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From: Michael J. Workosky, PTP, TOPS, TSOS
Brant T. McKinney
Wells + Associates, Inc.

Date: December 5, 2024

Re: Pike Center
Supplemental Traffic Analysis;
Montgomery County, Maryland

Introduction

This memorandum summarizes a supplemental traffic analysis for Pike Center. The project is located on the east side of Rockville Pike (MD Route 355) and north of Bou Avenue in Montgomery County, Maryland.

The existing retail shopping center of approximately 81,000 square feet (S.F.) and commercial uses is proposed to be redeveloped with up to 290 mid-rise and 470 high-rise apartment dwelling units and up to 90,000 S.F. of retail space (including a supermarket). The proposed development is expected to occur in two phases with phase one expected to be built in 2034 and phase two in 2039. The phase 1 and phase 2 site plans are shown in Attachment I.

The purpose of the study is to investigate potential mitigation measures at the Rockville Pike/Bou Avenue intersection. This intersection was initially identified in the Local Area Transportation Review (LATR) study, dated October 21, 2024 to exceed the intersection delay threshold of 71 seconds during the PM peak under buildout conditions in phase 2 expected in year 2039.

Based on follow up comments and discussions with both Maryland State Highway (SHA) and Montgomery County Department of Transportation (MCDOT), adjustments to other study intersections were required, and are provided in this supplemental report.

MEMORANDUM

This supplemental report addresses the motor system vehicle test. The remaining non-auto elements (pedestrian, bicycle, and transit) tests were previously evaluated as part of the October 2024 LATR.

Traffic Volumes, Forecasts, and Lane Use

A summary of the existing, background, and total future traffic volumes and lane use were extracted from the aforementioned LATR study and are contained in Attachment I. Note that the numbering for each of the figures is consistent with the LATR study for continuity purposes.

As previously presented, existing (2024), background, and future conditions for 2034 and 2039 are included in the supplemental report.

Synchro Analysis Adjustments

Based on comments provided by SHA and MCDOT, the following adjustments were made to the synchro analysis files:

- Cycle lengths were adjusted to reflect the AM and PM differences between cycles for the following intersections:
 - Intersection 5 set to 150 seconds.
 - Intersection 9 set to 80 seconds.
 - Intersection 11 set to 85 seconds due to errors in max split errors preventing 80 seconds.
 - Intersection 12 set to 150 seconds.
 - Intersection 13 set to 150 seconds.
 - Intersection 14 set to 150 seconds.
 - Intersection 15 set to 150 seconds.
 - Intersection 16 set to 150 seconds.
- Offset values were corrected according to the relevant AM and PM signal timing values for each intersection.
- Minimum split times were increased to correct errors at all intersections occurring from times below the minimum threshold.
- Maximum split times were adjusted to reflect the relevant AM and PM max split values at all intersections.

MEMORANDUM

Capacity and Queuing Analysis Summary

Updated capacity and queuing analyses were prepared for each of the aforementioned conditions based on the HCM 2000 Edition methodology for signalized and unsignalized intersections. The queuing analyses are based on five (5) SimTraffic runs in accordance with SHA procedures.

The congestion standard (HCM delay based) for intersections within the Orange North Bethesda Policy Area is an overall average vehicle delay of 71 seconds per vehicle.

The results of the analyses are summarized on Tables 1 and 2 in Attachment II and discussed in the following sections. Detailed capacity analyses are contained in Appendices A through D.

Existing 2024 and Background Conditions The results of the revised analysis indicates that under both existing and background conditions (without the site redevelopment), all the study intersections in the Orange Policy Area currently operate and would continue to operate within the 71 second per vehicle delay standard.

