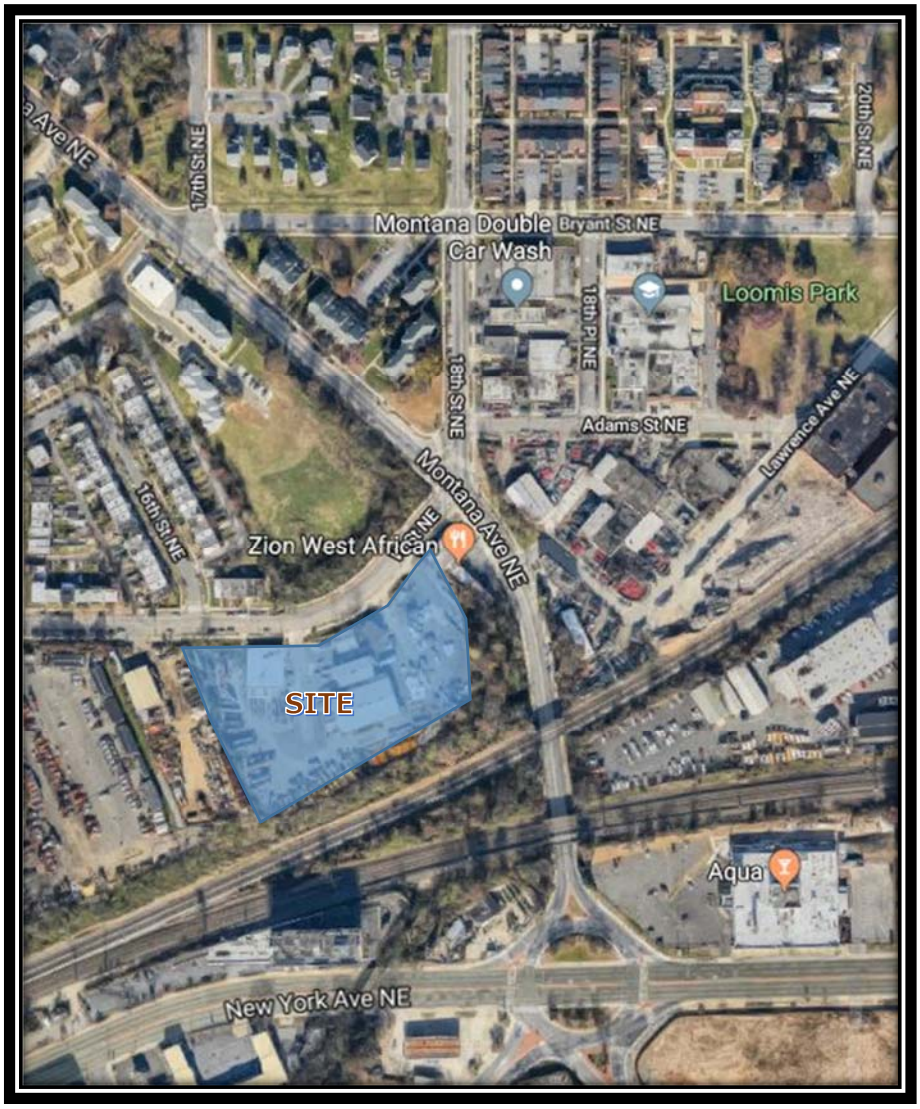


BUS TERMINAL

1601 W STREET, NE, WASHINGTON, DC

TRAFFIC IMPACT STUDY

PREPARED FOR:
DGS

DGS
THE DEPARTMENT OF GENERAL SERVICES

PREPARED BY:

AMT LLC
CONSULTING ENGINEERS AND LAND SURVEYORS

MAY 2019

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

APPENDICES

Introduction

This report presents the findings of the traffic impact analysis conducted for the planned OSSE DOT Bus Terminal site, to be located at 1601 W Street, NE, Washington, D.C. The analysis was conducted to determine the feasibility from a traffic impact standpoint of renovating the site to accommodate 230 bus parking spaces, 47 car parking spaces, bus terminal office / maintenance facility, and bus fueling and washing station areas.

The site is bounded by Montana Avenue, NE to the west, railroad and then New York Avenue, NE to the south, and W Street, NE to the north, as shown on the site location map (Figure 1). See Figure 2 and Figure 3 for bus and car access points.

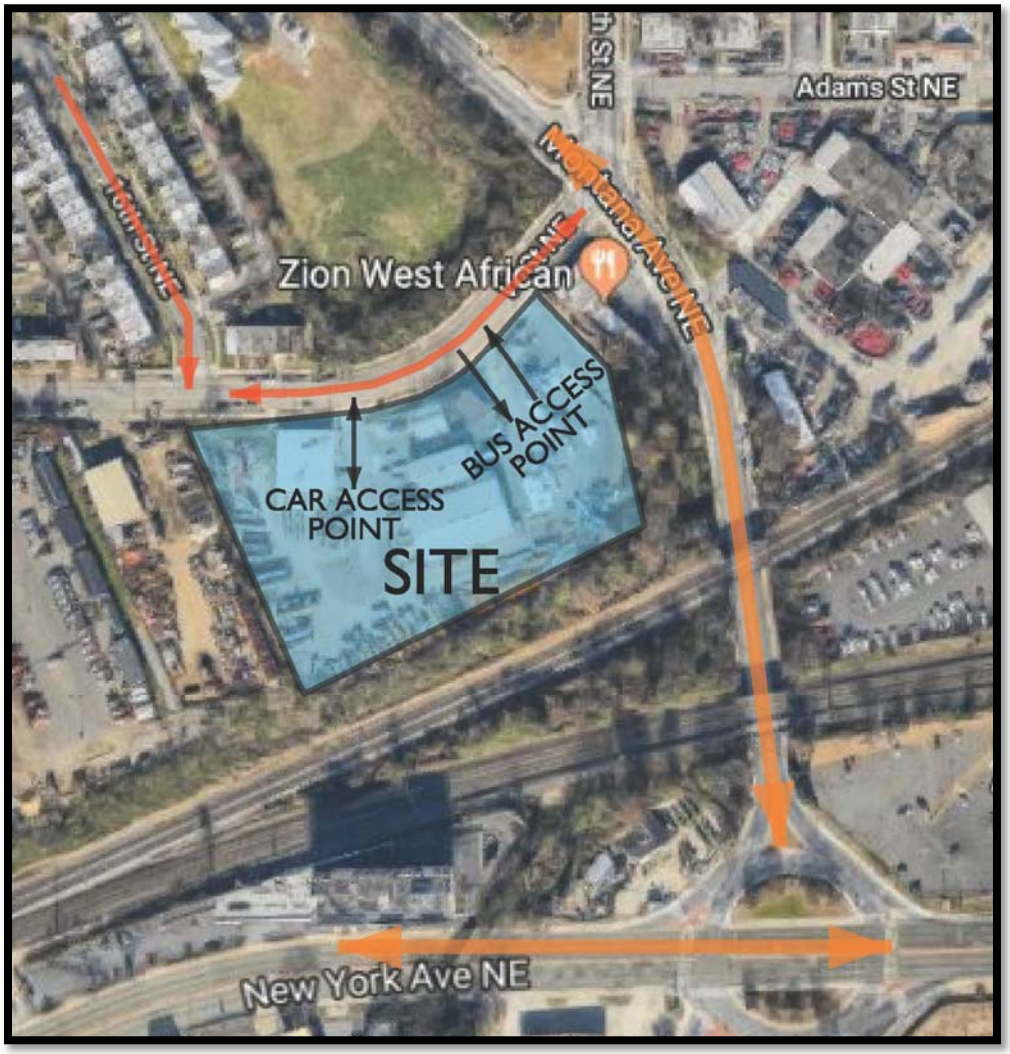


Figure 1 – Site Location

Figure 2 – Site Access Point for Bus from W Street, NE

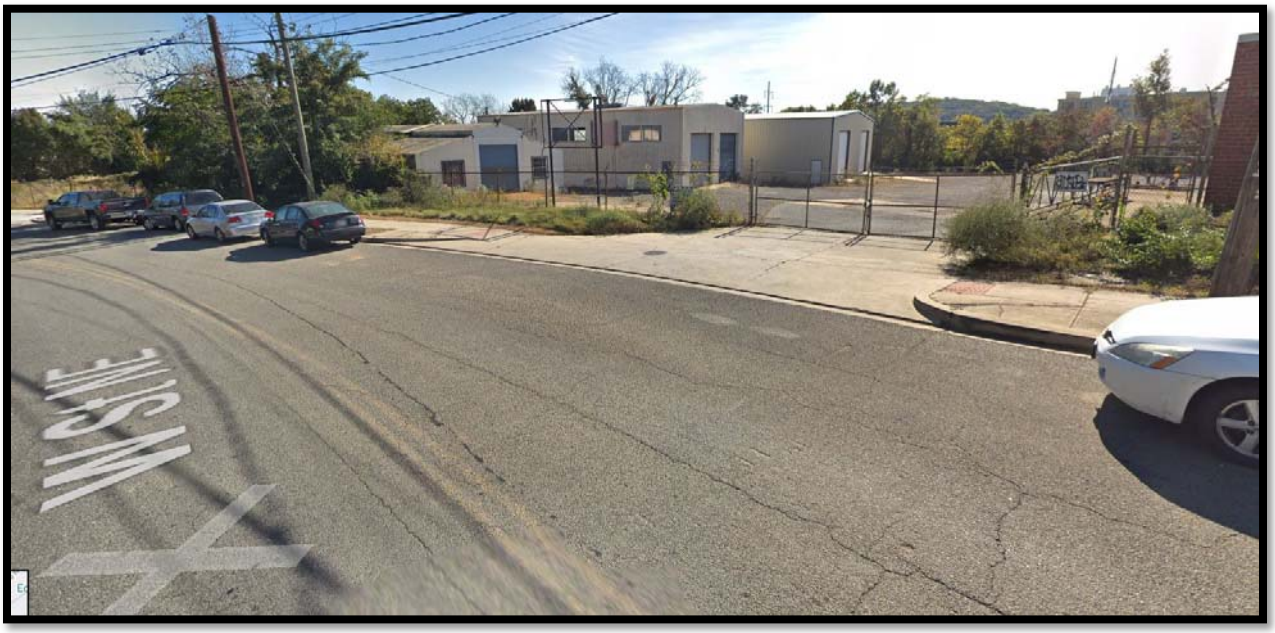


Figure 3 – Site Access Point for Cars from W Street, NE

Existing Conditions

Existing Road Network

Local Roads

Local access to the site is provided via W Street, NE. The roads immediately surrounding the site, W Street and Montana Avenue.

W Street, NE, running along the northern side of the site, is an east/west street providing two-lane two-direction local travel between Montana Ave on the east and 14th St on the west (Figure 3). W St is one way, WB west of 14th Street. W St provides access to/from Montana Ave, NE to the East. The speed limit is posted 25 mph. Unrestricted parking is available adjacent to study area on both sides of W St. The width of the road is 40'. All intersections on W St, NE, with the exception of the intersection with Montana Ave, NE, are stop-sign-controlled.

Collector and Arterial Roads

Montana Avenue, NE, (Figure 4) running along the eastern border of the site, north of W St, NE is a two-way two-lane undivided north/south collector providing access to/from W Street, NE linking New York Ave, NE and Rhode Island Ave, NE. The speed limit is posted 25 mph. Unrestricted parking is allowed on both sides of the street. South of W St, Montana Ave, NE is a two-way four-lane roadway with parking prohibited at all time along both sides. The intersection of Montana Ave, NE with Edwin St, NE (south of W St, NE) is stop-sign-controlled for Edwin St, all other intersections along Montana Ave within the study area are signalized. The width of the road is 40'.

Figure 4 – Montana Avenue, NE

Existing Traffic, Pedestrian, and Bicycle Counts

Existing Traffic Counts

Existing turning movement counts were collected by AMT on Wednesday, April 24th between 6:30AM and 7:00PM at the following intersections (shown graphically in Figure 8):

1. Montana Avenue, NE and W Street, NE/18th Street, NE
2. W Street, NE and 16th Street, NE
3. Montana Avenue, NE and 17th Street, NE/Bryant Street, NE
4. Montana Avenue, NE and Edwin Street, NE

Based on traffic data collected, 7:00AM to 8:00AM and 6:00PM to 7:00PM were chosen as AM and PM peak hours. The existing turning movement count and 2021 background and future forecast sheets are located in Appendix A. The turning movement counts are used to project the peak hour traffic volumes for 2021 (Figure 5).

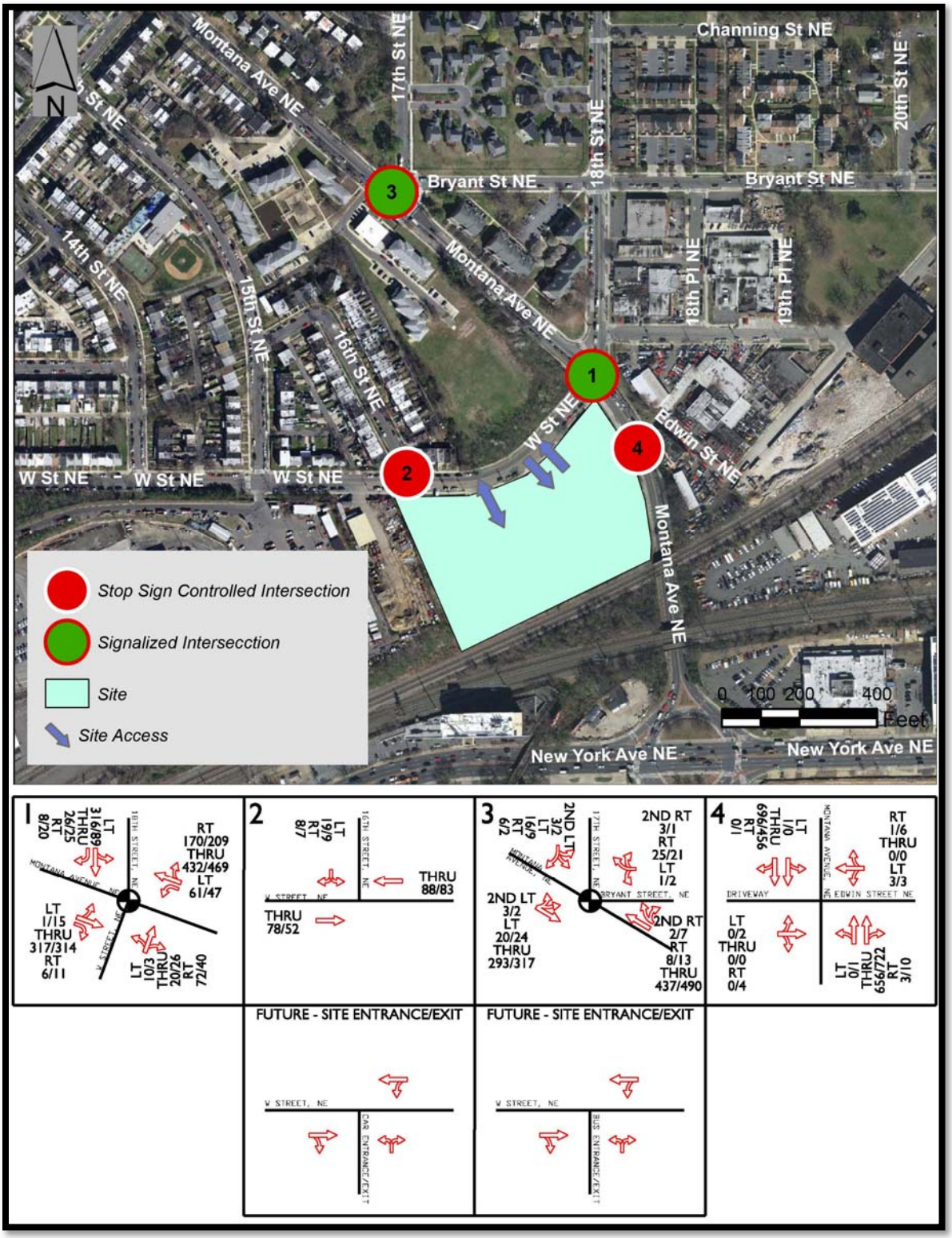


Figure 5 - 2021 No-Build Peak Hour Lane Use, Traffic Control, and Volumes

Existing Pedestrian and Bicycle Counts and Facilities

In addition to vehicular traffic counts, pedestrian and bicycle counts were also conducted during the AM and PM peak hours at the key intersections listed above and are included in Appendix A. Field observations indicated the following:

- Pedestrian and bike volume at intersections around the Site is low
- There are sidewalks on both sides of W Street, NE and Montana Avenue, NE
- Generally, marked crosswalks are provided at intersections adjoining the site
- Existing intersection crossings and sidewalks were generally ADA compliant and will require little improvement
- Bike lanes exist along 18th Street, NE
- On-street bicycle facilities currently exist along 18th Street, NE

Existing Curbside Parking and Loading Facilities

Unrestricted curbside parking is available on both sides of W Street, NE and Montana Avenue, NE, north of the W St intersection. South of W St, parking is prohibited at all time along both sides of Montana Ave, NE.

