Connecticut Avenue NW operates in each direction with two travel lanes, and the outside lane is allocated for bus stops, parking, and commercial loading.

Details such as curbside regulations, and occupancy were noted based upon type, location, and time of day. The observations will be used to quantify the curbside impacts related to alternative approaches to removal/modification of the reversable lane along the corridor.

Parking Supply and Regulations

Figures 31 through **34** shows curbside regulations along the Connecticut Avenue NW corridor within the Primary Study Area. **Table 18** illustrates the parking regulations and supply along the corridor.

Parking Regulation	Description	Supply
Unregulated Parking	Parking allowed at all times and days. No parking during AM and/or PM peak hours	290 spaces
2-Hour Parking	2 Hour time limited parking (9:30am-4:00pm). No parking during AM and PM peak hours	150 spaces
2-Hour and 3 ½ Hour Metered Parking	Time limited paid parking ($2.30/hr.), No parking during AM and PM peak hours	185 spaces
Loading Zone	Signed, on street metered zones exclusively for commercial vehicles for up to two hours at a time during off peak periods	12 locations

Table 18: Corridor-Wide Parking Regulations and Supply

Key Findings

Unregulated Parking

As shown on **Figures 31** through **34**, a majority of parking along the Connecticut Avenue NW corridor is unregulated parking. This allows motorists to be able to park for an unlimited amount of time during posted times and dates with the exception no parking during the AM and PM peak hours.

Time Limited Parking

Time limited parking is scattered throughout the corridor within and outside of the primary commercial activity centers. Time limited parking is free and is often limited to 2 hours during off-peak time periods.

Metered Parking

Metered parking is predominantly located near commercial activity centers such as Cleveland Park, Van Ness, and Woodley Park. Metered parking is regulated during the non-peak hours of the day, from 9:30 AM to 4:00 PM, limited to 2-hour parking and from 6:30 PM to 10 PM, limited to 3 ½ hour parking. Outside these hours and AM/PM peak periods, parking is permitted and is free.

Loading

Dedicated curbside loading is primarily located in close proximity to the three Corridor commercial activity centers. These are signed as on-street metered zones exclusively for commercial vehicles for a period of up to two (2) hours at a time during the off-peak period.

Curbside Utilization

Mid-day parking utilization counts and observations were conducted on Thursday, March 5th, 2020 between 11:30 AM and 12:30 PM within the study area corridor. **Tables 19** and **20** captures the mid-day parking utilization for each the major commercial activity centers and street segments along the corridor.

Key Findings

- Of all major commercial activity center, the Van Ness corridor has the highest on-street parking utilization, while Cleveland Park shows moderate utilization levels;
- Commercial loading zones within activity centers are consistently utilized and at capacity during the off-peak hours; and
- Overall on-street parking demand is generally low (unregulated spaces are less than 50% utilized), with the exception of some on-street parking in major activity centers, commercial corridor segments (e.g. Fessenden to Nebraska Ave) and concentrated residential areas (e.g. Legation to Livingston Street).

Parking Regulation	Woodley Park Calvert St NW to Devonshire Pl NW		Cleveland Park Devonshire Pl NW to Tilden St NW		Van Ness Tilden St NW to Yuma St NW	
Unregulated Parking			50%		70%	
2 Hour Time Limited	45%				80%	
2 Hour & 3 ½ Hour Metered Parking	90%		55%		60%	
Loading Zones (in feet)	100%	4 Zones: 80’, 65’ 58’, 29’	100% 30%	2 Zones: 37’, 49’ 1 Zone: 76’	100%	1 Zone: 54’
Other			Taxicab (100%)		Diplomat (100%)	

Table 19: Parking Utilization Commercial Activity Center

Connecticut Ave NW from:	to:	Unregulated Parking		2 HR Parking		2 HR (and 3 1/2 HR) Metered Parking		Loading Zone			Other Parking		
		Spaces	Utilization %	Spaces	Utilization %	Spaces	Utilization %	Spaces	Length (ft)	Utilization %	Regulation	Spaces	Utilization %
Calvert St NW	24th St NW					17	90%	6	167	100%			
24th St NW	Woodley Rd NW					3	100%						
Woodley Rd NW	Cathedral Ave NW			57	30%			2	65	100%			
Cathedral Ave NW	North Rd			34	45%								
North Rd	Devonshire Pl NW			24	85%								
Devonshire Pl NW	Macomb St NW												
Macomb St NW	Ordway St NW					42	50%	5	125	60%			
Ordway St NW	Porter St NW					12	65%	1	37	100%	TaxiCab	1	100%
Porter St NW	Sedgwick St NW*	29	50%										
Sedgwick St NW	Tilden St NW	23	45%										
Tilden St NW	Van Ness St NW	27	70%			18	30%						
Van Ness St NW	Veazey Ter NW					23	70%	1	54	100%			
Veazey Ter NW	Windom Pl NW					13	90%				Diplomat	2	100%
Windom Pl NW	Yuma St NW			5	80%	21	60%						
Yuma St NW	Albemarle St NW					17	60%	3	90	30%			
Albemarle St NW	Brandywine St NW	14	50%	18	35%								
Brandywine St NW	Davenport St NW	33	25%										
Davenport St NW	Ellicott St NW	19	35%										
Ellicott St NW	Fessenden St NW	18	10%								1 HR - Mid-day	1	0%
Fessenden St NW	Nebraska Ave NW	2	100%			18	70%						
Nebraska Ave NW	Chevy Chase Pkwy NW	14	55%	11	20%								
Chevy Chase Pkwy NW	Huntington St NW	6	0%										
Huntington St NW	Jenifer St NW	22	25%										
Jenifer St NW	Military Rd NW	36	30%										
Military Rd NW	Legation St NW	17	35%										
Legation St NW	Livingston St NW	15	95%					2	41	100%	20 MIN Mid-day	1	100%