Vehicle queuing was evaluated at all of the study intersections. The following locations were noted where queues are critical and exceed available storage lengths at Orange Policy Area intersections noted for both existing and background conditions:

- Rockville Pike/Bou Avenue (intersection 1)
 - Westbound through-right – PM peak hour (existing/background)
 - Northbound left – PM peak hour (existing/background)
 - Southbound left – PM peak hour (existing/background)
- Rockville Pike/Pike Center Driveway (intersection 2)
 - Northbound left – PM peak hour (existing/background)
- Bou Avenue/Pike Center Driveway (intersection 10)
 - Eastbound left-through - PM peak hour (existing)
- Rockville Pike/Hubbard Drive/Plaza Driveway (intersection 15)
 - Southbound left - PM peak hour (existing/background)

Changes in queueing from existing to background conditions can be accounted for at some intersections from changes in the trip distributions and assignments associated with a change in use at the pipeline development locations.

MEMORANDUM

Total Future 2034 and 2039 Conditions The results of the revised analysis indicates that under both phase 1 and 2 conditions (with the site redevelopment), all the study intersections in the Orange Policy Area would continue to operate within the 71 second per vehicle delay standard without further improvements.

As noted previously, the initial LATR report from October 2024 identified a capacity constraint at the Rockville Pike/Bou Avenue intersection during the PM peak hour under phase 2 conditions in 2039. However, as shown in this updated study, the adjustments made to the analysis files as previously described resolve this issue and the overall intersection delay would remain below 71 seconds without additional improvements.

In addition, the Critical Lane Volume (CLV) analyses indicate that all of the Orange Policy Area intersections would continue to operate within acceptable thresholds under both phase 1 and phase 2 conditions. Details are provided in the appendices.

Thus, these results indicate that the traffic generated by the application does not exceed the intersection delay or critical lane volume threshold as applicable under the Planning Board's LATR Guidelines and would not adversely impact traffic operations.

The results of the queuing analysis are summarized for future conditions at Orange Policy Area intersections. The results of the analysis show queues exceeding the available storage at the following locations:

- Rockville Pike/Bou Avenue (intersection 1)
 - Westbound through-right – PM peak hour (phase 1)
 - Northbound left – PM peak hour (phase 1)
- Rockville Pike/Pike Center Driveway (intersection 2)
 - Eastbound right – PM peak hour (phase 1)
- Bou Avenue/Pike Center Driveway (intersection 10)
 - Eastbound left-through - PM peak hour (phase 2)
- Rockville Pike/Hubbard Drive/Plaza Driveway (intersection 15)
 - Southbound left - PM peak hour (phase 1)

Note that queuing is reduced under future conditions at some locations (specifically at intersections 1 and 2) due to the shift in traffic volumes with the change in site access and signal timing coordination under phase 2 conditions.

MEMORANDUM

Each of the locations was reviewed to determine if adjustments could be made to accommodate queuing. Based on the review, each location has physical constraints that limit the ability to modify the turn lane storage. Each location, with the exception of the Bou Avenue/Pike Center Driveway (intersection 10) would ultimately accommodate the phase 2 buildout development program.

Further, while the eastbound queue at the Bou Avenue/Pike Center Driveway (intersection 10) is forecasted to exceed the storage, a second eastbound lane is provided that would allow through traffic to avoid the queue and not impact traffic operations at the Rockville Pike intersection to the west.

Conclusion

The initial LATR for Pike Center prepared in October 2024 identified a capacity constraint at the Rockville Pike/Bou Avenue intersection during the PM peak hour under phase 2 conditions in 2039. Through the review process, adjustments to the analysis files were made based on comments provided by SHA and MCDOT. As a result, the updated supplemental traffic analysis for Pike Center indicates that all of intersections within the Orange Policy Area would operate within acceptable thresholds (with overall delays of less than 71 seconds) during both the AM and PM peak hours, without additional improvements under buildout conditions in phases 1 and 2.

In addition, the Critical Lane Volume (CLV) analyses indicate that all of the Orange Policy Area intersections would continue to operate within acceptable thresholds under both phase 1 and phase 2 conditions. Therefore, the traffic generated by the application does not exceed the intersection delay or critical lane volume threshold as applicable under the Planning Board's LATR Guidelines.

Questions regarding this document should be directed to Wells + Associates.