Public Transportation

Public transportation is available in the vicinity of the site and includes the following:

1. The bus terminal site is located 1.3 miles from Rhode Island Ave-Brentwood Metro Station on the Red Metro line and 2.7 miles from Shaw-Howard University Metro Station on the Blue, green, and yellow Metro lines.

2. Metrobus Major Routes

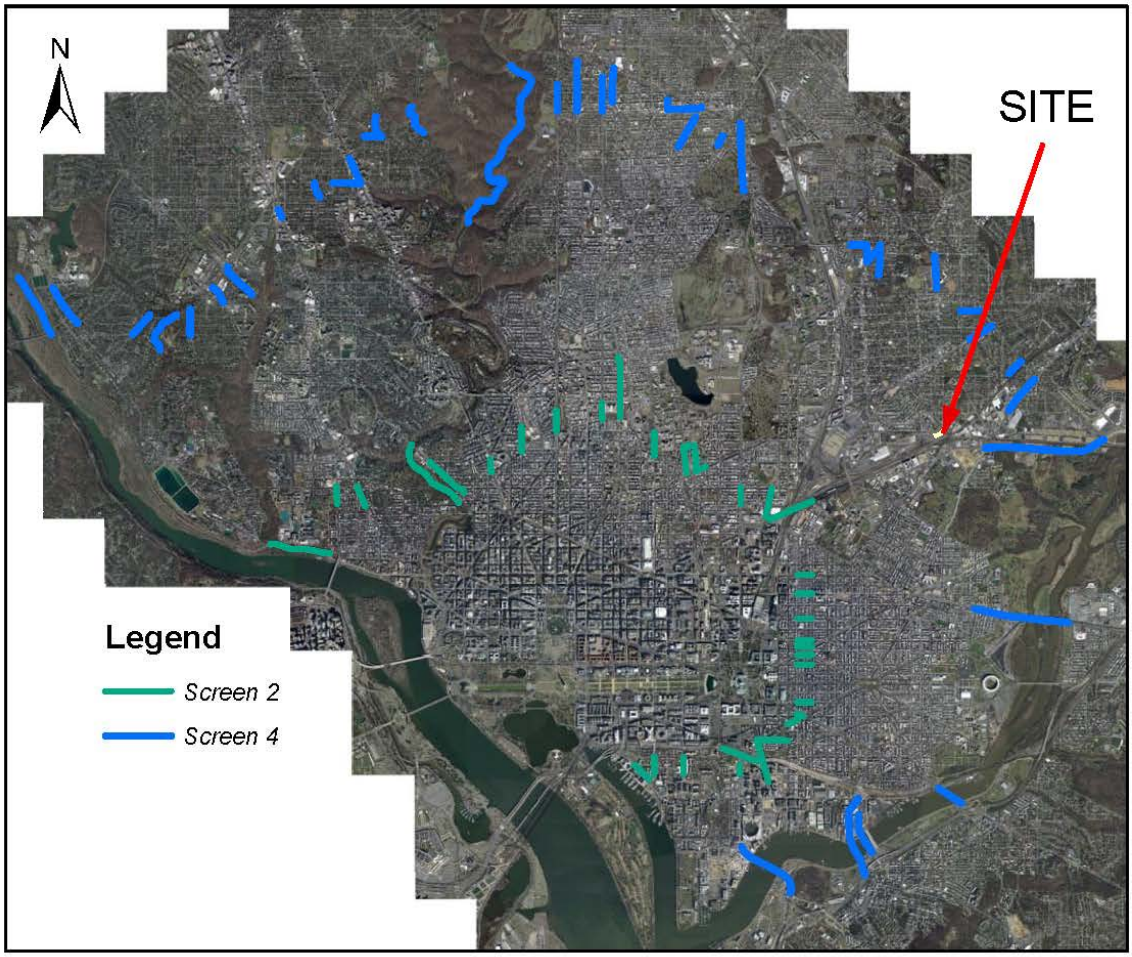
   E2 Route provides service along West Virginia Ave, NE, 18th Street, NE, South Dakota Ave, NE, Sargent Rd, NE, and Galloway Street, NE. This line serves Fort Totten Metro station, North Michigan Park, Woodridge, Brookland, Langdon, and Ivy city. Route runs early morning to midnight during weekdays and weekends.

   S41 Route provides service along Rhode Island Ave, Montana Ave, Bladensburg Rd, Benning Rd, and Maryland Ave. S41 connects Carver Terrace on 26th St. NE north of Benning Rd. to Rhode Island Ave Metro station. This line operates only on days when public school is open with one southbound am trip and one northbound pm trip.

Background Conditions

Annual Growth Rate and Nearby Developments

Based on MWCOG model runs for years 2020 and 2040 and previous transportation impact studies conducted near the site, a 0.5% growth rate (compounded annually) was applied to all turning movements for 2019 (existing) along all perimeter roadways to and from the site. The background conditions peak hour forecasts are built into the Future site conditions. Figure 6 demonstrates the set of links from MWCOG model that are used to calculate vehicular growth rate in the study area. The table under the map lists the total traffic volume in 2020 and 2040 in AM, PM, and 24 hour period.



	AM Period		PM Period		24 Hour	
	2020	2040	2020	2040	2020	2040
Screen 4 Total Volume	191863	209269	292400	315811	1038880	1125477
2020 to 2040 Growth	9.07%		8.01%		8.34%	
Annual Growth Rate	0.44%		0.39%		0.40%	

Figure 6 - MWCOG Model Links and Volumes Used to Calculate Vehicular Growth Rate

Since no major pipeline developments in the immediate vicinity of the site were referenced or seem to be far enough in the planning/design process to warrant inclusion in our study, we assumed that the growth rate applied will take into account any localized developments that may be constructed and completed in or immediately adjoining during the study period.

Regarding future roadway network development, moveDC, DC's Multimodal Long-Range Transportation Plan, references two Future Plan Elements inside the study area (Figure 7): (1) bike lane(s) (Tier 2 priority) along Montana Avenue between New York Ave and 18th St, NE; and (2) a new street (Tier 4 priority) extending between the intersections of New York Ave and 16th St, NE and W St and 14th St, NE.

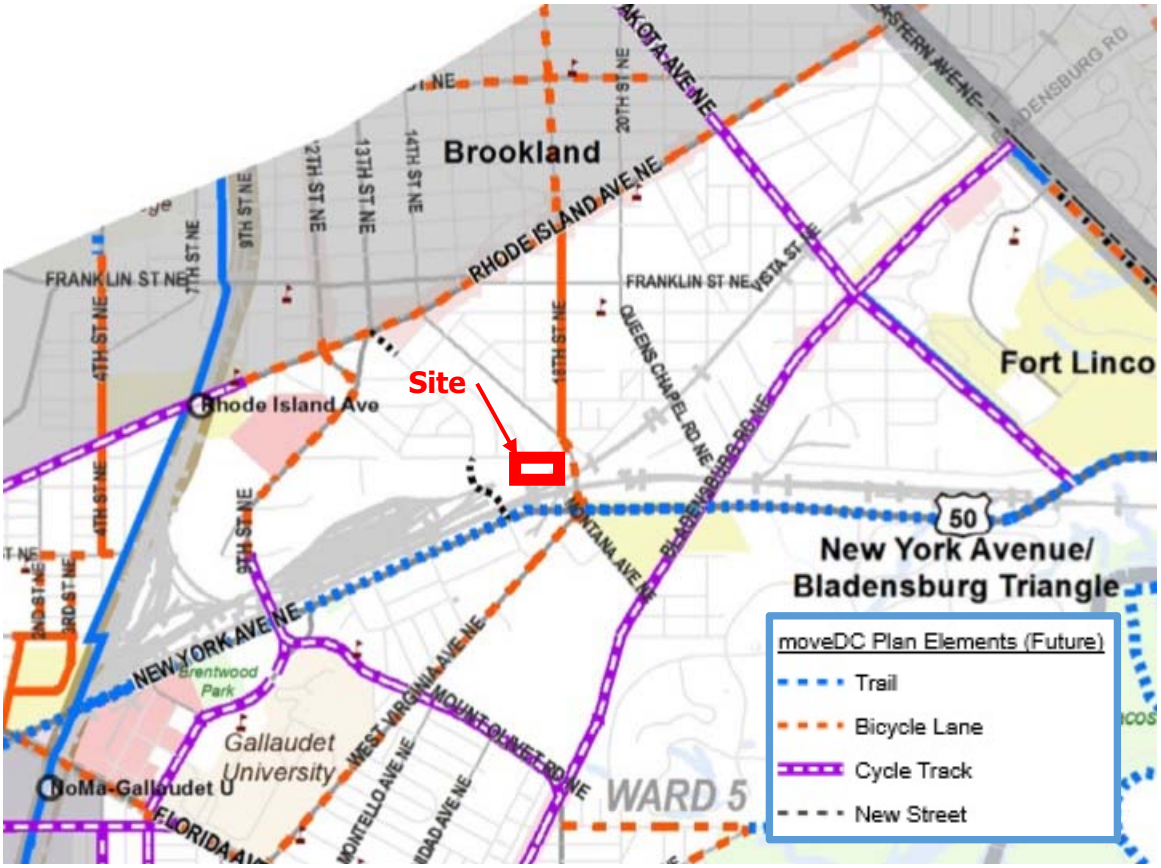


Figure 7 - moveDC – Study Area Future Roadway Network

Background Conditions Analysis

Background conditions levels of service (LOS) and delays were determined at each of the key intersections based on the existing lane use and traffic control, and 2021 projected AM and PM peak hour volumes (Figure 8). Synchro10 was utilized to calculate MOEs based on the Highway Capacity Manual 2000 (HCM2000) methodology. Existing signal timing and phasing was used and an overall Peak Hour Factor (PHF) calculated for each intersection based on existing counts. The same PHF was used for future analysis (2021 Build Scenario). Percent of Heavy Vehicles was calculated for each movement and separately for Build Scenario.

Levels of service are a qualitative measure of the operations of an intersection whereby a letter grade of A through F is assigned in order of decreasing performance. "Average control delay per vehicle" or average delay per vehicle due to any intersection traffic control device is used to select the appropriate LOS. STOP-controlled and signalized intersections use different threshold values as follows:

Table 1 – Level of Service and Delay Criteria (Vehicles)

Level of Service	Description	Delay per Vehicle (Seconds/Vehicle)	
		Signalized Intersection	STOP-Controlled Intersection
A	Free Flow	≤ 10	0 - 10
B	Stable Flow (slight delay)	> 10 - 20	> 10 - 15
C	Stable Flow (acceptable delay)	> 20 - 35	> 15 - 25
D	Approaching Unstable Flow (tolerable delay)	> 35 - 55	> 25 - 35
E	Unstable Flow (approaching intolerable delay)	> 55 - 80	> 35 - 50
F	Forced Flow (jammed)	> 80	> 50

The Synchro results of the build and no-build analyses are located in Appendices C and D and summarized in Table 2. The results indicate the following.

Table 2 – 2021 No-Build and Build Intersection Level of Service

Location	Control	AM		PM	
		No-Build	Build	No-Build	Build
1. Montana Avenue, NE and W Street, NE/18th Street, NE	**Signal**	**D**	**D**	**C**	**C**
South Eastbound (Montana Avenue, NE)		B	B	A	A
North Westbound (Montana Avenue, NE)		D	D	C	C
North Eastbound (W Street, NE)		D	D	D	D
Southbound (18th Street, NE)		F	F	D	D
2. W Street, NE and 16th Street, NE	**ALL-WAY Stop**	**A**	**A**	**A**	**A**
Eastbound (W Street, NE)		A	A	A	A
Westbound (W Street, NE)		A	A	A	A
Southbound (16th Street, NE)		A	A	A	B
3. Montana Avenue, NE and Bryan Street, NE/17th Street, NE	**Signal**	**C**	**C**	**B**	**B**
South Eastbound (Montana Avenue, NE)		C	C	B	B
North Westbound (Montana Avenue, NE)		C	C	B	B
Westbound (Bryant Street, NE)		D	D	D	D
Southbound (17th Street, NE)		D	D	D	D
4. Montana Avenue, NE and Edwin Street, NE	**Stop**				
Eastbound (Driveway)		**C**	**C**	**C**	**C**
Westbound (Edwin Street, NE)		A	A	A	A
Northbound (Montana Avenue, NE) - Free					
Southbound (Montana Avenue, NE) - Free					

Site Development

Site Trip Generation

The site plan is scheduled for a 2021 completion date. There will be 230 bus spaces and 47 car spaces available on site. Assuming the arrival/departure timing below, provided by DGS, and uniform distribution of the inbound/outbound bus traffic over the time period of entering/exiting the site, hourly volume of bus trips will be as shown in Table 3. Table 4 demonstrates passenger car trips generated by site. Since staff pm shift arrival is before the end of am shift, only half of the number of available parking spaces are considered for each shift (23 am shift, 24 pm shift)

- Anticipate bus routes entering/leaving the sites
  - Going north 50%
  - Going south 50%

- Timing of buses leaving & returning each day
  - AM shift leave between 4:30am and 7:00am, returns between 8:30am 10:30am
  - PM shift leave between 12:00pm and 2:00pm, returns between 3:00pm 7:00pm

- Timing of staff vehicles entering & exiting each day
  - AM shift arrives 4:00am and leaves at 1:00pm
  - PM shift arrives 10:00am thru 11:00am and leaves between 6:00pm and 7:00pm

Table 3 - Site Trip Generation, Buses

Time of Day	4:30am–7:00am	8:30am–10:30am	12:00pm–2:00pm	3:00pm–7:00pm
Outbound Traffic Hourly Rate	230 buses / 2.5 hrs = 92		230 buses / 2 hrs = 115	
Inbound Traffic Hourly Rate		230 buses / 2 hrs = 115		230 buses / 4 hrs = 58

Table 4 - Site Trip Generation, Passenger Cars

Time of Day	3:45am–4:00am	10:00am–11:00am	1:00pm–1:15pm	6:00pm–7:00pm
Inbound Traffic Hourly Rate	23	24		
Outbound Traffic Hourly Rate			23	24

Of the trips in the two previous tables, only the trips occurring in peak hours of the network (highlighted in the tables) are considered site generated trips for the purpose of this study.

Based on data provided by DGS and capacity of the site parking, the following table illustrates the trip generation summary:

Table 5 - Site Trip Generation Summary

Travel Mode	AM Peak Hour Trips	PM Peak Hour Trips
Total Trips	None	82
Passenger Car	None	24
Bus	None	58

Refer to Figure 8 for site trips distribution.