* 13 Unregulated Parking spaces not available during mid-day

Table 20: Parking Utilization by Street Segment

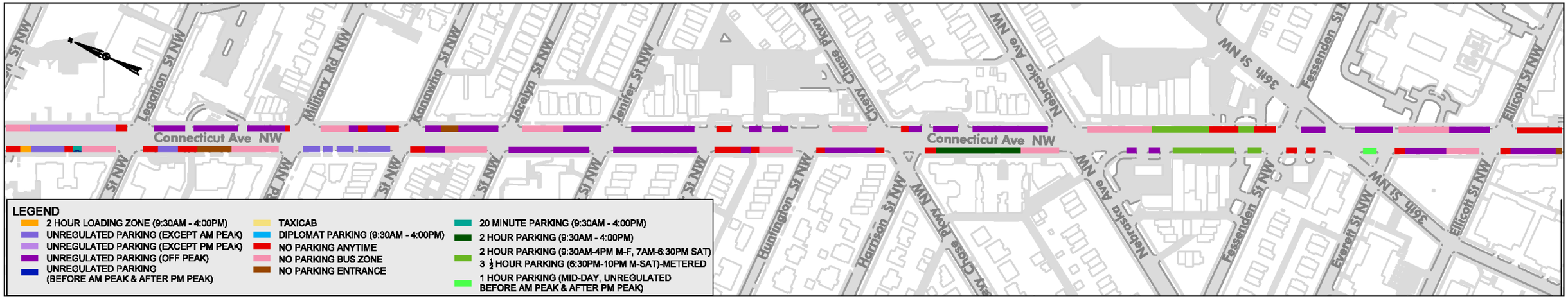


Figure 31: Parking Supply and Curbside Regulations

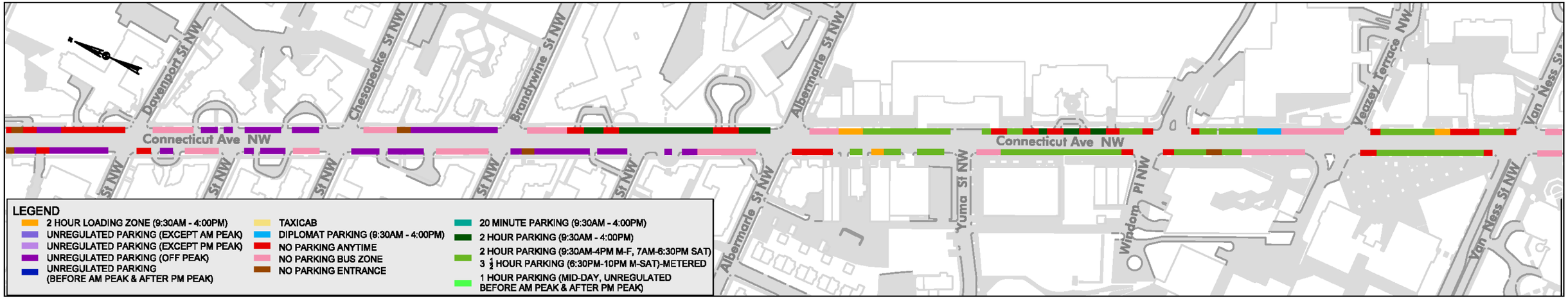


Figure 32: Parking Supply and Curbside Regulations

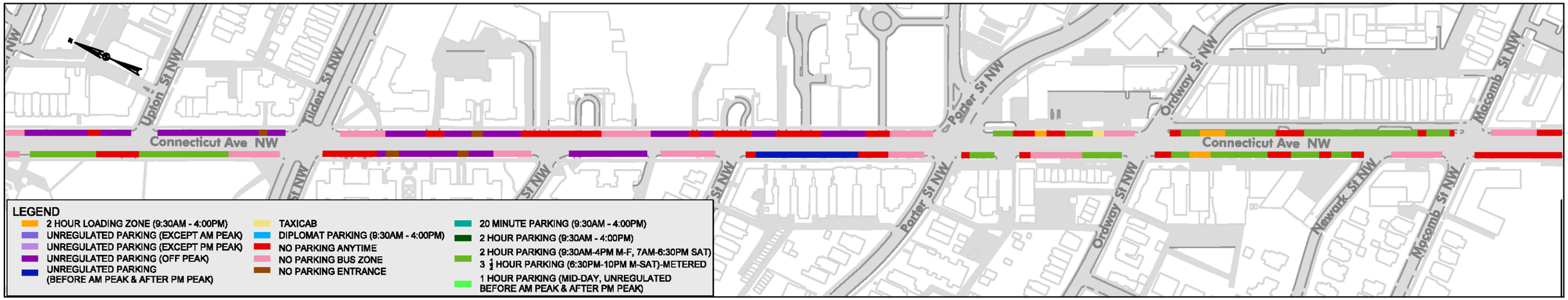


Figure 33: Parking Supply and Curbside Regulations

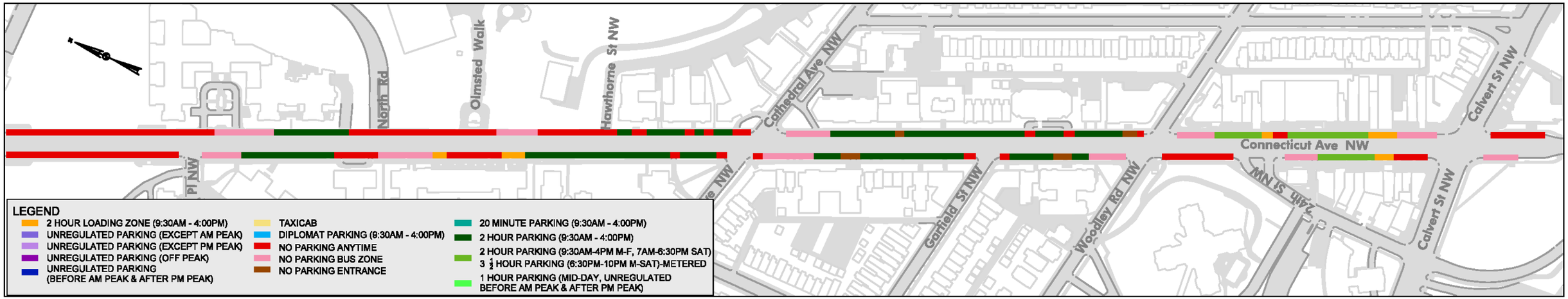


Figure 34: Parking Supply and Curbside Regulations

SAFETY

DATA COLLECTION

Crash Data Overview

A total of 1,507 police-reported crashes occurred during the five-year study period (2015-2019) along the Connecticut Avenue NW study corridor.

Table 21 shows the number of crashes for various categories, along with the percent of crashes that occurred either during reversible lane hours or outside of reversible lane (RL) hours (normal operations). Overall, 44% of total and combined injury crashes occurred during reversible lane operations. A smaller portion of pedestrian (32%) and bicycle (20%) crashes occurred during reversible lane operations.

	Reversible Lane Operation		Normal Operation		Total Crashes	
Crash Category	Count	%	Count	%	Count	%
Pedestrian	22	32%	46	68%	68	100%
Bicycle	2	20%	8	80%	10	100%
Disabling Injury	11	52%	10	48%	21	100%
Non-Disabling Injury	183	43%	239	57%	422	100%
PDO	470	44%	594	56%	1064	100%
Total Crashes	664	44%	843	56%	1507	100%

Table 21: Number of Crashes by Category, by Reversible Lane, and Normal Time of Day Operations

Figure 35 illustrates the percent of time that reversible lanes are in effect (15%) versus the percent of crashes that occur during reversible lane hours (44%).

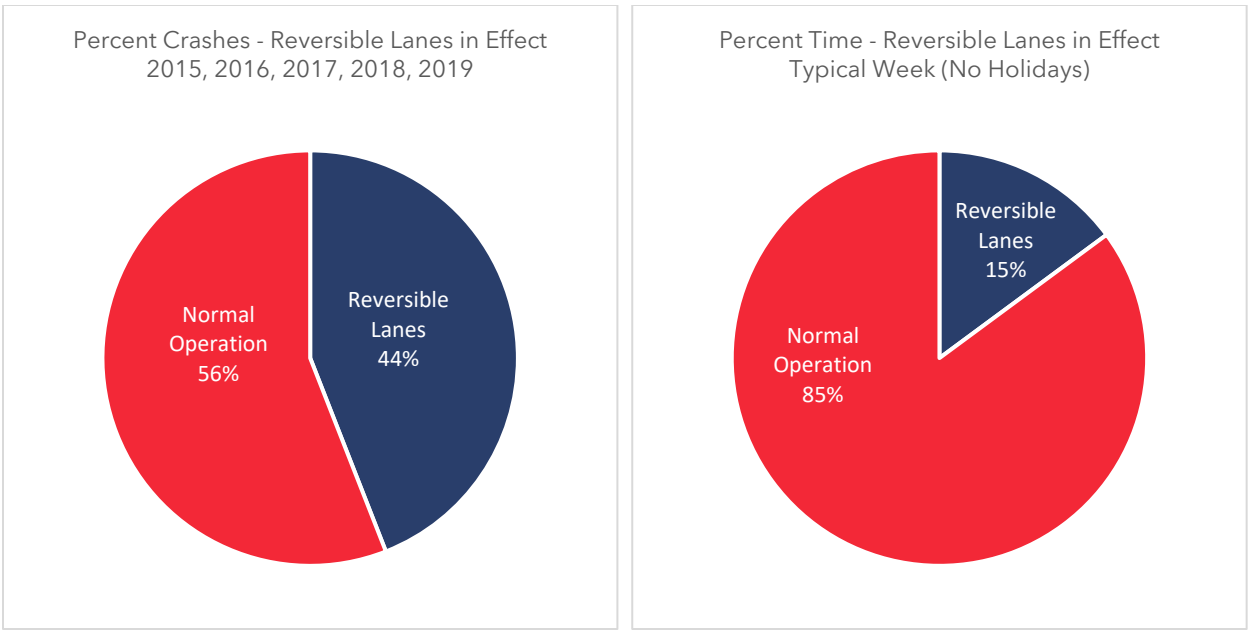


Figure 35: Percent of Time Reversible Lanes (RL) are in effect vs. Percent of Crashes during RL Operations

Figure 36 shows the number of crashes reported along the Connecticut Avenue NW study corridor by time of day in 30-minute increments. Data in the figure are limited to days when reversible lanes were in effect during 2015-2019. The orange bars indicate the number of crashes that occurred during reversible lane hours.