ATTACHMENT I

FIGURES

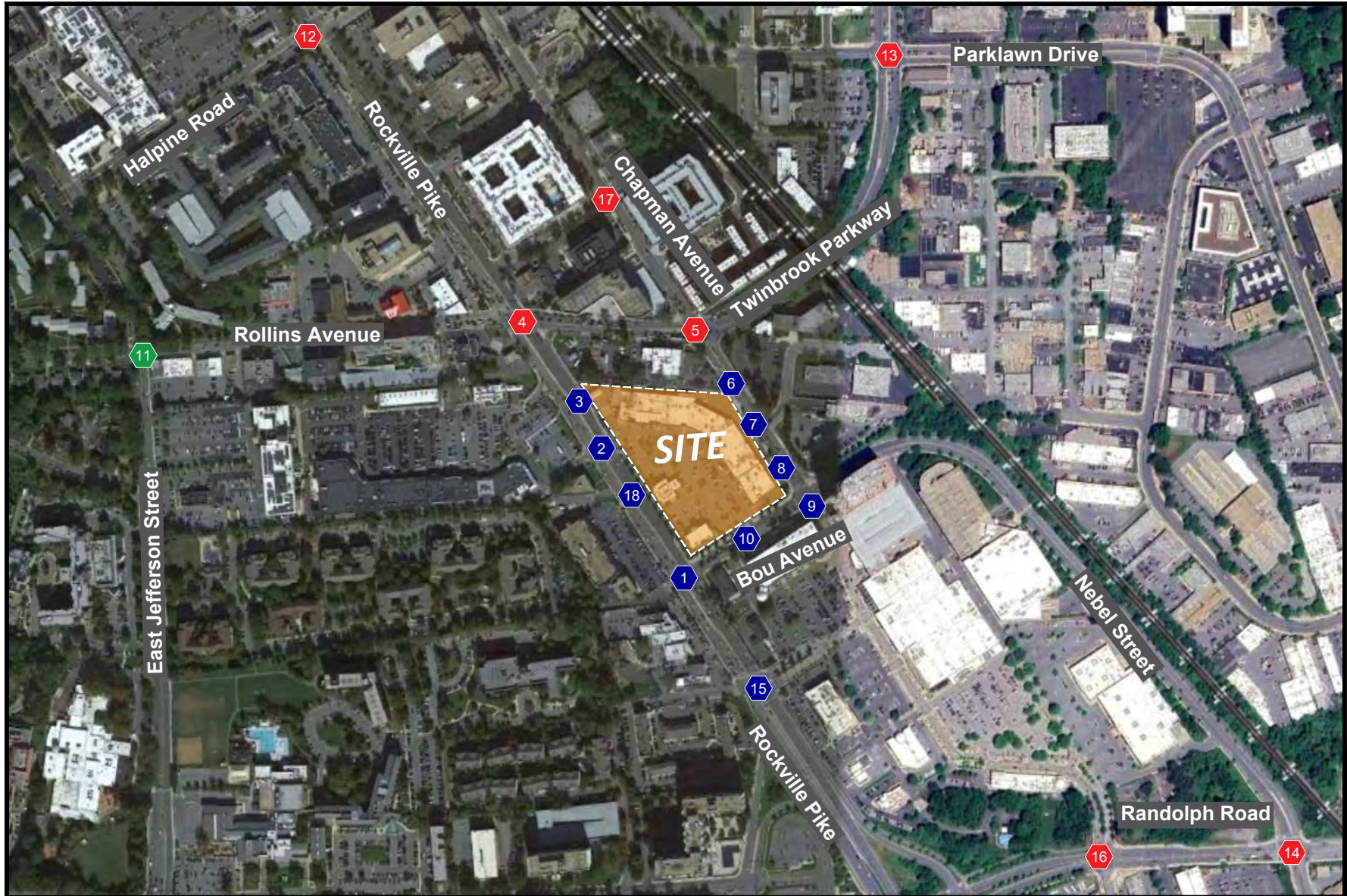


Figure 1-1
Site Location and Study Intersections

-  Orange Policy Area Study Intersection
-  Red Policy Area Study Intersection
-  City of Rockville Study Intersection