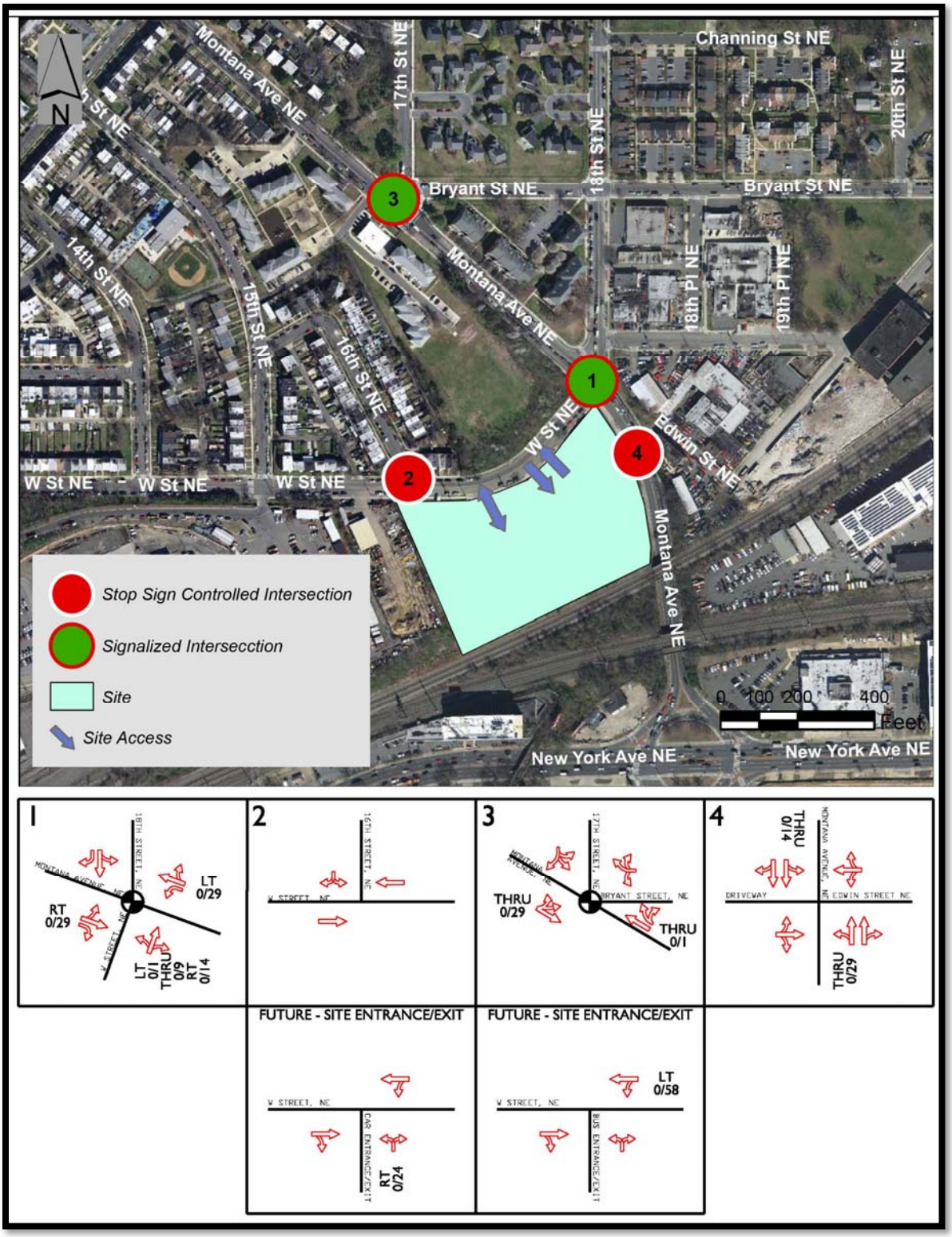


Figure 8 - Site Trip Generation Assignments and Distribution

Future Conditions

Future Conditions Forecasts

The future conditions forecasts were determined based on the background volumes (Figure 5) and number of the proposed site trips (Figure 8). The resulting future conditions peak hour forecasts are shown on Figure 9.

Future Conditions Analysis

Future conditions LOS and delays were determined at each of the key intersections based on the existing lane use and traffic control, and the future conditions peak hour volume (Figure 9) utilizing Synchro10 HCM2000 methodology.

The Synchro results of the future conditions analysis are located in Appendix C and summarized on Table 2. The results indicate the following:

- All key intersections are expected to continue to operate at overall acceptable LOS "D" or better during both the AM and PM peak hours.
- Zero intersection experienced a degradation in overall Level of Service during the AM and PM study periods.

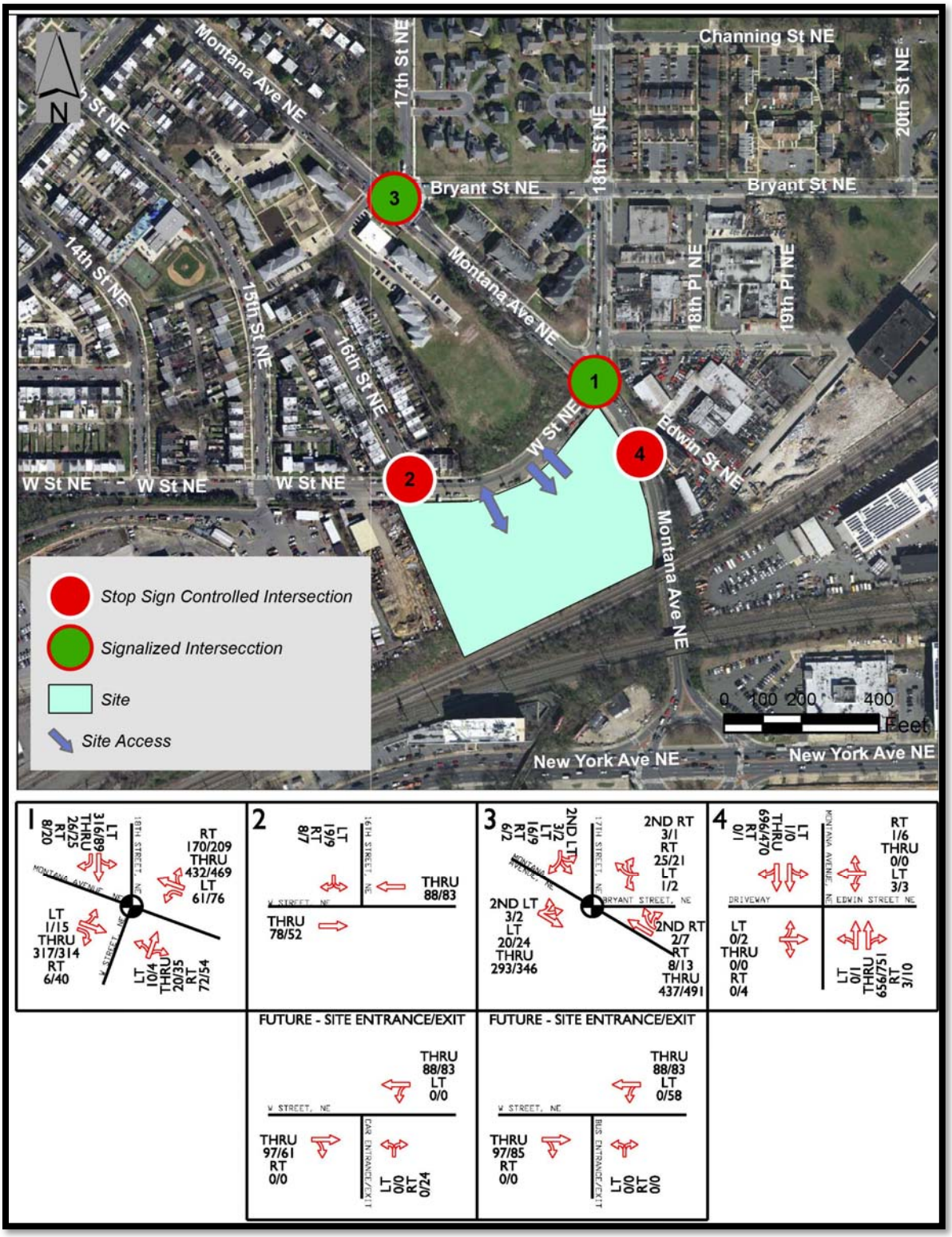


Figure 9 - Future Conditions Peak Hour Forecast

Conclusions

The conclusions and recommendations of the traffic impact analysis conducted in support of the proposed Bus Terminal site are as follows:

Existing Conditions:

- All key intersections currently operate at overall acceptable LOS "D" or better during both the AM and PM peak hours.

Background Conditions/Proposed Site:

- All key intersections under background condition are expected to continue to operate at overall acceptable LOS "D" or better during both the AM and PM peak hours. No overall intersection LOS degradation occurs as a result of the annual growth anticipated in the vicinity of the site.

- The trip generation summary determined that approximately 82 additional PM peak hour trips will be generated as a result of the proposed development at 1601 W Street, NE Bus Terminal site.

Future Conditions:

- All key intersections are expected to continue to operate at overall acceptable LOS "D" or better during both the AM and PM peak hours.

APPENDICES

Appendix A

Existing, Background, and Future AM and PM Vehicular, Pedestrian, and Bicycle Turning Movements

A. Morton Thomas & Associates, Inc.
Turning Movement Counts - Field Sheet

Job No.: 18-0493

Location: W Street N.E at Montana Ave and 18th Street
Date: 4/24/2019 Wednesday
Recorder: Video
Interval (dd) : 15
(In Minutes)

County: Washington DC
Town: Washington DC
Weather: Clear/Cold

PEAK HOURS	AM PERIOD	Start	End	Volume	LOS	V/C	PM PERIOD	Start	End	Volume	LOS	V/C	MD PERIOD	0	0
	6:30AM-10:00AM	07:00	08:00	0			4:00PM-7:00PM	18:00	19:00	0			10:00AM-4:00PM	13:30	14:30

Street Name-->	Montana Ave NE					Montana Ave NE					18th St					W Street NE					GRAND TOTAL
HOUR	From North					From South					From East					From West					
ENDING	U turn	Left	Through	Right	Total	U turn	Left	Through	Right	Total	U turn	Left	Through	Right	Total	U turn	Left	Through	Right	Total	
06:45	0	0	68	2	70	0	30	77	25	132	0	50	10	0	60	0	5	7	18	30	292
07:00	0	0	78	1	79	0	20	84	25	129	0	72	7	2	81	0	9	17	17	43	332
07:15	0	1	74	2	77	0	15	96	36	147	0	79	8	4	91	0	4	8	16	28	343
07:30	0	0	74	2	76	0	12	101	40	153	0	68	4	0	72	0	1	5	19	25	326
07:45	0	0	76	0	76	0	16	112	46	174	0	83	9	2	94	0	4	6	16	26	370
08:00	0	0	90	2	92	0	17	119	46	182	0	83	5	2	90	0	1	1	20	22	386
08:15	0	1	68	2	71	0	11	81	35	127	0	92	7	7	106	0	2	3	16	21	325
08:30	0	1	80	0	81	0	5	93	45	143	0	83	8	3	94	0	2	5	6	13	331
08:45	0	3	82	2	87	0	20	89	55	164	1	72	8	1	82	0	4	5	8	17	350
09:00	0	1	82	6	89	0	10	95	60	165	0	72	3	2	77	0	0	6	6	12	343
09:15	0	2	81	3	86	0	12	89	45	146	0	69	4	2	75	0	3	7	7	17	324
09:30	0	4	72	4	80	2	8	128	48	186	0	50	6	5	61	0	0	1	6	7	334
09:45	0	1	77	6	84	0	11	132	45	188	0	47	5	1	53	1	2	1	11	15	340
10:00	0	0	83	1	84	0	13	109	41	163	0	47	0	1	48	0	3	2	11	16	311
10:15	0	3	80	0	83	0	13	100	51	164	0	63	1	3	67	0	2	3	7	12	326
10:30	0	1	103	2	106	0	16	94	48	158	0	66	6	1	73	0	1	0	12	13	350
10:45	0	1	105	2	108	0	10	103	37	150	0	55	2	0	57	0	1	1	12	14	329
11:00	0	2	94	0	96	0	17	97	34	148	0	48	5	4	57	0	0	8	6	14	315
11:15	0	0	87	4	91	0	19	86	41	146	0	35	5	6	46	0	6	1	4	11	294
11:30	0	2	86	4	92	0	11	88	38	137	0	47	3	5	55	0	4	6	5	15	299
11:45	0	0	95	0	95	0	11	87	38	136	0	66	1	4	71	0	3	5	8	16	318
12:00	0	4	77	5	86	0	18	82	45	145	0	45	5	3	53	0	0	3	7	10	294
12:15	0	1	87	5	93	0	25	85	38	148	0	63	4	3	70	0	0	5	13	18	329
12:30	0	0	97	2	99	0	17	96	51	164	0	44	4	4	52	0	4	6	13	23	338
12:45	0	1	91	4	96	0	9	82	52	143	0	49	3	7	59	0	2	4	10	16	314
13:00	0	3	83	2	88	0	18	114	49	181	0	46	4	3	53	0	3	4	18	25	347
13:15	0	4	103	5	112	0	8	111	58	177	0	42	2	4	48	0	0	5	13	18	355
13:30	0	1	107	1	109	0	14	82	44	140	0	58	3	2	63	0	0	3	13	16	328
13:45	0	2	109	4	115	0	9	101	53	163	0	62	2	4	68	0	1	3	8	12	358
14:00	0	0	113	1	114	0	16	128	55	199	0	55	2	6	63	0	6	2	16	24	400
14:15	0	2	138	4	144	0	17	131	55	203	0	53	4	2	59	0	2	4	7	13	419
14:30	0	1	113	1	115	0	15	140	59	214	1	37	2	3	43	0	0	7	7	14	386
14:45	0	2	85	2	89	0	8	139	45	192	0	48	3	7	58	0	6	6	6	18	357
15:00	0	1	82	1	84	0	20	116	62	198	0	34	6	2	42	0	1	2	15	18	342
15:15	0	7	97	3	107	0	7	93	80	180	0	36	10	2	48	0	3	7	12	22	357
15:30	0	1	79	1	81	0	8	112	77	197	0	30	5	5	40	0	1	10	7	18	336
15:45	0	1	94	4	99	0	12	117	61	190	0	44	7	5	56	0	0	7	11	18	363
16:00	0	1	113	2	116	0	14	99	49	162	0	39	6	3	48	2	2	10	10	24	350
16:15	0	1	71	3	75	0	9	86	57	152	0	30	7	8	45	0	1	9	2	12	284
16:30	0	2	85	4	91	0	9	95	56	160	0	30	11	4	45	0	2	7	6	15	311
16:45	0	1	57	3	61	0	13	81	30	124	0	28	5	3	36	0	0	5	7	12	233
17:00	0	0	59	4	63	0	9	106	45	160	0	33	3	3	39	0	1	1	9	11	273
17:15	0	3	63	3	69	0	15	92	53	160	0	25	9	3	37	0	2	9	8	19	285
17:30	0	4	40	2	46	0	15	127	44	186	0	26	5	6	37	0	3	5	9	17	286
17:45	1	8	47	0	56	0	11	89	47	147	0	23	3	5	31	0	0	9	13	22	256
18:00	0	5	50	4	59	0	13	96	50	159	0	14	5	6	25	0	1	4	4	9	252
18:15	1	2	68	4	75	0	13	109	64	186	0	23	6	11	40	0	0	2	14	16	317
18:30	0	3	70	1	74	0	13	120	37	170	0	21	11	3	35	0	0	13	11	24	303
18:45	0	6	92	2	100	0	14	122	52	188	0	24	3	2	29	0	1	5	4	10	327
19:00	1	4	81	4	90	0	7	113	54	174	0	20	5	4	29	0	2	6	11	19	312
TOTAL	**3**	**94**	**4186**	**126**	**4409**	**2**	**673**	**5124**	**2401**	**8200**	**2**	**2429**	**252**	**178**	**2861**	**3**	**101**	**261**	**515**	**880**	**16350**
AM Peak Vol	0	1	314	6	321	0	60	428	168	656	0	313	26	8	347	0	10	20	71	101	1425
PM Peak Vol	2	15	311	11	339	0	47	464	207	718	0	88	25	20	133	0	3	26	40	69	1259