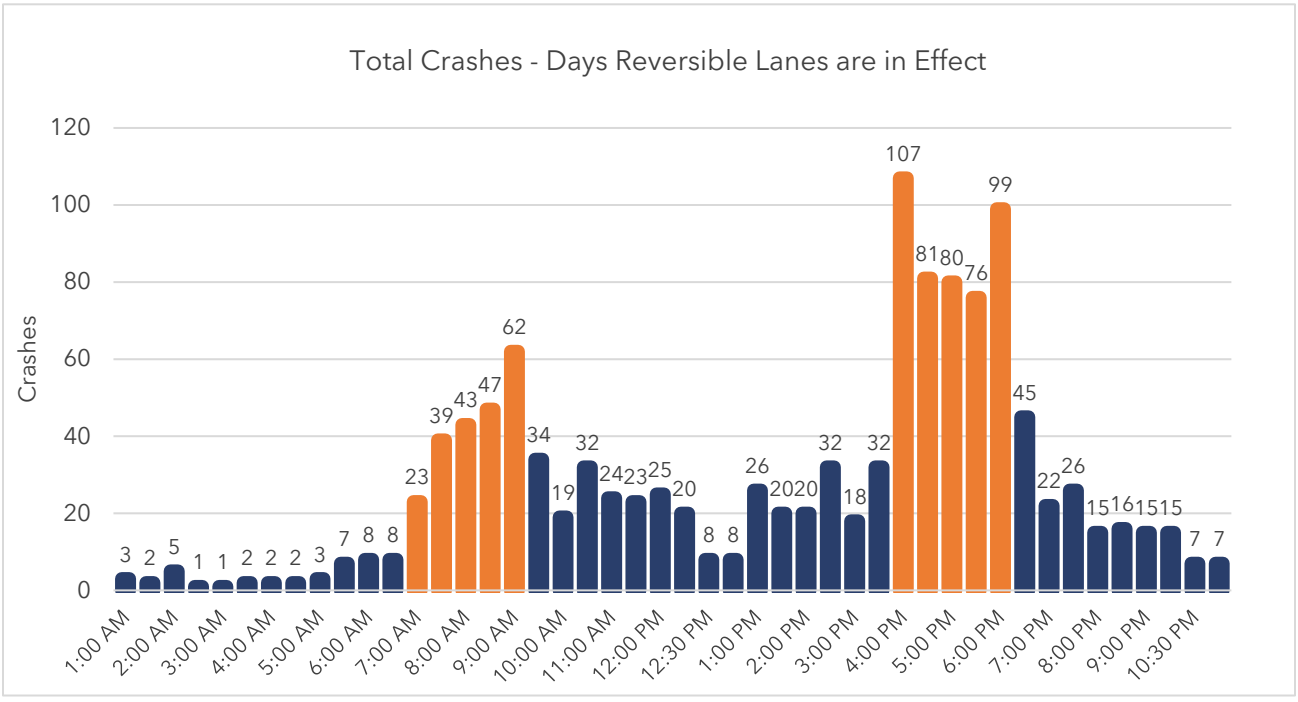


Figure 36: Number of Crashes along Connecticut Avenue NW Study Corridor by Time of Day

Table 22 compares the total crashes and reversible lane operation crashes at each intersection on the corridor. The table shows the percentage of total and injury crashes that occurred during reversible lane operations and the corresponding portion of daily traffic that occurs during reversible lane operations. In total, approximately 40% of daily traffic volume and 44% of total crashes and 44% injury crashes occur during reversible lane operations.

The percentage of crashes occurring during reversible lane hours varies by intersection. Please note that the percentage of injury crashes during reversible lane hours is more meaningful at intersections with greater numbers of injury crashes. **Figure 37** illustrates the percentage of crashes that occurred during reversible lane operations by intersection. **Figure 38** illustrates the total of injury crashes by intersection.

	Crashes						Daily Traffic Volume		
Cross Street	Total	Rev Lane	% Rev Lane	Total Injury	Rev Lane Injury	% Rev Lane Injury	AADT	Rev. Lane	% Vol. Rev. Lane
CALVERT ST	69	18	26%	14	2	14%	*	*	*
TWENTY FOURTH ST	33	14	42%	3	1	33%	*	*	*
WOODLEY RD	42	10	24%	11	2	18%	*	*	*
GARFIELD ST	31	14	45%	16	8	50%	*	*	*
CATHEDRAL AVE	10	5	50%	2	1	50%	*	*	*
HAWTHORNE ST	77	33	43%	22	13	59%	*	*	*
DEVONSHIRE PL	90	47	52%	35	14	40%	30443	12328	40%
MACOMB ST	50	35	70%	16	9	56%	30443	12328	40%
NEWARK ST	63	18	29%	16	7	44%	*	*	*
ORDWAY ST	74	28	38%	15	4	27%	*	*	*
PORTER ST	70	25	36%	14	4	29%	29407	12075	41%
RODMAN ST	33	22	67%	8	7	88%	29407	12075	41%
SEDGWICK ST	63	29	46%	22	13	59%	29407	12075	41%
TILDEN ST	28	18	64%	7	4	57%	29407	12075	41%
UPTON ST	30	15	50%	9	4	44%	31841	12811	40%
VAN NESS ST	48	13	27%	15	4	27%	31841	12811	40%
VEAZEY TER	47	18	38%	16	6	38%	*	*	*
WINDOM PL	59	23	39%	16	8	50%	*	*	*
YUMA ST	71	34	48%	18	6	33%	*	*	*
ALBEMARLE ST	50	27	54%	12	7	58%	*	*	*
APPLETON ST	11	3	27%	3	0	0%	*	*	*

Table 22: Crashes by Intersections (continued on next page)

	Crashes						Daily Traffic Volume		
Cross Street	Total	Rev Lane	% Rev Lane	Total Injury	Rev Lane Injury	% Rev Lane Injury	AADT	Rev. Lane	% Vol. Rev. Lane
BRANDYWINE ST	32	15	47%	11	6	55%	*	*	*
CHESAPEAKE ST	23	16	70%	8	5	63%	*	*	*
CUMBERLAND ST	5	2	40%	1	0	0%	*	*	*
DAVENPORT ST	25	14	56%	11	9	82%	*	*	*
ELLICOTT ST	47	25	53%	16	5	31%	*	*	*
THIRTY SIXTH ST	4	2	50%	1	1	100%	*	*	*
FESSENDEN ST	52	30	58%	13	9	69%	*	*	*
NEBRASKA AVE	63	20	32%	25	9	36%	29857	11166	37%
CHEVY CHASE PKWY	35	20	57%	12	6	50%	29857	11166	37%
HARRISON ST	1	1	100%	0	0	N/A	29857	11166	37%
HUNTINGTON ST	13	5	38%	5	3	60%	29857	11166	37%
INGOMAR ST	5	4	80%	2	2	100%	29857	11166	37%
JENIFER ST	20	14	70%	5	4	80%	29857	11166	37%
JOCELYN ST	8	6	75%	2	2	100%	29857	11166	37%
KANAWHA ST	21	13	62%	7	3	43%	29857	11166	37%
MILITARY RD	48	18	38%	11	3	27%	29857	11166	37%
LEGATION ST	37	11	30%	16	3	19%	*	*	*
Intersection Not Assigned	19	15	79%	7	6	86%	*	*	*