NORTH

Pike Center
Montgomery County, Maryland

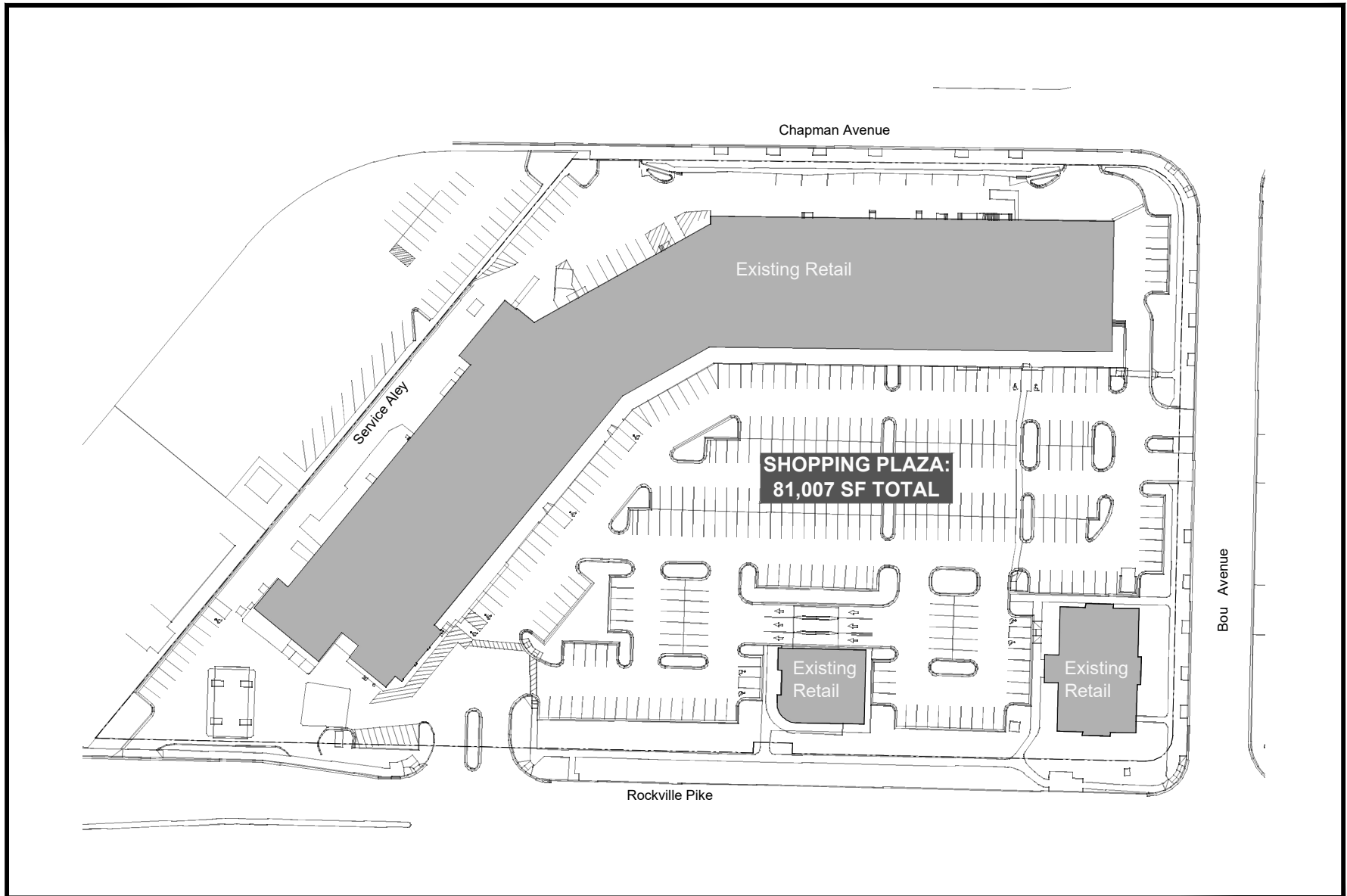


Figure 1-2
Existing Site Plan



Figure 2-1