NETWORK PEAK HOURS	AM PEAK	Start	End	Volume	LOS	V/C	PM PEAK	Start	End	Volume	LOS	V/C	MD PEAK	Start	End
		07:00	08:00					18:00	19:00					12:00	13:00

AM Peak Vol	0	1	314	6	321	0	60	428	168	656	0	313	26	8	347	0	10	20	71	101	1425
AM HV%	0%	0%	2%	0%	2%	0%	7%	5%	3%	5%	0%	3%	0%	13%	3%	0%	0%	5%	8%	7%	4%
AM PHF			0.87					0.90					0.92					0.90			0.92
PM Peak Vol	2	15	311	11	339	0	47	464	207	718	0	88	25	20	133	0	3	26	40	69	1259
PM HV%	0%	7%	2%	0%	2%	0%	0%	0%	0%	0%	0%	2%	0%	5%	2%	0%	0%	0%	0%	0%	1%
PM PHF			0.85					0.95					0.83					0.72			0.96

Opening Year	2021	Annual Growth Rate	0.5%	Years to Grow	2

Background AM Peak Vol	0	1	317	6	324	0	61	432	170	663	0	316	26	8	350	0	10	20	72	102	1439
Site Trips - Cars					0					0					0					0	0
Site Trips - Buses					0					0					0					0	0
Total Future AM Peak Vol	0	1	317	6	324	0	61	432	170	663	0	316	26	8	350	0	10	20	72	102	1439
AM HV%	0%	0%	2%	0%	2%	0%	7%	5%	3%	5%	0%	3%	0%	13%	3%	0%	0%	5%	8%	7%	4%
Background PM Peak Vol	2	15	314	11	342	0	47	469	209	725	0	89	25	20	134	0	3	26	40	70	1272
Site Trips - Cars					0					0					0		1	9	14	24	24
Site Trips - Buses				29	29		29			29					0					0	58
Total Future PM Peak Vol	2	15	314	40	371	0	76	469	209	754	0	89	25	20	134	0	4	35	54	94	1354
PM HV%	0%	7%	2%	72%	9%	0%	38%	0%	0%	4%	0%	2%	0%	5%	2%	0%	0%	0%	0%	0%	5%

SCHOOL CHILDREN, PEDESTRIANS & BICYCLES

Hour Ending	From North Montana Ave NE			From South Montana Ave NE			From East 18th St			From West W Street NE		
	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles
06:45	0	2	0	0	0	0	0	0	0	0	0	0
07:00	0	2	0	0	0	0	0	0	0	0	1	0
07:15	0	2	1	0	0	0	0	0	0	0	0	1
07:30	0	1	0	0	0	0	0	0	0	0	0	1
07:45	0	3	0	0	1	0	0	0	0	0	0	0
08:00	0	1	0	0	1	1	0	0	1	0	0	0
08:15	0	1	0	0	0	0	0	0	0	0	0	1
08:30	0	1	1	0	2	0	0	0	0	0	1	1
08:45	0	4	0	0	4	0	0	1	0	0	1	0
09:00	0	0	0	0	2	0	0	1	0	0	2	0
09:15	0	1	0	0	1	0	0	0	0	0	3	0
09:30	0	2	0	0	1	0	0	0	0	0	1	0
09:45	0	0	0	0	0	0	0	2	0	0	1	0
10:00	0	0	0	0	0	0	0	1	0	0	0	0
10:15	0	1	1	0	1	0	0	0	0	0	1	1
10:30	0	0	0	0	1	0	0	0	0	0	0	1
10:45	0	0	0	0	1	0	0	0	0	0	2	0
11:00	0	0	0	0	0	0	0	1	0	0	2	0
11:15	0	0	0	0	0	0	0	1	0	0	2	0
11:30	0	0	0	0	1	0	0	1	0	0	1	0
11:45	0	1	0	0	0	0	0	0	0	0	0	0
12:00	0	1	0	0	1	0	0	0	0	0	1	0
12:15	0	1	0	0	4	0	0	1	0	0	0	0
12:30	0	0	0	0	5	0	0	1	0	0	1	0
12:45	0	0	0	0	1	0	0	0	0	0	1	0
13:00	0	1	0	0	3	0	0	1	0	0	0	0
13:15	0	1	0	0	1	0	0	1	0	0	1	0
13:30	0	0	0	0	6	0	0	0	0	0	4	0
13:45	0	2	0	0	0	0	0	0	0	0	1	0
14:00	0	0	0	0	1	0	0	0	0	0	2	0
14:15	0	0	0	0	0	0	0	0	0	0	0	0
14:30	0	2	0	0	0	0	0	0	0	0	0	0
14:45	0	0	0	0	0	0	0	1	0	0	2	0
15:00	0	1	0	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	1	0	0	0	0
15:45	0	0	0	0	6	0	0	4	0	0	4	0
16:00	0	2	0	0	2	0	0	0	0	0	0	0
16:15	0	2	0	0	0	1	0	1	1	0	4	0
16:30	0	4	0	0	3	0	0	0	0	0	3	0
16:45	0	3	1	0	2	0	0	3	0	0	3	0
17:00	0	4	0	0	3	0	0	1	0	0	3	0
17:15	0	1	0	0	5	1	0	2	0	0	2	0
17:30	0	2	0	0	1	0	0	2	0	0	0	1
17:45	0	1	0	0	1	0	0	0	0	0	0	0
18:00	0	3	0	0	2	0	0	0	0	0	1	0
18:15	0	4	0	0	1	0	0	1	0	0	0	0
18:30	0	2	0	0	3	0	0	0	0	0	1	0
18:45	0	4	0	0	2	0	0	0	0	0	3	0
19:00	0	1	0	0	2	0	0	1	0	0	3	0
TOTAL	**0**	64	4	**0**	71	3	**0**	29	2	**0**	58	7
AM Peak Vol	0	7	1	0	2	1	0	0	1	0	0	2
PM Peak Vol	0	11	0	0	8	0	0	2	0	0	7	0

Network Peak Hour Volumes

Hour Ending	From North Montana Ave NE			From South Montana Ave NE			From East 18th St			From West W Street NE		
	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles
AM Peak Vol	**0**	7	1	**0**	2	1	**0**	0	1	**0**	0	2
PM Peak Vol	**0**	11	0	**0**	8	0	**0**	2	0	**0**	7	0

A. Morton Thomas & Associates, Inc.
Turning Movement Counts - Field Sheet

Job No.: 18-0493

Location: W Street N.E at 16th Street
Date: 4/24/2019 Wednesday
Recorder: Video
Interval (dd) : 15
(In Minutes)

County: Washington DC
Town: Washington DC
Weather: Clear/Cold

PEAK HOURS	AM PERIOD	Start	End	Volume	LOS	V/C	PM PERIOD	Start	End	Volume	LOS	V/C	MD PERIOD	0	0
	6:30AM-10:00AM	06:30	07:30	0			4:00PM-7:00PM	17:00	18:00	0			10:00AM-4:00PM	12:00	13:00

Street Name-->	16th Street					0					W Street NE					W Street NE					GRAND TOTAL
HOUR	From North					From South					From East					From West					
ENDING	U turn	Left	Through	Right	Total	U turn	Left	Through	Right	Total	U turn	Left	Through	Right	Total	U turn	Left	Through	Right	Total	
06:45	0	5	0	1	6	0	0	0	0	0	1	0	33	0	34	0	0	21	0	21	61
07:00	0	6	0	2	8	0	0	0	0	0	3	0	28	0	31	0	1	35	0	36	75
07:15	0	4	0	2	6	0	0	0	0	0	1	0	23	0	24	1	0	25	0	26	56
07:30	0	4	0	1	5	0	0	0	0	0	0	0	18	0	18	0	0	22	0	22	45
07:45	0	4	0	2	6	0	0	0	0	0	0	0	22	0	22	0	0	17	0	17	45
08:00	0	7	0	3	10	0	0	0	0	0	0	0	24	0	24	0	0	13	0	13	47
08:15	0	3	0	2	5	0	0	0	0	0	0	0	19	0	19	0	0	17	0	17	41
08:30	0	4	0	0	4	0	0	0	0	0	0	0	13	0	13	0	0	7	0	7	24
08:45	0	3	0	1	4	0	0	0	0	0	1	0	27	0	28	0	0	13	0	13	45
09:00	0	4	0	2	6	0	0	0	0	0	1	0	17	0	18	0	0	8	0	8	32
09:15	0	3	0	2	5	0	0	0	0	0	0	0	17	0	17	0	0	12	0	12	34
09:30	0	0	0	2	2	0	0	0	0	0	0	0	18	0	18	0	0	7	0	7	27
09:45	0	2	0	3	5	0	0	0	0	0	0	0	21	1	22	0	0	11	0	11	38
10:00	0	4	0	3	7	0	0	0	0	0	0	0	14	0	14	0	0	11	0	11	32
10:15	0	2	0	0	2	0	0	0	0	0	0	0	14	0	14	0	0	9	0	9	25
10:30	0	2	0	0	2	0	0	0	0	0	2	0	21	0	23	0	0	8	0	8	33
10:45	0	0	0	1	1	0	0	0	0	0	0	0	13	0	13	0	0	11	0	11	25
11:00	0	1	0	1	2	0	0	0	0	0	0	0	18	1	19	0	0	11	0	11	32
11:15	0	1	0	1	2	0	0	0	0	0	0	0	28	0	28	0	0	10	0	10	40
11:30	0	3	0	1	4	0	0	0	0	0	0	0	18	0	18	0	0	13	0	13	35
11:45	0	1	0	1	2	0	0	0	0	0	0	0	8	0	8	0	0	12	0	12	22
12:00	0	0	0	0	0	0	0	0	0	0	0	0	24	0	24	0	0	9	0	9	33
12:15	0	2	0	2	4	0	0	0	0	0	0	0	31	0	31	0	0	14	0	14	49
12:30	0	2	0	0	2	0	0	0	0	0	0	0	24	0	24	0	0	15	0	15	41
12:45	0	3	0	2	5	0	0	0	0	0	0	0	19	0	19	0	0	12	0	12	36
13:00	0	5	0	0	5	0	0	0	0	0	0	0	21	0	21	0	0	18	0	18	44
13:15	0	3	0	1	4	0	0	0	0	0	0	0	16	0	16	0	0	14	0	14	34
13:30	0	2	0	1	3	0	0	0	0	0	0	0	15	0	15	0	0	14	0	14	32
13:45	0	3	0	2	5	0	0	0	0	0	1	0	18	0	19	0	0	9	0	9	33
14:00	0	3	0	1	4	0	0	0	0	0	0	0	19	0	19	1	0	15	0	16	39
14:15	0	5	0	4	9	0	0	0	0	0	0	0	25	0	25	0	0	10	0	10	44
14:30	0	4	0	2	6	0	0	0	0	0	0	0	19	0	19	0	0	8	0	8	33
14:45	0	3	0	0	3	0	0	0	0	0	0	0	12	0	12	0	0	13	0	13	28
15:00	0	1	0	1	2	0	0	0	0	0	0	0	29	0	29	0	0	19	0	19	50
15:15	0	2	0	1	3	0	0	0	0	0	0	0	16	0	16	0	0	15	0	15	34
15:30	0	5	0	2	7	0	0	0	0	0	0	0	14	0	14	0	0	12	0	12	33
15:45	0	2	0	5	7	0	0	0	0	0	1	0	22	0	23	1	0	15	0	16	46
16:00	0	3	0	3	6	0	0	0	0	0	0	0	22	1	23	0	0	20	0	20	49
16:15	0	3	0	3	6	0	0	0	0	0	0	0	19	0	19	0	1	10	0	11	36
16:30	0	0	0	1	1	0	0	0	0	0	1	0	23	0	24	0	0	10	0	10	35
16:45	0	2	0	2	4	0	0	0	0	0	0	0	22	1	23	0	0	7	0	7	34
17:00	0	1	0	2	3	0	0	0	0	0	1	0	17	0	18	0	0	9	0	9	30
17:15	0	10	0	1	11	0	0	0	0	0	0	0	26	0	26	0	0	10	0	10	47
17:30	0	0	0	1	1	0	0	0	0	0	0	0	24	0	24	0	0	14	0	14	39
17:45	0	3	0	8	11	0	0	0	0	0	0	0	15	0	15	1	0	15	0	16	42
18:00	0	2	0	0	2	0	0	0	0	0	0	0	24	0	24	0	0	10	0	10	36
18:15	0	2	0	4	6	0	0	0	0	0	0	0	25	0	25	0	0	9	0	9	40
18:30	0	4	0	0	4	0	0	0	0	0	1	0	22	0	23	1	0	18	0	19	46
18:45	0	1	0	1	2	0	0	0	0	0	1	0	19	0	20	0	0	8	0	8	30
19:00	0	2	0	2	4	0	0	0	0	0	1	0	16	0	17	1	0	16	0	17	38
TOTAL	**0**	**141**	**0**	**83**	**224**	**0**	**0**	**0**	**0**	**0**	**16**	**0**	**1012**	**4**	**1032**	**6**	**2**	**661**	**0**	**669**	**1925**
AM Peak Vol	0	19	0	6	25	0	0	0	0	0	5	0	102	0	107	1	1	103	0	105	237
PM Peak Vol	0	15	0	10	25	0	0	0	0	0	0	0	89	0	89	1	0	49	0	50	164

NETWORK PEAK HOURS	AM PEAK	Start	End	Volume	LOS	V/C	PM PEAK	Start	End	Volume	LOS	V/C	MD PEAK	0	0
		07:00	08:00					18:00	19:00					12:00	13:00

AM Peak Vol	0	19	0	8	27	0	0	0	0	0	1	0	87	0	88	1	0	77	0	78	193
AM HV%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	6%	0%	6%	5%
AM PHF	0.68					0.92					0.75										0.86
PM Peak Vol	0	9	0	7	16	0	0	0	0	0	3	0	82	0	85	2	0	51	0	53	154
PM HV%	0%	0%	0%	14%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%
PM PHF	0.67					0.85					0.70										0.84

Opening Year	2021	Annual Growth Rate	0.5%	Years to Grow	2

Background AM Peak Vol	0	19	0	8	27	0	0	0	0	0	1	0	88	0	89	1	0	78	0	79	195
Site Trips - Cars					0					0					0					0	0
Site Trips - Buses					0					0					0					0	0
Total Future AM Peak Vol	0	19	0	8	27	0	0	0	0	0	1	0	88	0	89	1	0	78	0	79	195
AM HV%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	6%	0%	6%	5%
Background PM Peak Vol	0	9	0	7	16	0	0	0	0	0	3	0	83	0	86	2	0	52	0	54	156
Site Trips - Cars					0					0					0					0	0
Site Trips - Buses					0					0					0					0	0
Total Future PM Peak Vol	0	9	0	7	16	0	0	0	0	0	3	0	83	0	86	2	0	52	0	54	156
PM HV%	0%	0%	0%	14%	6%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%