** AADT data not available at these locations*

Table 22: Crashes by Intersections

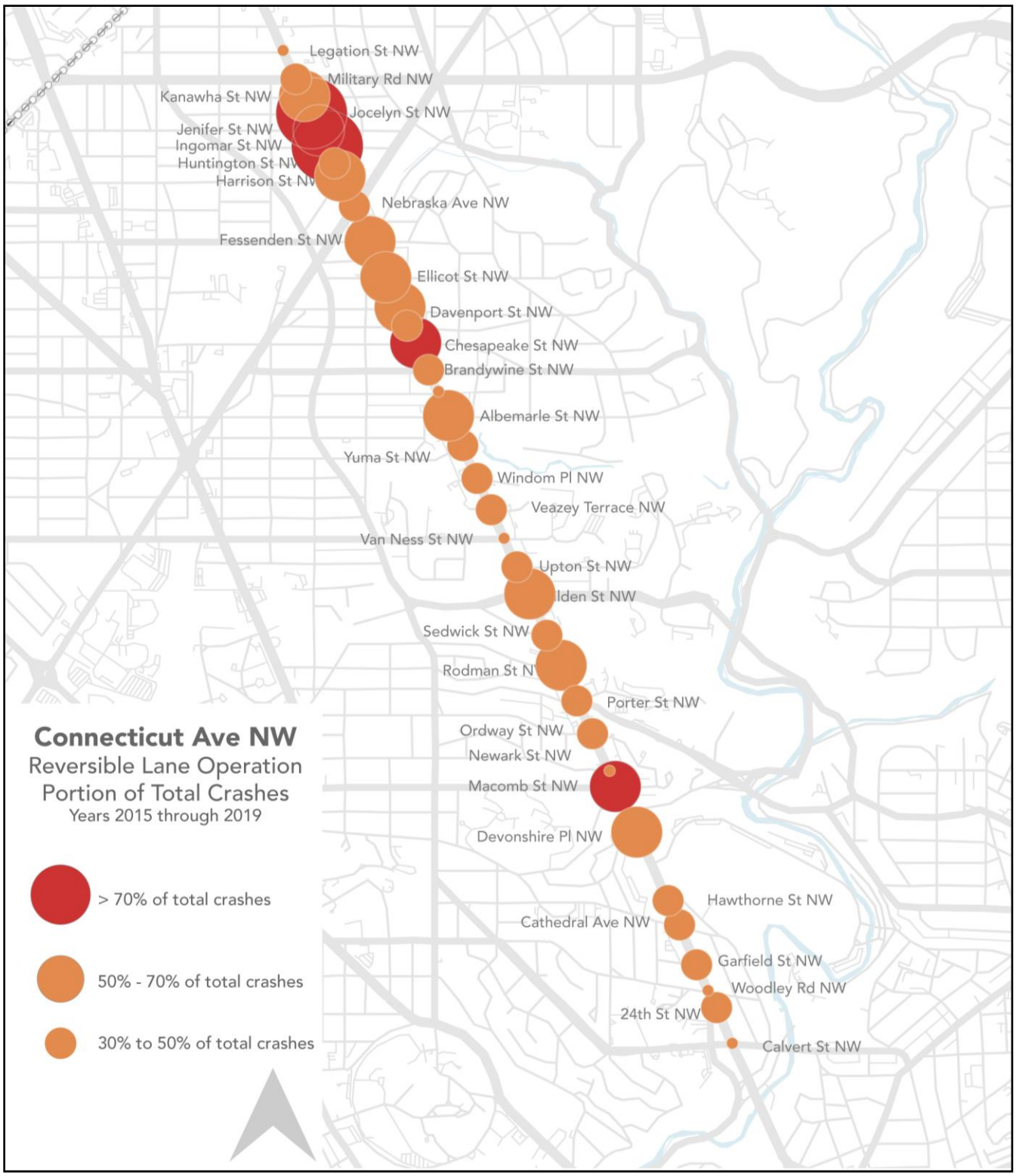


Figure 37: Portions of Crashes Occurring During Reversible Lane Operations

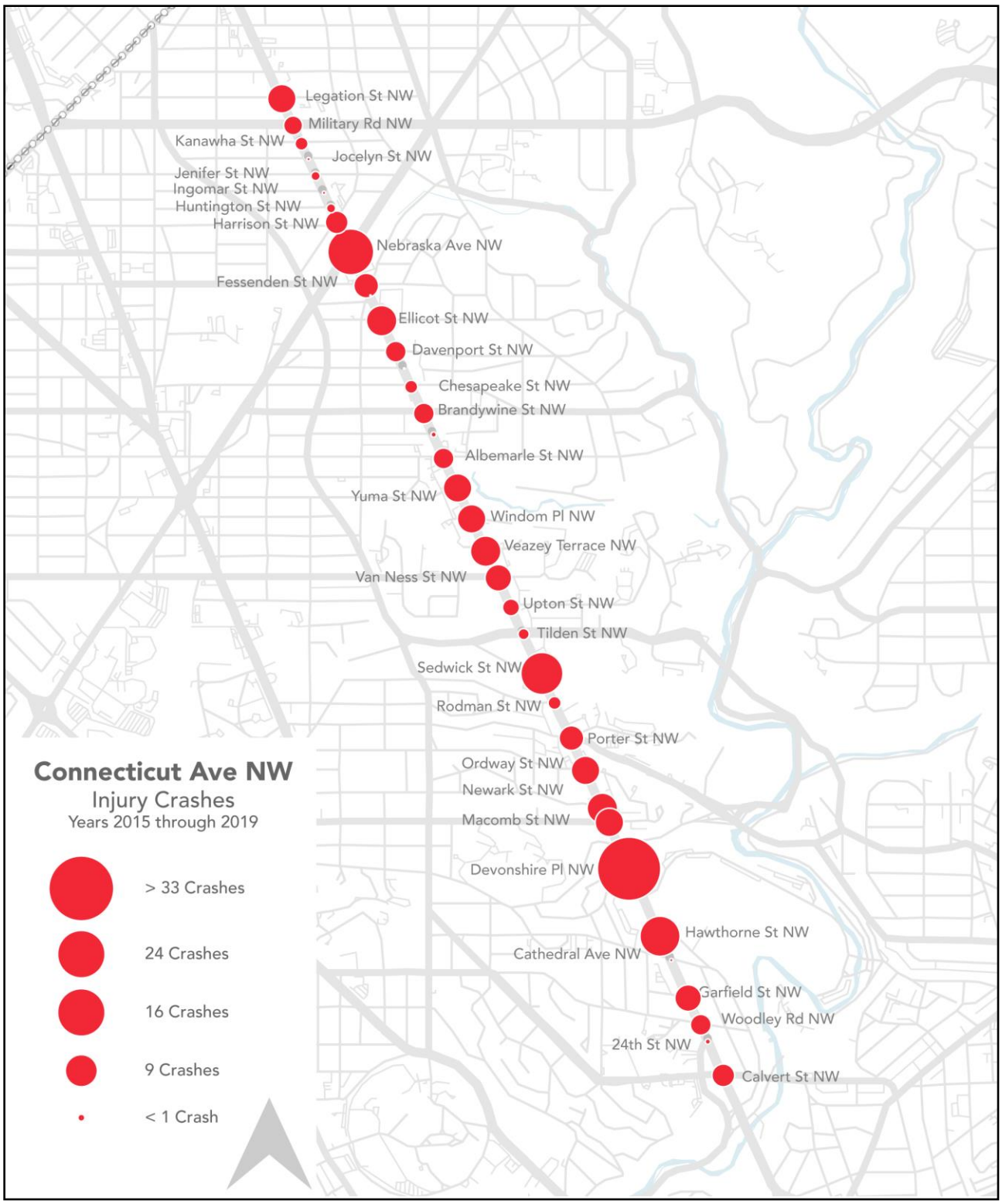


Figure 38: Total Injury Crashes by Intersection

Crash Types

Within the study area, three crash types accounted for 72% of all crashes – Left Turn Hit Vehicle (27%), Side Swiped (24%), and Rear End (21%) as shown on **Figure 39**.