Phase 1 Site Plan

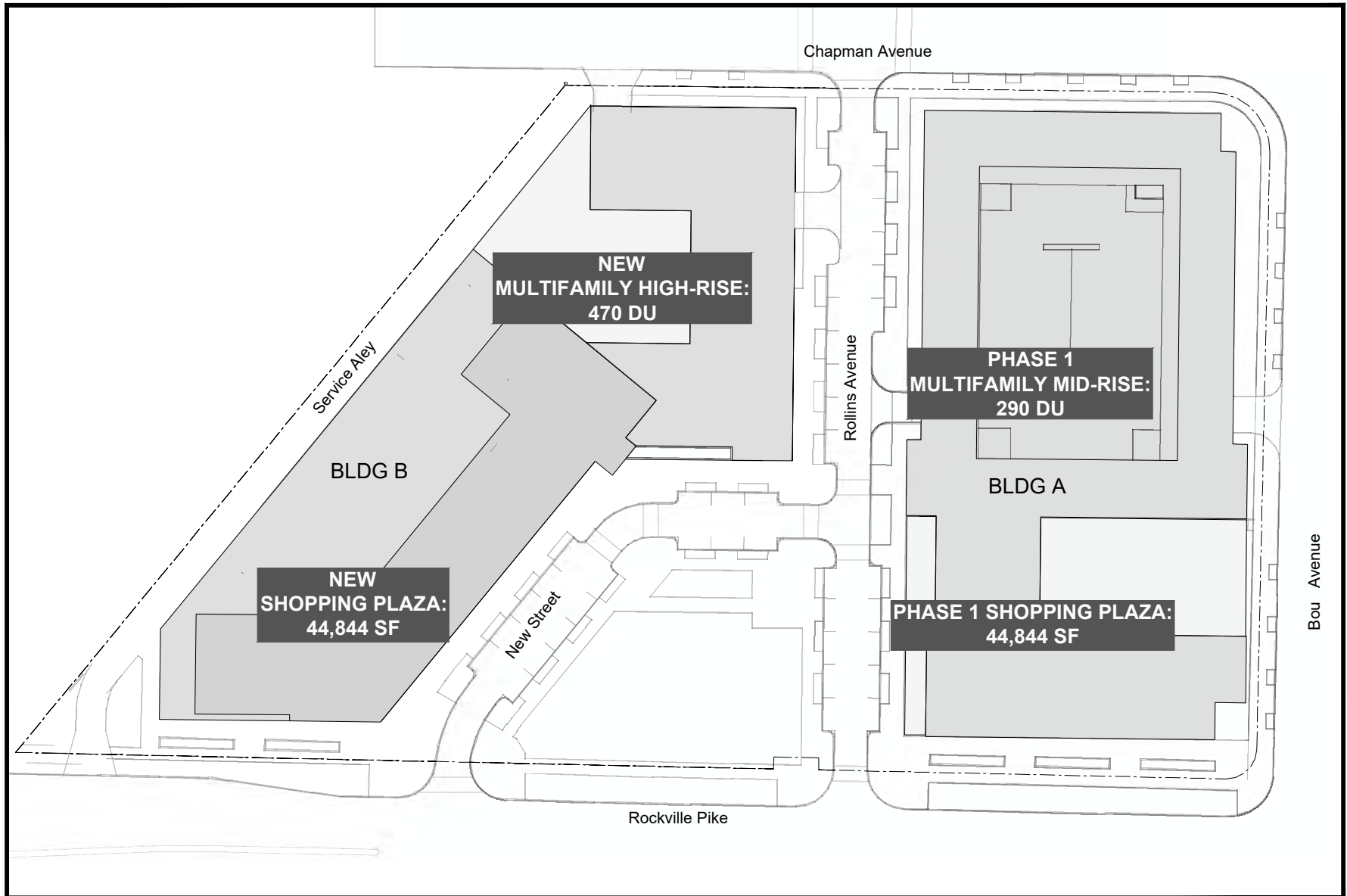


Figure 2-2
Phase 2 Site Plan



Pike Center
Montgomery County, Maryland