SCHOOL CHILDREN, PEDESTRIANS & BICYCLES

Hour Ending	From North 16th Street			From South 0			From East W Street NE			From West W Street NE		
	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles
06:45	0	1	0	0	0	0	0	9	0	0	4	0
07:00	0	1	0	0	0	0	0	4	0	0	4	0
07:15	0	2	0	0	0	0	0	1	0	0	4	0
07:30	0	1	0	0	0	0	0	0	0	0	1	0
07:45	0	5	0	0	0	0	0	0	0	0	1	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	3	1	0	0	0	0	0	0	0	0	0
08:45	0	1	0	0	0	0	0	0	0	0	0	0
09:00	0	3	0	0	0	0	0	0	0	0	2	0
09:15	0	3	0	0	0	0	0	0	0	0	1	0
09:30	0	1	0	0	0	0	0	0	0	0	0	0
09:45	0	0	0	0	0	0	0	0	0	0	0	0
10:00	0	0	0	0	0	0	0	0	0	0	0	0
10:15	0	1	0	0	0	0	0	0	0	0	0	0
10:30	0	0	0	0	0	0	0	0	0	0	2	0
10:45	0	0	0	0	0	0	0	0	0	0	0	0
11:00	0	2	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	1	0	0	0	0	0	0	0	0	0	0
11:45	0	2	1	0	0	0	0	0	0	0	0	0
12:00	0	2	0	0	0	0	0	0	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0	0	2	0
12:30	0	1	0	0	0	0	0	0	0	0	0	0
12:45	0	2	0	0	0	0	0	0	0	0	1	0
13:00	0	3	0	0	0	0	0	0	0	0	1	0
13:15	0	2	0	0	0	0	0	0	0	0	0	0
13:30	0	1	0	0	0	0	0	1	0	0	1	0
13:45	0	0	0	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0	0	0	0
14:15	0	0	0	0	0	0	0	0	0	0	0	0
14:30	0	2	0	0	0	0	0	0	0	0	2	0
14:45	0	0	0	0	0	0	0	0	0	0	0	0
15:00	0	1	0	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0	0	0	0
15:30	0	0	0	0	0	0	0	0	0	0	2	0
15:45	0	3	1	0	0	0	0	0	0	0	4	0
16:00	0	2	0	0	0	0	0	0	0	0	0	0
16:15	0	1	0	0	0	0	0	0	0	0	0	0
16:30	0	1	0	0	0	0	0	1	0	0	1	0
16:45	0	3	1	0	0	0	0	1	1	0	0	0
17:00	0	1	0	0	0	0	0	0	0	0	1	0
17:15	0	3	0	0	0	0	0	0	0	0	0	1
17:30	0	3	0	0	0	0	0	0	0	0	0	0
17:45	0	2	0	0	0	0	0	0	0	0	0	0
18:00	0	2	0	0	0	0	0	2	0	0	0	0
18:15	0	3	0	0	0	0	0	2	0	0	0	0
18:30	0	0	0	0	0	0	0	0	0	0	0	0
18:45	0	2	2	0	0	0	0	1	0	0	0	0
19:00	0	2	0	0	0	0	0	0	0	0	1	0
TOTAL	**0**	69	6	**0**	0	0	**0**	22	1	**0**	35	1
AM Peak Vol	0	5	0	0	0	0	0	14	0	0	13	0
PM Peak Vol	0	10	0	0	0	0	0	2	0	0	0	1

Network Peak Hour Volumes

Hour Ending	From North 16th Street			From South 0			From East W Street NE			From West W Street NE		
	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles
AM Peak Vol	**0**	8	0	**0**	0	0	**0**	1	0	**0**	6	0
PM Peak Vol	**0**	7	2	**0**	0	0	**0**	3	0	**0**	1	0

A. Morton Thomas & Associates, Inc.
Turning Movement Counts - Field Sheet

Job No.: 18-0493

Location: Montana Ave at 17th Street and Bryant Street
Date: 4/24/2019 Wednesday
Recorder: Video
Interval (dd) : 15
(In Minutes)

County: Washington DC
Town: Washington DC
Weather: Clear/Cold

PEAK HOURS	AM PERIOD	Start	End	Volume	LOS	V/C	PM PERIOD	Start	End	Volume	LOS	V/C	MD PERIOD	0	0
	6:30AM-10:00AM	08:45	09:45	0			4:00PM-7:00PM	18:00	19:00	0			10:00AM-4:00PM	13:45	14:45

Street Name-->	Montana Ave					Montana Ave					Bryant St					17th St					GRAND
HOUR	From North					From South					From East					From West					
ENDING	U turn	Left	Through	Right	Total	U turn	Left	Through	Right	Total	U turn	Left	Through	Right	Total	U turn	Left	Through	Right	Total	TOTAL
06:45	0	0	68	0	68	0	0	77	0	77	0	2	0	3	5	0	1	1	7	9	159
07:00	1	4	76	0	81	0	0	95	0	95	0	0	0	3	3	0	0	0	2	2	181
07:15	1	3	71	2	77	0	1	100	1	102	0	0	0	6	6	0	1	0	0	1	186
07:30	0	2	68	0	70	0	0	107	0	107	0	0	1	3	4	0	1	1	6	8	189
07:45	0	5	78	1	84	0	1	107	0	108	0	0	1	3	4	0	1	2	3	6	202
08:00	0	10	73	0	83	2	6	119	1	128	0	1	1	13	15	0	3	0	7	10	236
08:15	0	3	65	1	69	0	1	82	0	83	0	0	1	10	11	0	5	0	8	13	176
08:30	0	3	83	0	86	0	0	95	0	95	0	1	3	15	19	0	2	1	5	8	208
08:45	0	5	77	5	87	0	2	96	0	98	0	2	2	17	21	0	0	0	7	7	213
09:00	0	8	82	0	90	0	4	95	2	101	0	2	1	12	15	0	1	0	7	8	214
09:15	2	6	77	0	85	0	2	93	2	97	0	1	2	6	9	0	2	0	6	8	199
09:30	0	1	76	0	77	0	1	127	0	128	0	0	0	7	7	0	0	1	5	6	218
09:45	1	1	79	1	82	0	1	135	0	136	0	0	0	8	8	0	0	1	1	2	228
10:00	0	0	81	0	81	0	1	116	0	117	0	1	0	8	9	0	1	0	4	5	212
10:15	0	2	80	0	82	0	6	96	2	104	0	1	1	5	7	0	1	1	4	6	199
10:30	0	6	99	1	106	0	4	93	0	97	0	1	1	6	8	0	1	0	9	10	221
10:45	0	5	102	0	107	0	3	100	1	104	0	0	0	3	3	0	0	0	4	4	218
11:00	0	2	89	1	92	0	2	97	0	99	0	1	1	7	9	0	3	1	5	9	209
11:15	0	3	82	0	85	0	1	95	1	97	0	0	0	6	6	0	0	0	5	5	193
11:30	0	5	81	1	87	1	0	94	0	95	0	2	0	9	11	0	0	1	6	7	200
11:45	0	4	83	0	87	0	1	89	0	90	0	1	1	3	5	0	1	1	4	6	188
12:00	2	1	81	0	84	0	3	85	2	90	0	2	0	8	10	1	1	0	5	7	191
12:15	0	9	82	0	91	0	2	82	0	84	0	0	1	5	6	0	2	0	4	6	187
12:30	0	5	95	0	100	0	3	100	0	103	0	1	0	6	7	0	1	0	4	5	215
12:45	0	4	91	1	96	0	1	93	0	94	0	2	0	7	9	0	0	1	3	4	203
13:00	0	8	81	0	89	0	3	113	3	119	0	0	0	7	7	0	0	0	5	5	220
13:15	1	5	103	0	109	0	4	111	1	116	0	4	0	3	7	0	3	0	6	9	241
13:30	0	7	106	0	113	0	3	77	0	80	0	2	0	3	5	0	1	0	4	5	203
13:45	1	5	115	1	122	0	3	110	0	113	0	0	1	8	9	0	1	0	4	5	249
14:00	0	13	104	2	119	0	5	125	0	130	0	3	1	7	11	0	2	1	2	5	265
14:15	0	6	131	0	137	0	4	134	0	138	0	0	1	5	6	0	2	2	5	9	290
14:30	0	5	124	1	130	0	3	134	0	137	0	1	1	6	8	0	2	0	4	6	281
14:45	0	11	75	2	88	0	3	148	1	152	0	3	1	7	11	0	0	0	4	4	255
15:00	0	5	88	1	94	0	3	121	0	124	0	2	1	4	7	0	1	0	3	4	229
15:15	0	7	95	0	102	0	5	96	2	103	0	2	0	9	11	0	1	1	0	2	218
15:30	0	8	75	3	86	0	1	108	1	110	0	0	3	8	11	0	1	0	2	3	210
15:45	0	9	95	1	105	0	4	125	0	129	0	0	1	11	12	0	2	0	2	4	250
16:00	0	7	135	2	144	0	5	95	1	101	0	1	2	2	5	0	2	1	1	4	254
16:15	0	19	81	0	100	0	3	104	2	109	0	0	1	19	20	0	0	1	0	1	230
16:30	0	16	67	0	83	0	1	95	0	96	0	0	1	7	8	0	2	1	2	5	192
16:45	1	6	58	0	65	0	2	92	0	94	0	0	1	1	2	0	0	2	2	4	165
17:00	2	5	63	1	71	2	4	93	1	100	0	0	2	2	4	0	0	2	1	3	178
17:15	1	8	73	0	82	0	4	97	0	101	0	1	1	6	8	0	2	0	0	2	193
17:30	0	18	62	1	81	0	3	139	0	142	0	0	0	4	4	0	2	0	4	6	233
17:45	4	13	54	2	73	0	2	103	2	107	0	0	1	8	9	0	1	1	1	3	192
18:00	1	12	48	0	61	1	0	105	3	109	0	1	0	6	7	0	4	2	1	7	184
18:15	0	11	58	0	69	1	4	121	4	130	0	1	1	5	7	0	0	0	1	1	207
18:30	0	3	83	0	86	1	1	117	2	121	0	0	0	7	7	0	1	1	0	2	216
18:45	0	5	90	2	97	1	5	131	1	138	0	0	0	5	5	0	1	0	3	4	244
19:00	0	5	83	0	88	2	3	116	0	121	0	1	0	4	5	0	0	1	5	6	220
TOTAL	**18**	**314**	**4166**	**33**	**4531**	**11**	**124**	**5278**	**36**	**5449**	**0**	**43**	**37**	**333**	**413**	**1**	**59**	**28**	**183**	**271**	**10664**
AM Peak Vol	3	16	314	1	334	0	8	450	4	462	0	3	3	33	39	0	3	2	19	24	859
PM Peak Vol	0	24	314	2	340	5	13	485	7	510	0	2	1	21	24	0	2	2	9	13	887

NETWORK PEAK HOURS	AM PEAK	Start	End	Volume	LOS	V/C	PM PEAK	Start	End	Volume	LOS	V/C	MD PEAK	0	0
		07:00	08:00					18:00	19:00					12:00	13:00

AM Peak Vol	1	20	290	3	314	2	8	433	2	445	0	1	3	25	29	0	6	3	16	25	813
AM HV%	0%	10%	3%	0%	4%	0%	0%	5%	0%	5%	0%	0%	0%	0%	0%	0%	0%	33%	0%	4%	4%
AM PHF			0.93					0.87					0.48					0.63			0.86
PM Peak Vol	0	24	314	2	340	5	13	485	7	510	0	2	1	21	24	0	2	2	9	13	887
PM HV%	0%	0%	3%	0%	3%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%
PM PHF			0.88					0.92					0.86					0.54			0.91

Opening Year	2021	Annual Growth Rate	0.5%	Years to Grow	2

Background AM Peak Vol	1	20	293	3	317	2	8	437	2	449	0	1	3	25	29	0	6	3	16	25	821
Site Trips - Cars					0					0					0					0	0
Site Trips - Buses					0					0					0					0	0
Total Future AM Peak Vol	1	20	293	3	317	2	8	437	2	449	0	1	3	25	29	0	6	3	16	25	821
AM HV%	0%	10%	3%	0%	4%	0%	0%	5%	0%	5%	0%	0%	0%	0%	0%	0%	0%	33%	0%	4%	4%
Background PM Peak Vol	0	24	317	2	343	5	13	490	7	515	0	2	1	21	24	0	2	2	9	13	896
Site Trips - Cars					0			1		1					0					0	1
Site Trips - Buses			29		29					0					0					0	29
Total Future PM Peak Vol	0	24	346	2	372	5	13	491	7	516	0	2	1	21	24	0	2	2	9	13	926
PM HV%	0%	0%	11%	0%	10%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%

SCHOOL CHILDREN, PEDESTRIANS & BICYCLES

Hour Ending	From North Montana Ave			From South Montana Ave			From East Bryant St			From West 17th St		
	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles
06:45	0	0	0	0	0	0	0	1	0	0	0	0
07:00	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	1	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	1	0
08:00	0	0	0	0	0	0	0	3	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	3	0	0	0	0	0	0	0
08:45	0	1	0	0	1	0	0	3	0	0	5	0
09:00	0	0	0	0	1	0	0	2	0	0	3	0
09:15	0	0	1	0	0	0	0	3	0	0	3	0
09:30	0	0	0	0	0	0	0	3	0	0	4	0
09:45	0	1	0	0	0	0	0	2	0	0	4	0
10:00	0	2	0	0	0	0	0	1	0	0	1	0
10:15	0	0	0	0	0	0	0	2	0	0	1	0
10:30	0	0	0	0	0	0	0	0	0	0	0	0
10:45	0	1	0	0	0	0	0	1	0	0	1	0
11:00	0	0	0	0	1	0	0	0	0	0	0	0
11:15	0	2	0	0	0	0	0	2	0	0	3	0
11:30	0	0	0	0	0	0	0	0	0	0	0	0
11:45	0	0	1	0	2	0	0	0	0	0	0	1
12:00	0	2	0	0	0	0	0	3	0	0	2	0
12:15	0	0	0	0	0	0	0	0	0	0	0	0
12:30	0	1	0	0	1	0	0	1	0	0	0	0
12:45	0	0	0	0	2	0	0	1	0	0	0	1
13:00	0	0	0	0	0	0	0	1	0	0	2	1
13:15	0	0	0	0	2	0	0	0	0	0	0	0
13:30	0	0	0	0	1	0	0	1	0	0	1	0
13:45	0	0	0	0	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0	0	0	0	0
14:15	0	1	0	0	0	0	0	1	0	0	1	0
14:30	0	0	0	0	0	0	0	0	0	0	0	0
14:45	0	1	0	0	0	0	0	1	0	0	1	0
15:00	0	1	0	0	0	0	0	0	0	0	1	0
15:15	0	2	0	0	0	0	0	1	0	0	1	0
15:30	0	4	0	0	0	0	0	2	0	0	4	0
15:45	0	0	0	0	5	0	0	5	0	0	0	0
16:00	0	0	0	0	2	0	0	2	0	0	0	0
16:15	0	2	0	0	0	0	0	0	0	0	2	0
16:30	0	3	0	0	2	0	0	3	0	0	3	0
16:45	0	2	0	0	1	0	0	3	0	0	2	0
17:00	0	1	0	0	0	0	0	1	0	0	1	0
17:15	0	2	1	0	0	0	0	3	1	0	2	0
17:30	0	1	0	0	0	0	0	3	1	0	3	0
17:45	0	2	0	0	1	0	0	1	0	0	2	0
18:00	0	4	0	0	0	0	0	4	0	0	4	0
18:15	0	0	0	0	0	0	0	0	0	0	0	0
18:30	0	0	0	0	0	0	0	3	0	0	0	0
18:45	0	1	0	0	0	0	0	1	0	0	1	0
19:00	0	1	0	0	0	0	0	0	0	0	1	0
TOTAL	**0**	38	3	**0**	25	0	**0**	65	2	**0**	60	3
AM Peak Vol	0	1	1	0	1	0	0	10	0	0	14	0
PM Peak Vol	0	2	0	0	0	0	0	4	0	0	2	0

Network Peak Hour Volumes

Hour Ending	From North Montana Ave			From South Montana Ave			From East Bryant St			From West 17th St		
	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles
AM Peak Vol	**0**	0	0	**0**	0	0	**0**	4	0	**0**	1	0
PM Peak Vol	**0**	2	0	**0**	0	0	**0**	4	0	**0**	2	0

A. Morton Thomas & Associates, Inc.
Turning Movement Counts - Field Sheet

Job No.: 18-0493

Location: Montana Ave at Edwin Street and Driveway
Date: 4/24/2019 Wednesday
Recorder: Video
Interval (dd) : 15
(In Minutes)