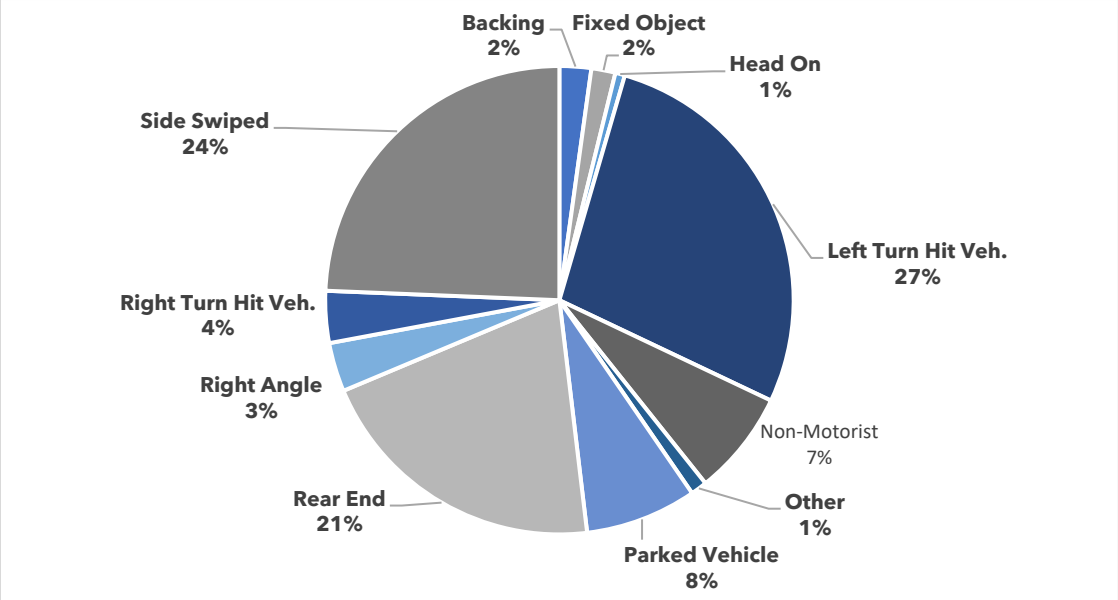


Figure 39: Number of Total Crashes along the Connecticut Avenue NW Study Corridor by Crash Type

Figure 40 shows how the number of crashes for each crash type were distributed between reversible lane hours and normal operations. Left turn crashes stand out disproportionally occurring during reversible lane hours.

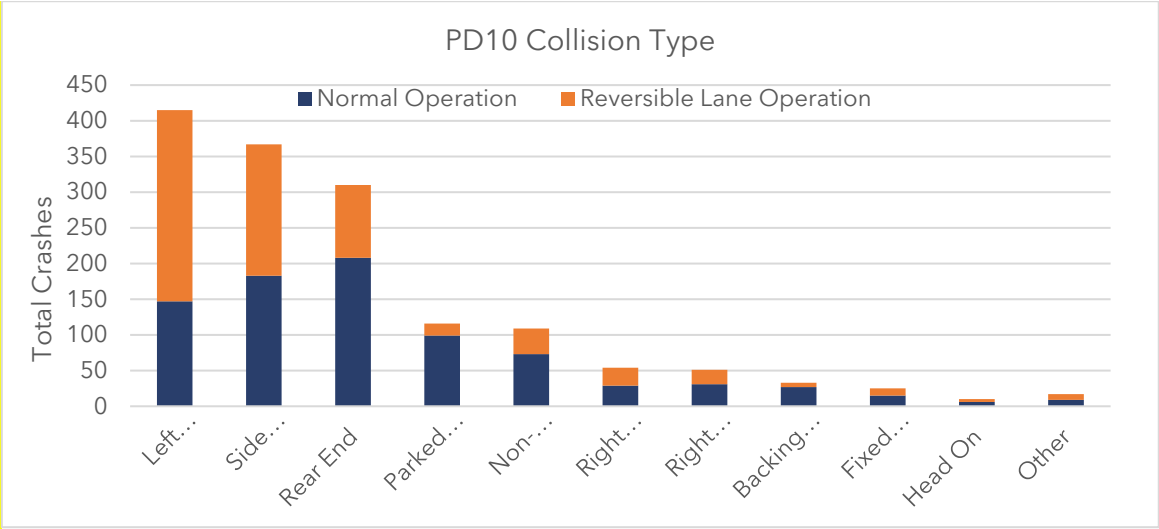


Figure 40: Number of Crashes by Category, by Reversible Lane, and Normal Time of Day Operations

Disabling Injury Crash Data

The following summarizes the analysis of 20 disabling injury crashes police reported along the Connecticut Avenue NW Reversible Lane Study corridor during the five-year period 2015-2019 (one crash reported by police to have resulted in a disabling injury was not analyzed because of a lack of any reference in the report to emergency medical response to the crash scene or transport to hospital). The designation of "disabling injury crashes" is based on the judgement of police officers who might categorize some injuries as disabling that do not meet Model Minimum Uniform Crash Criteria (MMUCC).[5] The approximate location of the crashes is shown on **Figure 41**.

Table 23 shows the primary contributing factors by crash category based on information contained on the police crash reports.

Crash Category	Primary Contributing Factor
Pedestrian	Crossing street outside of crosswalk
Pedestrian	Crossing street outside of crosswalk
Pedestrian	Failure to Yield Right of Way
Pedestrian	Failure to Yield Right of Way
Pedestrian	Failure to Yield Right of Way
Pedestrian	Pedestrian Intoxicated/Ran into Street
Pedestrian	Pedestrian Ran into Street
Multi-Vehicle	Failure to Yield + Speeding
Multi-Vehicle	Failure to Yield Right of Way
Multi-Vehicle	Following Too Close
Multi-Vehicle	Improper Lane Change
Multi-Vehicle	Improper Lane Change
Multi-Vehicle	Red Light Violation

Table 23: Primary Contributing Factors by Crash Category

A review of narratives on the police crash reports revealed two cases where road users involved in peak-hour disabling-injury crashes appeared to be confused by the reversible lane operation:

> *Crash sample 1: Driver #1 stated she thought the lane she was in was the correct lane for travel and did not realize that the lanes change during rush hour.*
>
> *Crash sample 2: Upon my arrival at MedStar Washington Hospital Center to check on the status of Pedestrian #1, he stated, "I forgot there were four lanes in the morning."*

A review of narratives on the police crash reports revealed two cases where road users involved in peak-hour disabling-injury crashes appeared to be confused by the

[5] MMUCC criteria for serious injuries include: severe laceration resulting in exposure of underlying tissues/muscle/organs or resulting in significant loss of blood, Broken or distorted extremity (arm or leg), Crush injuries, suspected skull, chest or abdominal injury other than bruises or minor lacerations and significant burns (second and third-degree burns over 10% or more of the body), unconsciousness when taken from the crash scene, and/or paralysis.

Crash Category	Primary Contributing Factor
Bicycle	Failure to Yield Right of Way
Bicycle	Failure to Yield Right of Way
Bicycle	Failure to Yield Right of Way
Bicycle	Unknown
Bicycle	Unknown
Emergency Vehicle Involved	Failure to Yield Right of Way
Emergency Vehicle Involved	Speeding

Table 23: Primary Contributing Factors by Crash Category (continued)

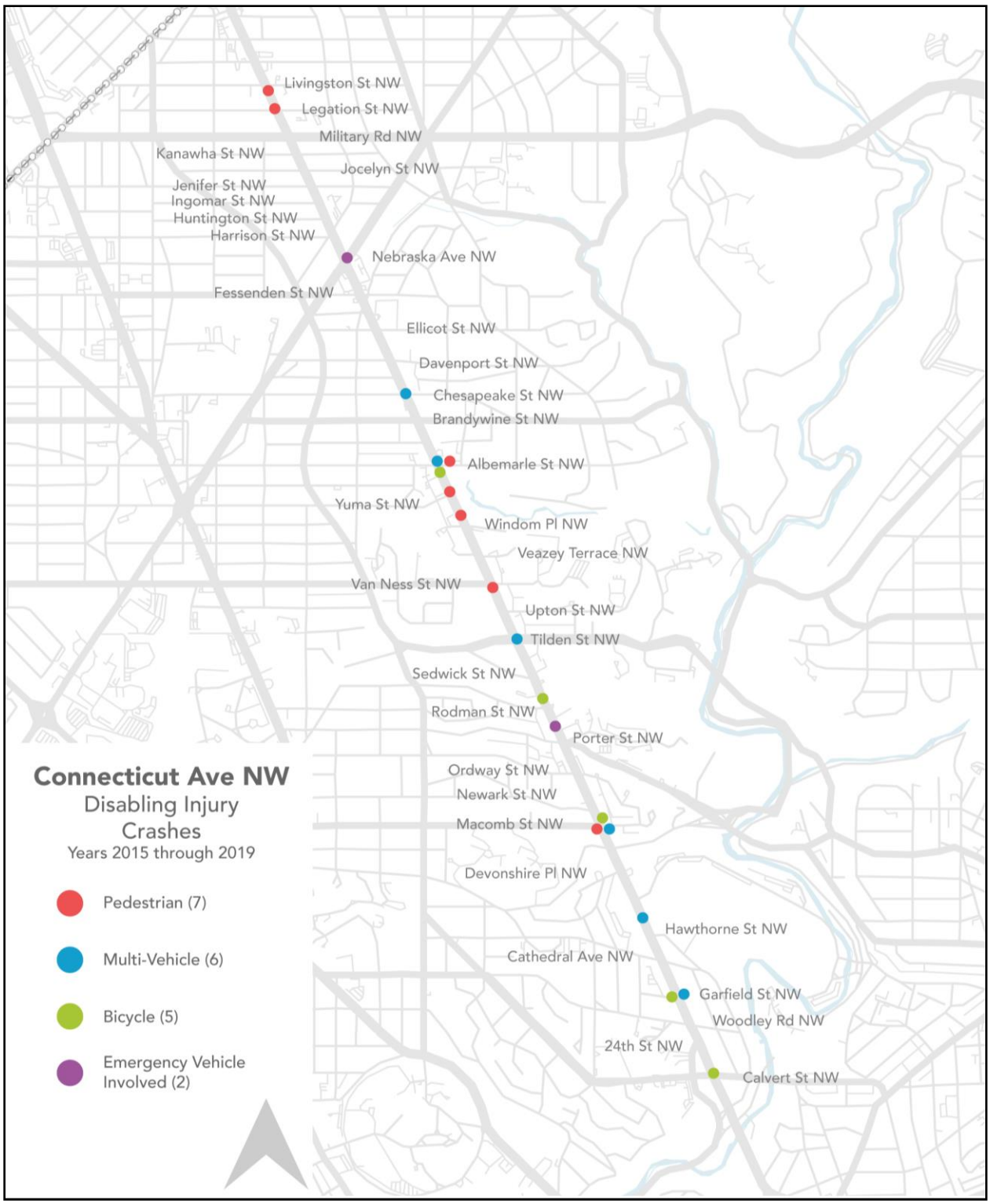


Figure 41: Approximate Locations of Disabling-Injury Crashes

Based on the 20 disabling injuries, **Figures 42**, **43** and **44** show disabling-injury crashes by a variety of time frames, locations, and crash types for the five-year analysis period. **Figure 42** shows that thirteen (13) of the twenty (20) Disabling-Injury crashes (65 percent) occurred at intersections, while the remainder did not occur at an intersection or occurred at a driveway. **Figure 43** shows that ten (10) of the sixteen (16) (approximately 63 percent) of the Disabling-Injury crashes that occurred on weekdays took place during the RL hours of operation. **Figure 44** shows that twelve (12) of the twenty (20) (60 percent of the Disabling-Injury crashes are either pedestrian or bicycle-related.

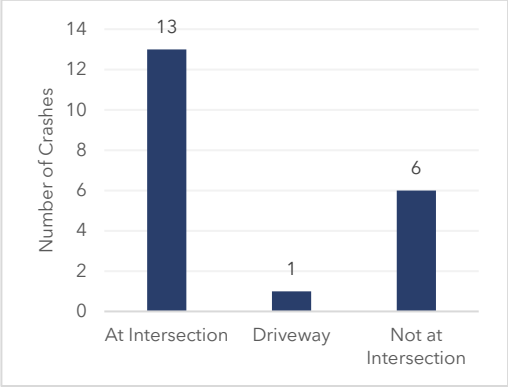


Figure 42: Location Type of Disabling-Injury Crashes

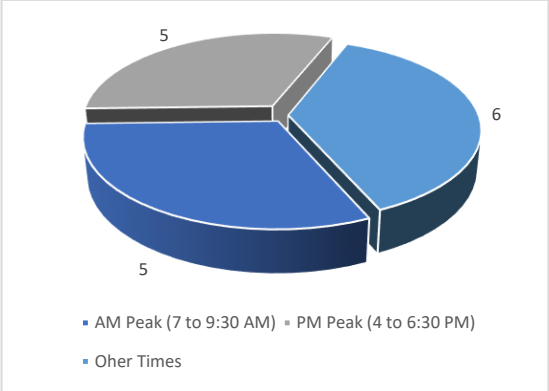


Figure 43: Weekday Disabling-Injury Crashes Occurring during Reversible Lane and Other Times of Day

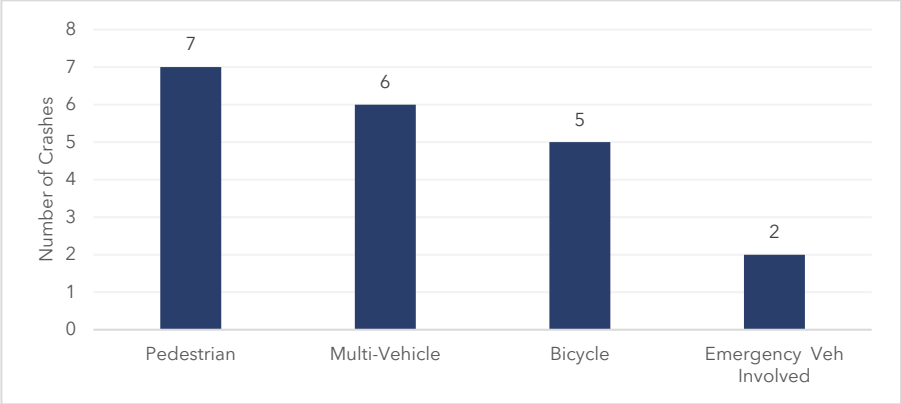


Figure 44: Disabling-Injury Crashes by Modal Type

COMPARISON OF CONNECTICUT AVE NW CRASH DATA TO DISTRICTWIDE PRINCIPAL ARTERIALS

The purpose of this analysis was to investigate whether the reversible lane hours on Connecticut Avenue experience a disproportionate number of crashes as compared with Districtwide principal arterials. A statistical analysis was performed to compare the proportion of all police-reported crashes that occurred during reversible lane hours along the Connecticut Avenue NW study corridor with the same metric for Districtwide principal arterials. **Figure 45** shows the Districtwide principal arterials used for comparison. The full list of principal arterials used for comparison can be found in **Appendix C**.