County: Washington DC
Town: Washington DC
Weather: Clear/Cold

PEAK HOURS	AM PERIOD	Start	End	Volume	LOS	V/C	PM PERIOD	Start	End	Volume	LOS	V/C	MD PERIOD	0	0
	6:30AM-10:00AM	07:00	08:00	0			4:00PM-7:00PM	18:00	19:00	0			10:00AM-4:00PM	13:30	14:30

Street Name-->	Montana Ave					Montana Ave					Edwin Street					Driveway					GRAND TOTAL
HOUR	From North					From South					From East					From West					
ENDING	U turn	Left	Through	Right	Total	U turn	Left	Through	Right	Total	U turn	Left	Through	Right	Total	U turn	Left	Through	Right	Total	
06:45	0	0	137	0	137	1	0	134	0	135	0	1	0	0	1	0	0	0	0	0	273
07:00	0	0	169	0	169	0	0	127	2	129	0	1	0	1	2	0	0	0	0	0	300
07:15	0	0	169	0	169	0	0	148	0	148	0	0	0	0	0	0	0	0	0	0	317
07:30	0	0	160	0	160	0	0	159	2	161	0	1	0	0	1	0	0	0	0	0	322
07:45	0	0	173	0	173	0	0	184	1	185	0	1	0	1	2	0	0	0	0	0	360
08:00	0	1	187	0	188	0	0	158	0	158	0	1	0	0	1	0	0	0	0	0	347
08:15	0	0	178	0	178	0	1	129	1	131	0	3	0	0	3	0	0	0	1	1	313
08:30	0	1	168	0	169	0	0	150	1	151	0	1	0	0	1	0	0	0	0	0	321
08:45	0	0	140	0	140	0	0	158	2	160	0	2	0	1	3	0	0	0	0	0	303
09:00	1	0	159	0	160	0	1	165	1	167	0	3	0	2	5	0	0	0	0	0	332
09:15	0	1	157	0	158	0	0	155	0	155	0	1	0	0	1	0	0	0	1	1	315
09:30	0	0	127	0	127	2	1	178	1	182	0	3	0	1	4	0	0	0	0	0	313
09:45	0	1	139	0	140	0	1	200	4	205	0	0	0	1	1	0	0	0	0	0	346
10:00	0	0	138	0	138	0	0	155	3	158	0	0	0	0	0	0	1	0	1	2	298
10:15	0	0	154	0	154	0	3	163	2	168	0	1	0	0	1	0	1	0	1	2	325
10:30	0	2	176	0	178	0	0	161	4	165	0	2	0	3	5	0	0	0	1	1	349
10:45	0	1	166	0	167	0	2	151	0	153	0	2	0	1	3	0	0	0	0	0	323
11:00	0	2	142	1	145	1	1	147	1	150	0	0	0	2	2	0	0	0	3	3	300
11:15	0	3	122	0	125	0	1	140	5	146	0	0	1	1	2	0	2	0	0	2	275
11:30	0	2	136	0	138	0	1	139	4	144	0	7	0	3	10	0	0	0	1	1	293
11:45	0	2	163	0	165	0	0	127	3	130	0	3	0	0	3	0	2	0	0	2	300
12:00	0	0	130	0	130	0	0	142	1	143	0	7	0	2	9	0	1	0	1	2	284
12:15	0	1	158	1	160	0	1	154	5	160	0	0	0	2	2	0	0	0	1	1	323
12:30	0	2	149	0	151	0	0	158	4	162	0	1	0	2	3	0	2	0	3	5	321
12:45	0	1	147	0	148	0	6	134	3	143	0	2	0	2	4	0	0	0	1	1	296
13:00	0	1	147	0	148	0	3	186	4	193	0	2	0	0	2	0	0	0	6	6	349
13:15	0	0	158	0	158	0	1	195	1	197	0	2	0	1	3	0	1	0	3	4	362
13:30	0	2	174	0	176	0	1	136	4	141	0	3	0	1	4	0	1	0	0	1	322
13:45	0	1	175	3	179	0	1	168	3	172	0	1	0	2	3	0	3	0	1	4	358
14:00	0	1	183	0	184	0	2	187	4	193	0	3	0	3	6	0	0	0	0	0	383
14:15	0	0	191	0	191	0	1	199	0	200	0	5	0	1	6	0	1	0	4	5	402
14:30	0	0	154	0	154	0	2	218	4	224	0	3	0	1	4	0	1	0	4	5	387
14:45	1	2	139	0	142	0	2	185	1	188	0	1	0	3	4	0	0	0	2	2	336
15:00	0	1	122	0	123	0	1	195	1	197	0	2	0	1	3	0	2	0	1	3	326
15:15	0	3	143	1	147	0	0	178	1	179	0	0	1	3	4	0	2	0	0	2	332
15:30	0	1	122	0	123	0	2	195	1	198	0	0	2	2	4	0	0	0	0	0	325
15:45	0	1	145	1	147	0	0	195	4	199	0	2	0	0	2	0	0	0	2	2	350
16:00	1	0	149	0	150	0	0	158	1	159	0	3	0	3	6	0	0	0	2	2	317
16:15	0	0	100	0	100	0	0	151	3	154	0	1	0	1	2	0	1	0	3	4	260
16:30	1	0	113	0	114	0	0	158	1	159	0	1	0	0	1	0	0	0	1	1	275
16:45	0	1	100	0	101	0	1	129	1	131	0	1	1	1	3	0	0	0	1	1	236
17:00	0	2	88	0	90	0	0	158	2	160	0	0	0	1	1	0	1	0	1	2	253
17:15	1	0	85	0	86	0	2	166	3	171	0	0	0	3	3	0	0	1	2	3	263
17:30	0	0	74	0	74	0	0	189	0	189	0	2	0	3	5	0	0	0	2	2	270
17:45	1	0	87	0	88	0	0	147	1	148	0	7	0	1	8	0	1	0	2	3	247
18:00	0	0	64	0	64	0	1	165	3	169	0	1	0	1	2	0	0	0	4	4	239
18:15	1	0	103	0	104	0	0	181	1	182	0	3	0	4	7	0	0	0	0	0	293
18:30	0	0	94	0	94	0	1	172	3	176	0	0	0	0	0	0	1	0	1	2	272
18:45	0	0	123	0	123	0	0	191	1	192	0	0	0	1	1	0	0	0	3	3	319
19:00	0	0	131	1	132	0	0	171	5	176	0	0	0	1	1	0	1	0	0	1	310
TOTAL	**7**	**36**	**7008**	**8**	**7059**	**4**	**40**	**8189**	**103**	**8336**	**0**	**86**	**5**	**63**	**154**	**0**	**25**	**1**	**60**	**86**	**15635**
AM Peak Vol	0	1	689	0	690	0	0	649	3	652	0	3	0	1	4	0	0	0	0	0	1346
PM Peak Vol	1	0	451	1	453	0	1	715	10	726	0	3	0	6	9	0	2	0	4	6	1194

NETWORK PEAK HOURS	AM PEAK	Start	End	Volume	LOS	V/C	PM PEAK	Start	End	Volume	LOS	V/C	MD PEAK	0	0
		07:00	08:00					18:00	19:00					12:00	13:00

AM Peak Vol	0	1	689	0	690	0	0	649	3	652	0	3	0	1	4	0	0	0	0	0	1346
AM HV%	0%	0%	3%	0%	3%	0%	0%	4%	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%
AM PHF	0.92					0.88					0.50					0.00					0.93
PM Peak Vol	1	0	451	1	453	0	1	715	10	726	0	3	0	6	9	0	2	0	4	6	1194
PM HV%	0%	0%	2%	0%	2%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%
PM PHF	0.86					0.95					0.32					0.50					0.94

Opening Year	2021	Annual Growth Rate	0.5%	Years to Grow	2

Background AM Peak Vol	0	1	696	0	697	0	0	656	3	659	0	3	0	1	4	0	0	0	0	0	1359
Site Trips - Cars					0					0					0					0	0
Site Trips - Buses					0					0					0					0	0
Total Future AM Peak Vol	0	1	696	0	697	0	0	656	3	659	0	3	0	1	4	0	0	0	0	0	1359
AM HV%	0%	0%	3%	0%	3%	0%	0%	4%	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%
Background PM Peak Vol	1	0	456	1	458	0	1	722	10	733	0	3	0	6	9	0	2	0	4	6	1206
Site Trips - Cars			14		14					0					0					0	14
Site Trips - Buses					0			29		29					0					0	29
Total Future PM Peak Vol	1	0	470	1	472	0	1	751	10	762	0	3	0	6	9	0	2	0	4	6	1249
PM HV%	0%	0%	2%	0%	2%	0%	0%	4%	0%	4%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	4%

SCHOOL CHILDREN, PEDESTRIANS & BICYCLES

Hour Ending	From North Montana Ave			From South Montana Ave			From East Edwin Street			From West Driveway		
	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles
06:45	0	0	0	0	0	0	0	1	0	0	0	0
07:00	0	0	0	0	0	0	0	2	0	0	0	0
07:15	0	0	0	0	0	0	0	1	0	0	0	0
07:30	0	0	0	0	0	0	0	0	1	0	1	1
07:45	0	0	0	0	0	0	0	0	1	0	2	0
08:00	0	0	0	0	0	0	0	4	0	0	4	1
08:15	0	0	0	0	0	0	0	0	0	0	0	1
08:30	0	0	0	0	0	0	0	0	0	0	4	1
08:45	0	1	0	0	0	0	0	4	0	0	4	1
09:00	0	0	0	0	0	0	0	1	1	0	4	0
09:15	0	0	0	0	0	0	0	1	0	0	3	0
09:30	0	0	0	0	0	0	0	0	0	0	3	0
09:45	0	0	0	0	0	0	0	3	0	0	0	1
10:00	0	0	0	0	0	0	0	2	0	0	3	0
10:15	0	0	0	0	0	1	0	1	0	0	0	1
10:30	0	0	0	0	0	0	0	0	0	0	1	1
10:45	0	1	0	0	0	0	0	0	1	0	2	0
11:00	0	0	0	0	0	0	0	0	1	0	1	0
11:15	0	0	0	0	0	0	0	1	0	0	6	0
11:30	0	2	0	0	0	0	0	0	0	0	2	0
11:45	0	0	0	0	1	0	0	4	0	0	4	0
12:00	0	0	0	0	0	0	0	1	0	0	1	0
12:15	0	2	0	0	0	0	0	2	0	0	1	0
12:30	0	3	0	0	1	0	0	2	0	0	2	2
12:45	0	1	0	0	1	0	0	1	0	0	2	0
13:00	0	0	0	0	0	0	0	3	0	0	2	0
13:15	0	0	0	0	0	0	0	1	0	0	0	0
13:30	0	1	0	0	0	0	0	0	0	0	7	0
13:45	0	0	0	0	1	0	0	3	0	0	1	1
14:00	0	5	0	0	0	0	0	0	1	0	2	1
14:15	0	2	0	0	0	0	0	0	0	0	0	0
14:30	0	0	0	0	0	0	0	1	1	0	2	1
14:45	0	1	0	0	0	0	0	0	0	0	2	0
15:00	0	1	0	0	0	0	0	2	1	0	2	0
15:15	0	0	0	0	0	0	0	4	0	0	1	0
15:30	0	2	0	0	2	0	0	2	0	0	4	0
15:45	0	0	0	0	0	0	0	6	2	0	2	1
16:00	0	1	0	0	0	0	0	2	1	0	1	0
16:15	0	2	0	0	2	0	0	3	1	0	4	1
16:30	0	1	0	0	0	0	0	1	0	0	2	1
16:45	0	2	0	0	0	0	0	4	0	0	4	1
17:00	0	5	0	0	0	0	0	2	0	0	5	0
17:15	0	1	0	0	0	0	0	7	3	0	4	1
17:30	0	3	0	0	0	0	0	2	2	0	1	1
17:45	0	0	0	0	0	0	0	1	1	0	3	1
18:00	0	0	0	0	0	0	0	0	1	0	2	0
18:15	0	2	0	0	1	0	0	1	0	0	4	0
18:30	0	0	0	0	0	0	0	1	0	0	1	1
18:45	0	1	0	0	1	0	0	1	0	0	6	0
19:00	0	0	0	0	0	0	0	2	0	0	3	0
TOTAL	**0**	40	0	**0**	10	1	**0**	80	19	**0**	115	21
AM Peak Vol	0	0	0	0	0	0	0	5	2	0	7	2
PM Peak Vol	0	3	0	0	2	0	0	5	0	0	14	1

Network Peak Hour Volumes

Hour Ending	From North Montana Ave			From South Montana Ave			From East Edwin Street			From West Driveway		
	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles	School Children	Pedestrians	Bicycles
AM Peak Vol	**0**	0	0	**0**	0	0	**0**	5	2	**0**	7	2
PM Peak Vol	**0**	3	0	**0**	2	0	**0**	5	0	**0**	14	1

Appendix B

2021 Background Conditions Analysis

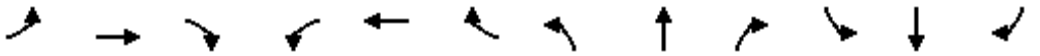
HCM Signalized Intersection Capacity Analysis
3126: Montana Ave NE & Bryant St NE & 17th St NE

05/31/2019

Movement	WBL	WBR	WBR2	SBL2	SBL	SBR	SEL2	SEL	SET	NWT	NWR	NWR2
Lane Configurations												
Traffic Volume (vph)	1	25	3	3	16	6	3	20	293	437	8	2
Future Volume (vph)	1	25	3	3	16	6	3	20	293	437	8	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	15	15	15	15	15	15	12	12	12	10	10	10
Grade (%)	8%				-3%				-5%	9%		
Total Lost time (s)	5.0				4.0				5.0	5.0	5.0	
Lane Util. Factor	1.00				1.00				1.00	1.00	1.00	
Frpb, ped/bikes	0.98				1.00				1.00	1.00	0.98	
Flpb, ped/bikes	1.00				0.99				1.00	1.00	1.00	
Frt	0.87				0.97				1.00	1.00	0.85	
Flt Protected	1.00				0.96				1.00	1.00	1.00	
Satd. Flow (prot)	1379				1530				1520	1306	1137	
Flt Permitted	1.00				0.98				0.94	1.00	1.00	
Satd. Flow (perm)	1376				1559				1441	1306	1137	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	1	29	3	3	19	7	3	23	341	508	9	2
RTOR Reduction (vph)	26	0	0	0	24	0	0	0	0	0	6	0
Lane Group Flow (vph)	7	0	0	0	5	0	0	0	367	508	5	0
Confl. Peds. (#/hr)			1	4			1	4			1	4
Heavy Vehicles (%)	0%	0%	0%	33%	0%	0%	0%	10%	3%	5%	0%	0%
Parking (#/hr)	0	0	0	0	0	0		0	0	0	0	0
Turn Type	Perm			Perm	Prot		Perm	Perm	NA	NA	Perm	
Protected Phases					4				2	6		
Permitted Phases	3			4			2	2			6	
Actuated Green, G (s)	25.0				18.0				57.0	57.0	57.0	
Effective Green, g (s)	27.0				20.0				59.0	59.0	59.0	
Actuated g/C Ratio	0.22				0.17				0.49	0.49	0.49	
Clearance Time (s)	7.0				6.0				7.0	7.0	7.0	
Lane Grp Cap (vph)	309				259				708	642	559	
v/s Ratio Prot										c0.39		
v/s Ratio Perm	c0.01				c0.00				0.25		0.00	
v/c Ratio	0.02				0.02				0.52	0.79	0.01	
Uniform Delay, d1	36.2				41.8				20.8	25.4	15.6	
Progression Factor	1.00				1.00				1.00	0.70	1.00	
Incremental Delay, d2	0.1				0.1				2.7	4.6	0.0	
Delay (s)	36.4				41.9				23.5	22.4	15.6	
Level of Service	D				D				C	C	B	
Approach Delay (s)	36.4				41.9				23.5	22.2		
Approach LOS	D				D				C	C		