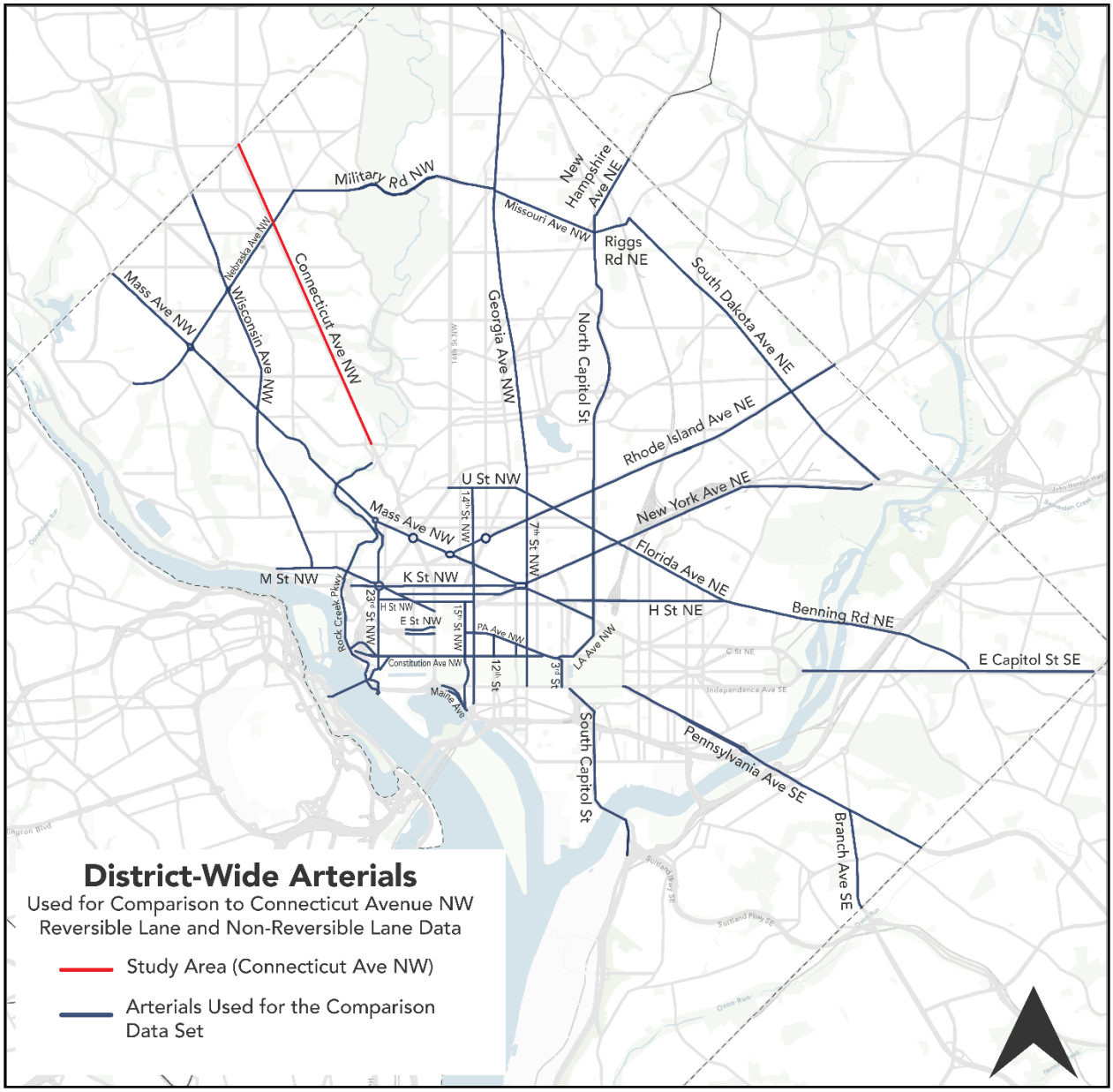


Figure 45: District-wide Arterials Used for Comparison to Connecticut Avenue NW Reversible Lane and Non-Reversible Lane Data

The data for Districtwide principal arterials excludes corridors that have reversible lanes (16th Street NW; Independence Avenue, Canal Road NW), as well as principal arterials with fewer than 250 crashes reported during the five-year study period (2015-2019).

Crash data for each principal arterial was grouped by half hour and the mean proportion of crashes across all principal arterials was calculated. The data for the principal arterials was then compared to the data for the study corridor.

As shown in **Figure 46**, Connecticut Avenue NW experienced a higher proportion of crashes during reversible lane hours than was found for Districtwide principal arterials, during both the AM and PM peak hours when reversible lanes are in effect on Connecticut Avenue NW. The contrast was considerably higher during PM peak hours.

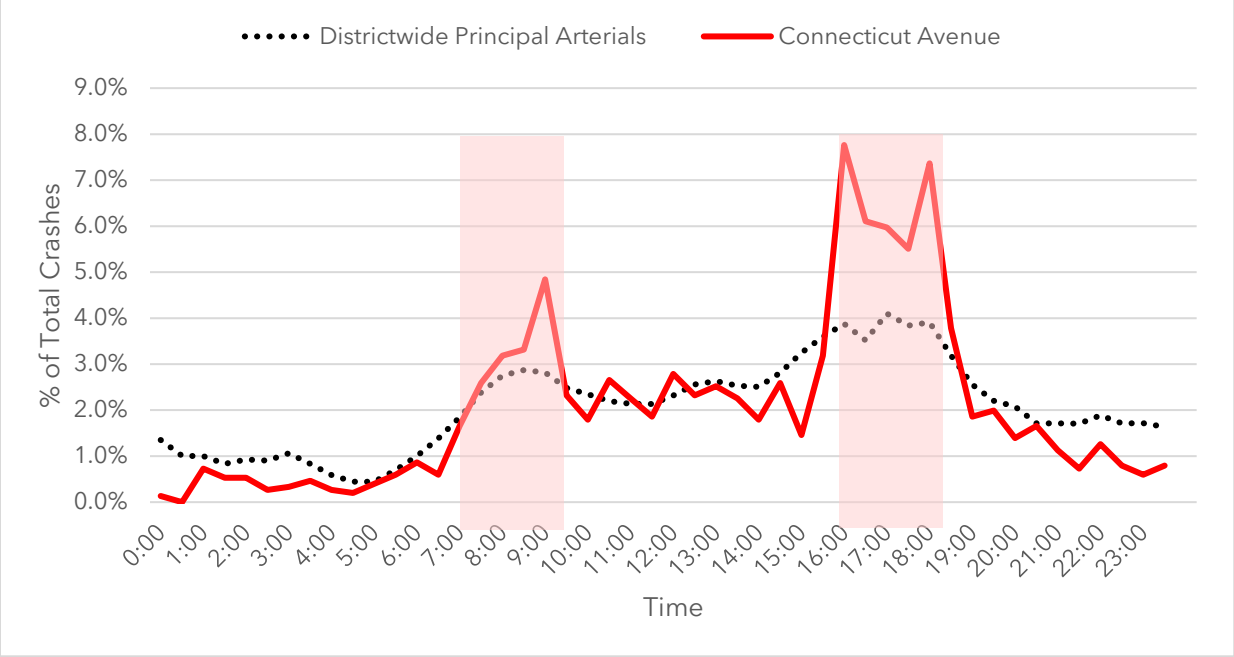


Figure 46: Proportion of Crashes Occurring During Reversible Lane hours on Connecticut Avenue NW Compared to Districtwide Principal Arterials

Figure 47 shows the proportion of all crashes that occurred during reversible lane hours along the Connecticut Avenue NW study corridor and for Districtwide principal arterials.

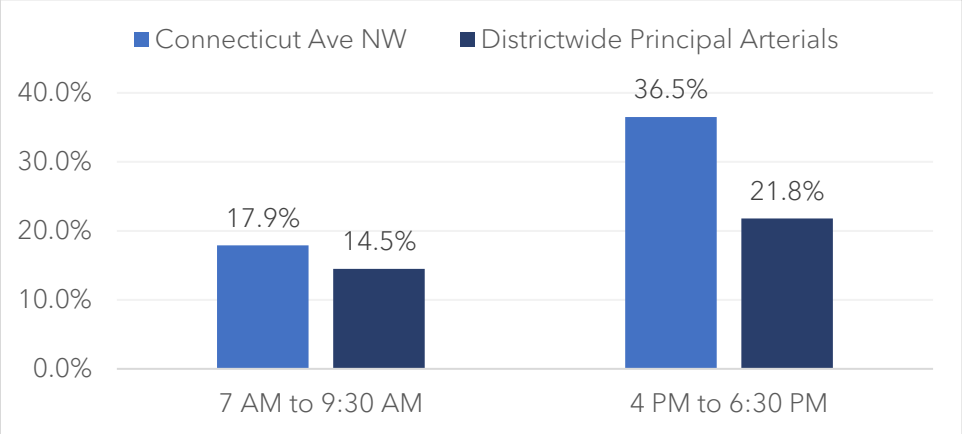


Figure 47: Connecticut Avenue NW vs. Districtwide Principal Arterials: Proportion of Crashes during Peak Hours

OBSERVED COMPLIANCE

The purpose of this task was to observe parking and moving violations, as well as hesitations and encroachments into the Connecticut Avenue NW reversible lanes (vehicles traveling in the opposite direction of the allowed direction of travel) on a sample basis during the weekday AM and PM peak hours within the Study Area corridor.

Methodology

Observations were conducted through videos collected during travel time runs in January 2020. The videos were recorded through the windshield of the car used to perform travel time runs and provided a relatively clear view of the roadway. **Figure 48** provides a screenshot of one of the videos.

Figure 48: Screenshot of Video Used for Observed Compliance Study

Approximately 2.5 hours of video were available for AM peak hours and approximately 2.5 hours for PM peak hours. Although it would have been preferable to observe driver behavior for a longer duration, COVID-19 impacts on the Connecticut Avenue study corridor precluded compliance observations beyond the five hours of available travel-time-run video.

One observer, with experience conducting field observations and conflict studies, watched each video from beginning to end. The observer recorded each of the following violations or noteworthy road user behaviors, and at which intersections these actions occurred:

- Loading/Standing Violation
- U-turn Violation
- Red Light Violation
- Right Turn on Red Violation
- Left Turn Violation
- Reversible Lane Hesitation

- Reversible Lane Encroachment
- Pedestrian Crossing Against Signal
- Pedestrian Midblock Crossing

Reversible Lane Encroachment was coded when a driver entered one of the reversible lanes while it was operating in the opposite direction of the driver encroaching. This generally occurred when a driver was turning left off Connecticut Avenue or when a driver was passing a vehicle traveling in the same direction.

Reversible Lane Hesitation was coded when a driver started to enter one of the reversible lanes but stopped due to uncertainty about the lane direction. In the single occurrence, the driver continued into the reversible lane after watching a vehicle behind enter the lane.

Each recorded violation or noteworthy road user behavior was entered into an Excel spreadsheet and associated with the nearest cross street.

Key Findings

Table 24 shows results of the compliance study. A total of 114 violations or noteworthy road user behaviors were observed.

- The largest category was parking violations (53) followed by loading/unloading violations (28), and reversible lane encroachment (15).
- The largest number of recorded violations or noteworthy road user behaviors were observed at Calvert Street NW (15). All other locations along the study corridor had fewer than 10 observed violations or noteworthy road user behaviors during the five hours of peak-hour video observations.
- Many of the violations occurred at the beginning of the reversible lane hours. It was frequently observed that vehicles parked overnight or during mid-day were not moved prior to the start of the reversible lanes. Throughout the observations, parking attendants were seen writing violations for these parked vehicles. Parking and Standing/Loading violations included both directions of travel for the AM and PM observations.
    - Calvert Street NW around the Woodley Park Metro entrance was frequently observed to have parking and loading/standing violations.
- Reversible lane encroachment was frequently seen in the PM hours near Military Road NW where the reversible lanes start on the north side of the corridor.

	Parking Violations	Loading/ Standing Violations	U-turn Violations	Red Light Violations	Reversible Lane Hesitation	Reversible Lane Encroachment	Pedestrians Crossing Against Signal	Pedestrian Midblock Crossings	Total
Calvert St	9	2	0	2	0	0	2	0	**15**
24th St	6	2	1	0	0	0	0	0	**9**
Woodley Rd	2	0	0	1	0	0	0	0	**3**
Garfield St	0	1	0	0	0	0	0	0	**1**
Cathedral Ave	3	1	0	0	0	1	0	0	**5**
Hawthorn St	2	0	0	0	0	0	0	0	**2**
Zoo Crossing	0	0	0	1	0	0	0	0	**1**
North Rd	1	2	0	0	0	0	0	0	**3**
Macomb St	0	1	1	0	0	0	0	0	**2**
Newark St	0	1	0	0	0	0	0	0	**1**
Ordway St	0	3	0	0	0	0	4	1	**8**
Porter St	1	1	0	0	0	0	0	0	**2**
Sedgwick St	2	2	0	0	0	0	0	0	**4**
Tilden St	0	0	0	0	0	2	0	0	**2**
Van Ness St	1	0	0	0	0	1	0	0	**2**
Veazey Ter	1	2	0	0	0	0	0	0	**3**
Windom Pl	4	0	0	0	0	0	0	0	**4**
Yuma St	2	0	0	0	0	0	0	0	**2**
Albemarle St	6	2	0	0	0	0	0	0	**8**
Appleton St	1	0	0	0	0	0	0	0	**1**
Brandywine St	0	2	0	0	0	2	0	0	**4**
Chesapeake St	1	0	0	0	0	0	0	0	**1**
Davenport St	2	0	1	0	0	0	1	0	**4**
Ellicott St	0	1	1	0	0	1	0	0	**3**
Nebraska Ave	1	0	0	0	0	0	0	0	**1**
Chevy Chase Pkwy	1	1	0	0	0	0	0	0	**2**
Huntington St	0	1	0	0	1	0	0	0	**2**
Jocelyn St	0	0	0	0	0	0	0	0	**0**
Kanawha St	4	0	1	0	0	0	0	0	**5**
Military Rd	0	1	0	0	0	7	0	0	**8**
Legation St	3	2	0	0	0	1	0	0	**6**
Total	**53**	**28**	**5**	**4**	**1**	**15**	**7**	**1**	**114**

Table 24: Compliance Study Observations