Intersection Summary			
HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

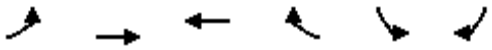
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	317	6	61	432	170	10	20	72	316	26	8
Future Volume (vph)	1	317	6	61	432	170	10	20	72	316	26	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	9	10	10	10	16	12	16	11	11	11
Grade (%)		-9%			9%			-4%			-6%	
Total Lost time (s)		4.0	4.0	3.0	4.0			4.0			4.0	4.0
Lane Util. Factor		1.00	1.00	1.00	1.00			1.00			1.00	1.00
Frpb, ped/bikes		1.00	0.98	1.00	0.99			0.98			1.00	0.97
Flpb, ped/bikes		1.00	1.00	1.00	1.00			1.00			1.00	1.00
Frt		1.00	0.85	1.00	0.96			0.91			1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			1.00			0.96	1.00
Satd. Flow (prot)		1524	1205	1353	1389			1277			1425	1119
Flt Permitted		1.00	1.00	0.38	1.00			1.00			0.96	1.00
Satd. Flow (perm)		1523	1205	539	1389			1277			1425	1119
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	345	7	66	470	185	11	22	78	343	28	9
RTOR Reduction (vph)	0	0	4	0	12	0	0	66	0	0	0	7
Lane Group Flow (vph)	0	346	3	66	643	0	0	45	0	0	371	2
Confl. Peds. (#/hr)							2		7	7		2
Confl. Bikes (#/hr)			1			1			2			1
Heavy Vehicles (%)	0%	2%	0%	7%	5%	3%	0%	5%	8%	3%	0%	13%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	4	0	0	0	0
Parking (#/hr)	0	0	0				0	0	0	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Split	NA		Split	NA	Perm
Protected Phases		2		1	6		8	8		7	7	
Permitted Phases	2		2	6								7
Actuated Green, G (s)		46.0	46.0	56.0	56.0			16.0			30.0	30.0
Effective Green, g (s)		48.0	48.0	58.0	58.0			18.0			32.0	32.0
Actuated g/C Ratio		0.40	0.40	0.48	0.48			0.15			0.27	0.27
Clearance Time (s)		6.0	6.0	5.0	6.0			6.0			6.0	6.0
Lane Grp Cap (vph)		609	482	308	671			191			380	298
v/s Ratio Prot				0.01	c0.46			c0.04			c0.26	
v/s Ratio Perm		0.23	0.00	0.09								0.00
v/c Ratio		0.57	0.01	0.21	0.96			0.23			0.98	0.01
Uniform Delay, d1		28.0	21.7	18.0	29.8			44.9			43.6	32.3
Progression Factor		0.34	1.00	1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2		3.4	0.0	1.6	25.9			2.9			40.6	0.0
Delay (s)		12.9	21.7	19.6	55.8			47.8			84.2	32.4
Level of Service		B	C	B	E			D			F	C
Approach Delay (s)		13.1			52.5			47.8			83.0	
Approach LOS		B			D			D			F	

Intersection Summary			
HCM 2000 Control Delay	50.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		

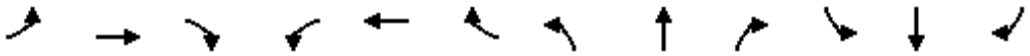
c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	0	78	88	0	19	8
Future Volume (vph)	0	78	88	0	19	8
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	91	102	0	22	9

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	91	102	31
Volume Left (vph)	0	0	22
Volume Right (vph)	0	0	9
Hadj (s)	0.10	0.08	-0.03
Departure Headway (s)	4.2	4.1	4.3
Degree Utilization, x	0.11	0.12	0.04
Capacity (veh/h)	848	855	796
Control Delay (s)	7.7	7.7	7.4
Approach Delay (s)	7.7	7.7	7.4
Approach LOS	A	A	A

Intersection Summary			
Delay	7.6		
Level of Service	A		
Intersection Capacity Utilization	15.0%	ICU Level of Service	A
Analysis Period (min)	15		



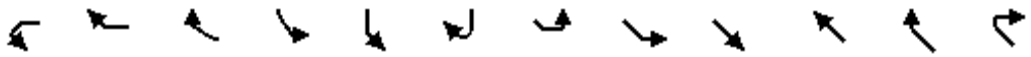
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	3	0	1	0	656	3	1	696	0
Future Volume (Veh/h)	0	0	0	3	0	1	0	656	3	1	696	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			9%			-9%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	0	0	3	0	1	0	705	3	1	748	0
Pedestrians		7			5							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		1			0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											196	
pX, platoon unblocked												
vC, conflicting volume	1110	1470	381	1088	1468	359	755			713		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1110	1470	381	1088	1468	359	755			713		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	98	100	100	100			100		
cM capacity (veh/h)	164	127	619	171	127	641	860			892		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	0	4	352	356	375	374
Volume Left	0	3	0	0	1	0
Volume Right	0	1	0	3	0	0
cSH	1700	209	860	1700	892	1700
Volume to Capacity	0.00	0.02	0.00	0.21	0.00	0.22
Queue Length 95th (ft)	0	1	0	0	0	0
Control Delay (s)	0.0	22.6	0.0	0.0	0.0	0.0
Lane LOS	A	C			A	
Approach Delay (s)	0.0	22.6	0.0		0.0	
Approach LOS	A	C				

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	29.9%	ICU Level of Service	A	
Analysis Period (min)	15			

HCM Signalized Intersection Capacity Analysis
3126: Montana Ave NE & Bryant St NE & 17th St NE

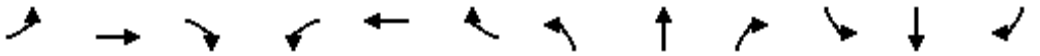
05/31/2019



Movement	WBL	WBR	WBR2	SBL2	SBL	SBR	SEL2	SEL	SET	NWT	NWR	NWR2
Lane Configurations												
Traffic Volume (vph)	2	21	1	2	9	2	2	24	317	490	13	7
Future Volume (vph)	2	21	1	2	9	2	2	24	317	490	13	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	15	15	15	15	15	15	12	12	12	10	10	10
Grade (%)	8%				-3%				-5%	9%		
Total Lost time (s)	5.0				4.0				5.0	5.0	5.0	
Lane Util. Factor	1.00				1.00				1.00	1.00	1.00	
Frpb, ped/bikes	0.97				1.00				1.00	1.00	0.97	
Flpb, ped/bikes	1.00				0.98				1.00	1.00	1.00	
Frt	0.88				0.98				1.00	1.00	0.85	
Flt Protected	1.00				0.96				1.00	1.00	1.00	
Satd. Flow (prot)	1376				1577				1529	1372	1137	
Flt Permitted	0.99				0.97				0.94	1.00	1.00	
Satd. Flow (perm)	1363				1601				1441	1372	1137	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	2	23	1	2	10	2	2	26	348	538	14	8
RTOR Reduction (vph)	21	0	0	0	12	0	0	0	0	0	10	0
Lane Group Flow (vph)	5	0	0	0	2	0	0	0	376	538	12	0
Confl. Peds. (#/hr)		2	2	2	4	2	2	4			2	4
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	3%	0%	0%	0%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm			Perm	Prot		Perm	Perm	NA	NA	Perm	
Protected Phases					4				2	6		
Permitted Phases	3			4			2	2			6	
Actuated Green, G (s)	20.0				15.0				65.0	65.0	65.0	
Effective Green, g (s)	22.0				17.0				67.0	67.0	67.0	
Actuated g/C Ratio	0.18				0.14				0.56	0.56	0.56	
Clearance Time (s)	7.0				6.0				7.0	7.0	7.0	
Lane Grp Cap (vph)	249				226				804	766	634	
v/s Ratio Prot										c0.39		
v/s Ratio Perm	c0.00				c0.00				0.26		0.01	
v/c Ratio	0.02				0.01				0.47	0.70	0.02	
Uniform Delay, d1	40.2				44.3				15.8	19.3	11.8	
Progression Factor	1.00				1.00				1.00	0.77	1.00	
Incremental Delay, d2	0.1				0.1				2.0	3.6	0.0	
Delay (s)	40.3				44.3				17.8	18.3	11.9	
Level of Service	D				D				B	B	B	
Approach Delay (s)	40.3				44.3				17.8	18.1		
Approach LOS	D				D				B	B		

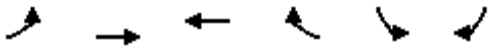
Intersection Summary			
HCM 2000 Control Delay	18.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	314	11	47	469	209	3	26	40	89	25	20
Future Volume (vph)	15	314	11	47	469	209	3	26	40	89	25	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	9	10	10	10	16	12	16	11	11	11
Grade (%)		-9%			9%			-4%			-6%	
Total Lost time (s)		4.0	4.0	3.0	4.0			4.0			4.0	4.0
Lane Util. Factor		1.00	1.00	1.00	1.00			1.00			1.00	1.00
Frpb, ped/bikes		1.00	0.95	1.00	0.99			0.98			1.00	0.94
Flpb, ped/bikes		1.00	1.00	1.00	1.00			1.00			1.00	1.00
Frt		1.00	0.85	1.00	0.95			0.92			1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			1.00			0.96	1.00
Satd. Flow (prot)		1517	1172	1442	1441			1401			1452	1162
Flt Permitted		0.96	1.00	0.44	1.00			1.00			0.96	1.00
Satd. Flow (perm)		1458	1172	661	1441			1401			1452	1162
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	16	327	11	49	489	218	3	27	42	93	26	21
RTOR Reduction (vph)	0	0	6	0	13	0	0	36	0	0	0	17
Lane Group Flow (vph)	0	343	5	49	694	0	0	36	0	0	119	4
Confl. Peds. (#/hr)	2		7	7		2	11		8	8		11
Heavy Vehicles (%)	7%	2%	0%	0%	0%	0%	0%	0%	0%	2%	0%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	0	0
Parking (#/hr)	0	0	0				0	0	0	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Split	NA		Split	NA	Perm
Protected Phases		2		1	6		8	8		7	7	
Permitted Phases	2		2	6								7
Actuated Green, G (s)		57.0	57.0	67.0	67.0			16.0			19.0	19.0
Effective Green, g (s)		59.0	59.0	69.0	69.0			18.0			21.0	21.0
Actuated g/C Ratio		0.49	0.49	0.58	0.58			0.15			0.18	0.18
Clearance Time (s)		6.0	6.0	5.0	6.0			6.0			6.0	6.0
Lane Grp Cap (vph)		716	576	425	828			210			254	203
v/s Ratio Prot				0.01	c0.48			c0.03			c0.08	
v/s Ratio Perm		0.24	0.00	0.06								0.00
v/c Ratio		0.48	0.01	0.12	0.84			0.17			0.47	0.02
Uniform Delay, d1		20.3	15.6	12.0	20.9			44.5			44.5	41.0
Progression Factor		0.25	1.00	1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2		2.1	0.0	0.6	9.9			1.8			6.1	0.2
Delay (s)		7.1	15.6	12.6	30.8			46.3			50.6	41.1
Level of Service		A	B	B	C			D			D	D
Approach Delay (s)		7.4			29.6			46.3			49.2	
Approach LOS		A			C			D			D	

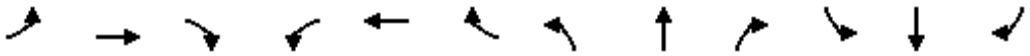
Intersection Summary			
HCM 2000 Control Delay	26.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	0	52	83	0	9	7
Future Volume (vph)	0	52	83	0	9	7
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	0	62	99	0	11	8

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	62	99	19
Volume Left (vph)	0	0	11
Volume Right (vph)	0	0	8
Hadj (s)	0.00	0.00	-0.04
Departure Headway (s)	4.0	4.0	4.2
Degree Utilization, x	0.07	0.11	0.02
Capacity (veh/h)	878	889	817
Control Delay (s)	7.3	7.5	7.3
Approach Delay (s)	7.3	7.5	7.3
Approach LOS	A	A	A

Intersection Summary			
Delay	7.4		
Level of Service	A		
Intersection Capacity Utilization	14.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	4	3	0	6	1	722	10	0	456	1
Future Volume (Veh/h)	2	0	4	3	0	6	1	722	10	0	456	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			9%			-9%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	2	0	4	3	0	6	1	768	11	0	485	1
Pedestrians		14			5			2			3	
Lane Width (ft)		12.0			12.0			10.0			10.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											196	
pX, platoon unblocked												
vC, conflicting volume	894	1286	259	1029	1280	398	500			784		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	894	1286	259	1029	1280	398	500			784		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	99	98	100	99	100			100		
cM capacity (veh/h)	230	163	736	186	164	604	1062			840		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	6	9	385	395	242	244
Volume Left	2	3	1	0	0	0
Volume Right	4	6	0	11	0	1
cSH	425	346	1062	1700	840	1700
Volume to Capacity	0.01	0.03	0.00	0.23	0.00	0.14
Queue Length 95th (ft)	1	2	0	0	0	0
Control Delay (s)	13.6	15.7	0.0	0.0	0.0	0.0
Lane LOS	B	C	A			
Approach Delay (s)	13.6	15.7	0.0		0.0	
Approach LOS	B	C				

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	31.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Appendix C

2021 Future Conditions Analysis

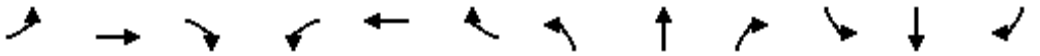
HCM Signalized Intersection Capacity Analysis
3126: Montana Ave NE & Bryant St NE & 17th St NE

05/31/2019

Movement	WBL	WBR	WBR2	SBL2	SBL	SBR	SEL2	SEL	SET	NWT	NWR	NWR2
Lane Configurations												
Traffic Volume (vph)	1	25	3	3	16	6	3	20	293	437	8	2
Future Volume (vph)	1	25	3	3	16	6	3	20	293	437	8	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	15	15	15	15	15	15	12	12	12	10	10	10
Grade (%)	8%				-3%				-5%	9%		
Total Lost time (s)	5.0				4.0				5.0	5.0	5.0	
Lane Util. Factor	1.00				1.00				1.00	1.00	1.00	
Frpb, ped/bikes	0.98				1.00				1.00	1.00	0.98	
Flpb, ped/bikes	1.00				0.99				1.00	1.00	1.00	
Frt	0.87				0.97				1.00	1.00	0.85	
Flt Protected	1.00				0.96				1.00	1.00	1.00	
Satd. Flow (prot)	1379				1530				1520	1306	1137	
Flt Permitted	1.00				0.98				0.94	1.00	1.00	
Satd. Flow (perm)	1376				1559				1441	1306	1137	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	1	29	3	3	19	7	3	23	341	508	9	2
RTOR Reduction (vph)	26	0	0	0	24	0	0	0	0	0	6	0
Lane Group Flow (vph)	7	0	0	0	5	0	0	0	367	508	5	0
Confl. Peds. (#/hr)			1	4			1	4			1	4
Heavy Vehicles (%)	0%	0%	0%	33%	0%	0%	0%	10%	3%	5%	0%	0%
Parking (#/hr)	0	0	0	0	0	0		0	0	0	0	0
Turn Type	Perm			Perm	Prot		Perm	Perm	NA	NA	Perm	
Protected Phases					4				2	6		
Permitted Phases	3			4			2	2			6	
Actuated Green, G (s)	25.0				18.0				57.0	57.0	57.0	
Effective Green, g (s)	27.0				20.0				59.0	59.0	59.0	
Actuated g/C Ratio	0.22				0.17				0.49	0.49	0.49	
Clearance Time (s)	7.0				6.0				7.0	7.0	7.0	
Lane Grp Cap (vph)	309				259				708	642	559	
v/s Ratio Prot										c0.39		
v/s Ratio Perm	c0.01				c0.00				0.25		0.00	
v/c Ratio	0.02				0.02				0.52	0.79	0.01	
Uniform Delay, d1	36.2				41.8				20.8	25.4	15.6	
Progression Factor	1.00				1.00				1.00	0.70	1.00	
Incremental Delay, d2	0.1				0.1				2.7	4.6	0.0	
Delay (s)	36.4				41.9				23.5	22.4	15.6	
Level of Service	D				D				C	C	B	
Approach Delay (s)	36.4				41.9				23.5	22.2		
Approach LOS	D				D				C	C		

Intersection Summary			
HCM 2000 Control Delay	23.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

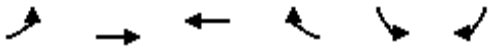
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	1	317	6	61	432	170	10	20	72	316	26	8
Future Volume (vph)	1	317	6	61	432	170	10	20	72	316	26	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	9	10	10	10	16	12	16	11	11	11
Grade (%)		-9%			9%			-4%			-6%	
Total Lost time (s)		4.0	4.0	3.0	4.0			4.0			4.0	4.0
Lane Util. Factor		1.00	1.00	1.00	1.00			1.00			1.00	1.00
Frpb, ped/bikes		1.00	0.98	1.00	0.99			0.98			1.00	0.97
Flpb, ped/bikes		1.00	1.00	1.00	1.00			1.00			1.00	1.00
Frt		1.00	0.85	1.00	0.96			0.91			1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			1.00			0.96	1.00
Satd. Flow (prot)		1524	1205	1353	1389			1277			1425	1119
Flt Permitted		1.00	1.00	0.38	1.00			1.00			0.96	1.00
Satd. Flow (perm)		1523	1205	539	1389			1277			1425	1119
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	1	345	7	66	470	185	11	22	78	343	28	9
RTOR Reduction (vph)	0	0	4	0	12	0	0	66	0	0	0	7
Lane Group Flow (vph)	0	346	3	66	643	0	0	45	0	0	371	2
Confl. Peds. (#/hr)							2		7	7		2
Confl. Bikes (#/hr)			1			1			2			1
Heavy Vehicles (%)	0%	2%	0%	7%	5%	3%	0%	5%	8%	3%	0%	13%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	4	0	0	0	0
Parking (#/hr)	0	0	0				0	0	0	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Split	NA		Split	NA	Perm
Protected Phases		2		1	6		8	8		7	7	
Permitted Phases	2		2	6								7
Actuated Green, G (s)		46.0	46.0	56.0	56.0			16.0			30.0	30.0
Effective Green, g (s)		48.0	48.0	58.0	58.0			18.0			32.0	32.0
Actuated g/C Ratio		0.40	0.40	0.48	0.48			0.15			0.27	0.27
Clearance Time (s)		6.0	6.0	5.0	6.0			6.0			6.0	6.0
Lane Grp Cap (vph)		609	482	308	671			191			380	298
v/s Ratio Prot				0.01	c0.46			c0.04			c0.26	
v/s Ratio Perm		0.23	0.00	0.09								0.00
v/c Ratio		0.57	0.01	0.21	0.96			0.23			0.98	0.01
Uniform Delay, d1		28.0	21.7	18.0	29.8			44.9			43.6	32.3
Progression Factor		0.34	1.00	1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2		3.4	0.0	1.6	25.9			2.9			40.6	0.0
Delay (s)		12.9	21.7	19.6	55.8			47.8			84.2	32.4
Level of Service		B	C	B	E			D			F	C
Approach Delay (s)		13.1			52.5			47.8			83.0	
Approach LOS		B			D			D			F	

Intersection Summary			
HCM 2000 Control Delay	50.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	90.6%	ICU Level of Service	E
Analysis Period (min)	15		

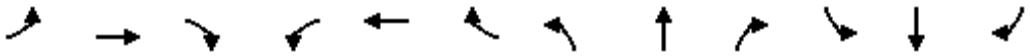
c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	0	78	88	0	19	8
Future Volume (vph)	0	78	88	0	19	8
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	0	91	102	0	22	9

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	91	102	31
Volume Left (vph)	0	0	22
Volume Right (vph)	0	0	9
Hadj (s)	0.10	0.08	-0.03
Departure Headway (s)	4.2	4.1	4.3
Degree Utilization, x	0.11	0.12	0.04
Capacity (veh/h)	848	855	796
Control Delay (s)	7.7	7.7	7.4
Approach Delay (s)	7.7	7.7	7.4
Approach LOS	A	A	A

Intersection Summary			
Delay	7.6		
Level of Service	A		
Intersection Capacity Utilization	15.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	3	0	1	0	656	3	1	696	0
Future Volume (Veh/h)	0	0	0	3	0	1	0	656	3	1	696	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			9%			-9%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	0	0	0	3	0	1	0	705	3	1	748	0
Pedestrians		7			5							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		1			0							
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											196	
pX, platoon unblocked												
vC, conflicting volume	1110	1470	381	1088	1468	359	755			713		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1110	1470	381	1088	1468	359	755			713		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	98	100	100	100			100		
cM capacity (veh/h)	164	127	619	171	127	641	860			892		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	0	4	352	356	375	374
Volume Left	0	3	0	0	1	0
Volume Right	0	1	0	3	0	0
cSH	1700	209	860	1700	892	1700
Volume to Capacity	0.00	0.02	0.00	0.21	0.00	0.22
Queue Length 95th (ft)	0	1	0	0	0	0
Control Delay (s)	0.0	22.6	0.0	0.0	0.0	0.0
Lane LOS	A	C			A	
Approach Delay (s)	0.0	22.6	0.0		0.0	
Approach LOS	A	C				

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	29.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	97	0	0	88	0	0
Future Volume (Veh/h)	97	0	0	88	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			4%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	108	0	0	98	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				191		
pX, platoon unblocked					1.00	
vC, conflicting volume			108		206	108
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			108		200	108
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1483		785	946

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	108	98	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1483	1700
Volume to Capacity	0.06	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	8.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	97	0	0	88	0	0
Future Volume (Veh/h)	97	0	0	88	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			4%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	108	0	0	98	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				418		
pX, platoon unblocked						
vC, conflicting volume			108		206	108
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			108		206	108
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1483		782	946

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	108	98	0
Volume Left	0	0	0
Volume Right	0	0	0
cSH	1700	1483	1700
Volume to Capacity	0.06	0.00	0.00
Queue Length 95th (ft)	0	0	0
Control Delay (s)	0.0	0.0	0.0
Lane LOS			A
Approach Delay (s)	0.0	0.0	0.0
Approach LOS			A

Intersection Summary			
Average Delay	0.0		
Intersection Capacity Utilization	15.1%	ICU Level of Service	A
Analysis Period (min)	15		

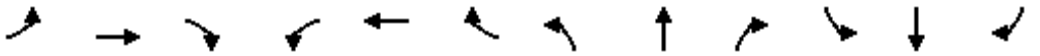
HCM Signalized Intersection Capacity Analysis
3126: Montana Ave NE & Bryant St NE & 17th St NE

05/31/2019

Movement	WBL	WBR	WBR2	SBL2	SBL	SBR	SEL2	SEL	SET	NWT	NWR	NWR2
Lane Configurations												
Traffic Volume (vph)	2	21	1	2	9	2	2	24	346	491	13	7
Future Volume (vph)	2	21	1	2	9	2	2	24	346	491	13	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	15	15	15	15	15	15	12	12	12	10	10	10
Grade (%)	8%				-3%				-5%	9%		
Total Lost time (s)	5.0				4.0				5.0	5.0	5.0	
Lane Util. Factor	1.00				1.00				1.00	1.00	1.00	
Frpb, ped/bikes	0.97				1.00				1.00	1.00	0.97	
Flpb, ped/bikes	1.00				0.98				1.00	1.00	1.00	
Frt	0.88				0.98				1.00	1.00	0.85	
Flt Protected	1.00				0.96				1.00	1.00	1.00	
Satd. Flow (prot)	1376				1577				1426	1372	1137	
Flt Permitted	0.99				0.97				0.94	1.00	1.00	
Satd. Flow (perm)	1363				1601				1350	1372	1137	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	2	23	1	2	10	2	2	26	380	540	14	8
RTOR Reduction (vph)	21	0	0	0	12	0	0	0	0	0	10	0
Lane Group Flow (vph)	5	0	0	0	2	0	0	0	408	540	12	0
Confl. Peds. (#/hr)		2	2	2	4	2	2	4			2	4
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	11%	0%	0%	0%
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm			Perm	Prot		Perm	Perm	NA	NA	Perm	
Protected Phases					4				2	6		
Permitted Phases	3			4			2	2			6	
Actuated Green, G (s)	20.0				15.0				65.0	65.0	65.0	
Effective Green, g (s)	22.0				17.0				67.0	67.0	67.0	
Actuated g/C Ratio	0.18				0.14				0.56	0.56	0.56	
Clearance Time (s)	7.0				6.0				7.0	7.0	7.0	
Lane Grp Cap (vph)	249				226				753	766	634	
v/s Ratio Prot										c0.39		
v/s Ratio Perm	c0.00				c0.00				0.30		0.01	
v/c Ratio	0.02				0.01				0.54	0.70	0.02	
Uniform Delay, d1	40.2				44.3				16.8	19.3	11.8	
Progression Factor	1.00				1.00				1.00	0.77	1.00	
Incremental Delay, d2	0.1				0.1				2.8	3.6	0.0	
Delay (s)	40.3				44.3				19.6	18.4	11.9	
Level of Service	D				D				B	B	B	
Approach Delay (s)	40.3				44.3				19.6	18.2		
Approach LOS	D				D				B	B		

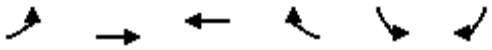
Intersection Summary			
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	15	314	40	76	469	209	4	35	54	89	25	20
Future Volume (vph)	15	314	40	76	469	209	4	35	54	89	25	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	9	10	10	10	16	12	16	11	11	11
Grade (%)		-9%			9%			-4%			-6%	
Total Lost time (s)		4.0	4.0	3.0	4.0			4.0			4.0	4.0
Lane Util. Factor		1.00	1.00	1.00	1.00			1.00			1.00	1.00
Frpb, ped/bikes		1.00	0.95	1.00	0.99			0.98			1.00	0.94
Flpb, ped/bikes		1.00	1.00	1.00	1.00			1.00			1.00	1.00
Frt		1.00	0.85	1.00	0.95			0.92			1.00	0.85
Flt Protected		1.00	1.00	0.95	1.00			1.00			0.96	1.00
Satd. Flow (prot)		1517	681	1045	1441			1401			1452	1162
Flt Permitted		0.96	1.00	0.44	1.00			1.00			0.96	1.00
Satd. Flow (perm)		1458	681	479	1441			1401			1452	1162
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	16	327	42	79	489	218	4	36	56	93	26	21
RTOR Reduction (vph)	0	0	21	0	13	0	0	42	0	0	0	17
Lane Group Flow (vph)	0	343	21	79	694	0	0	54	0	0	119	4
Confl. Peds. (#/hr)	2		7	7		2	11		8	8		11
Heavy Vehicles (%)	7%	2%	72%	38%	0%	0%	0%	0%	0%	2%	0%	5%
Bus Blockages (#/hr)	0	0	0	0	0	0	0	3	0	0	0	0
Parking (#/hr)	0	0	0				0	0	0	0	0	0
Turn Type	Perm	NA	Perm	pm+pt	NA		Split	NA		Split	NA	Perm
Protected Phases		2		1	6		8	8		7	7	
Permitted Phases	2		2	6								7
Actuated Green, G (s)		57.0	57.0	67.0	67.0			16.0			19.0	19.0
Effective Green, g (s)		59.0	59.0	69.0	69.0			18.0			21.0	21.0
Actuated g/C Ratio		0.49	0.49	0.58	0.58			0.15			0.18	0.18
Clearance Time (s)		6.0	6.0	5.0	6.0			6.0			6.0	6.0
Lane Grp Cap (vph)		716	334	308	828			210			254	203
v/s Ratio Prot				0.01	c0.48			c0.04			c0.08	
v/s Ratio Perm		0.24	0.03	0.13								0.00
v/c Ratio		0.48	0.06	0.26	0.84			0.26			0.47	0.02
Uniform Delay, d1		20.3	16.0	12.6	20.9			45.1			44.5	41.0
Progression Factor		0.24	1.00	1.00	1.00			1.00			1.00	1.00
Incremental Delay, d2		2.0	0.3	2.0	9.9			3.0			6.1	0.2
Delay (s)		6.8	16.3	14.6	30.8			48.1			50.6	41.1
Level of Service		A	B	B	C			D			D	D
Approach Delay (s)		7.8			29.2			48.1			49.2	
Approach LOS		A			C			D			D	

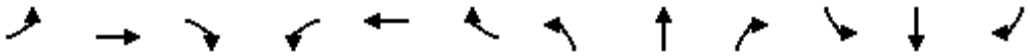
Intersection Summary			
HCM 2000 Control Delay	26.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	0	52	83	0	9	7
Future Volume (vph)	0	52	83	0	9	7
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	0	62	99	0	11	8

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	62	99	19
Volume Left (vph)	0	0	11
Volume Right (vph)	0	0	8
Hadj (s)	0.00	0.00	-0.04
Departure Headway (s)	4.0	4.0	4.2
Degree Utilization, x	0.07	0.11	0.02
Capacity (veh/h)	878	889	817
Control Delay (s)	7.3	7.5	7.3
Approach Delay (s)	7.3	7.5	7.3
Approach LOS	A	A	A

Intersection Summary			
Delay	7.4		
Level of Service	A		
Intersection Capacity Utilization	14.7%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	0	4	3	0	6	1	751	10	0	470	1
Future Volume (Veh/h)	2	0	4	3	0	6	1	751	10	0	470	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			9%			-9%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	2	0	4	3	0	6	1	799	11	0	500	1
Pedestrians		14			5			2			3	
Lane Width (ft)		12.0			12.0			10.0			10.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)											196	
pX, platoon unblocked												
vC, conflicting volume	925	1332	266	1068	1326	413	515			815		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	925	1332	266	1068	1326	413	515			815		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	99	98	100	99	100			100		
cM capacity (veh/h)	219	153	728	175	154	590	1049			818		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	6	9	400	410	250	251
Volume Left	2	3	1	0	0	0
Volume Right	4	6	0	11	0	1
cSH	410	329	1049	1700	818	1700
Volume to Capacity	0.01	0.03	0.00	0.24	0.00	0.15
Queue Length 95th (ft)	1	2	0	0	0	0
Control Delay (s)	13.9	16.2	0.0	0.0	0.0	0.0
Lane LOS	B	C	A			
Approach Delay (s)	13.9	16.2	0.0		0.0	
Approach LOS	B	C				

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	32.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	85	0	58	83	0	0
Future Volume (Veh/h)	85	0	58	83	0	0
Sign Control	Free			Free	Stop	
Grade	-4%			4%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	94	0	64	92	0	0
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				191		
pX, platoon unblocked						
vC, conflicting volume			94		314	94
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			94		314	94
tC, single (s)			5.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			3.1		3.5	3.3
p0 queue free %			94		100	100
cM capacity (veh/h)			1058		638	963

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	94	156	0
Volume Left	0	64	0
Volume Right	0	0	0
cSH	1700	1058	1700
Volume to Capacity	0.06	0.06	0.00
Queue Length 95th (ft)	0	5	0
Control Delay (s)	0.0	3.9	0.0
Lane LOS		A	A
Approach Delay (s)	0.0	3.9	0.0
Approach LOS			A

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	17.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	61	0	0	83	0	24
Future Volume (Veh/h)	61	0	0	83	0	24
Sign Control	Free			Free	Stop	
Grade	-4%			4%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	68	0	0	92	0	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (ft)				417		
pX, platoon unblocked						
vC, conflicting volume			68		160	68
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			68		160	68
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	97
cM capacity (veh/h)			1533		836	1001

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	68	92	27
Volume Left	0	0	0
Volume Right	0	0	27
cSH	1700	1533	1001
Volume to Capacity	0.04	0.00	0.03
Queue Length 95th (ft)	0	0	2
Control Delay (s)	0.0	0.0	8.7
Lane LOS			A
Approach Delay (s)	0.0	0.0	8.7
Approach LOS			A

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	14.7%	ICU Level of Service	A
Analysis Period (min)	15		