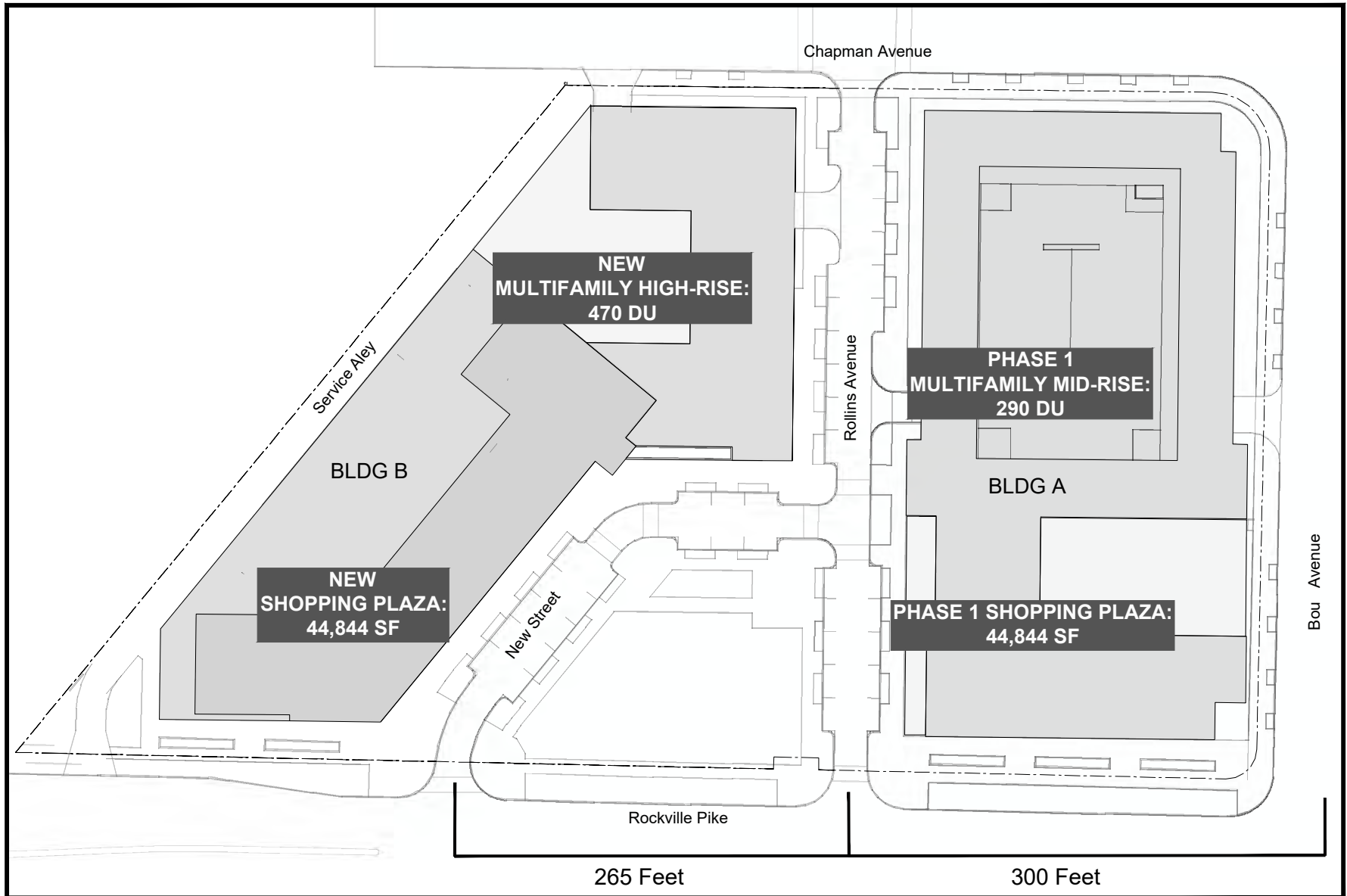


Figure 2-3
Proposed Driveway Spacing



Pike Center
Montgomery County, Maryland

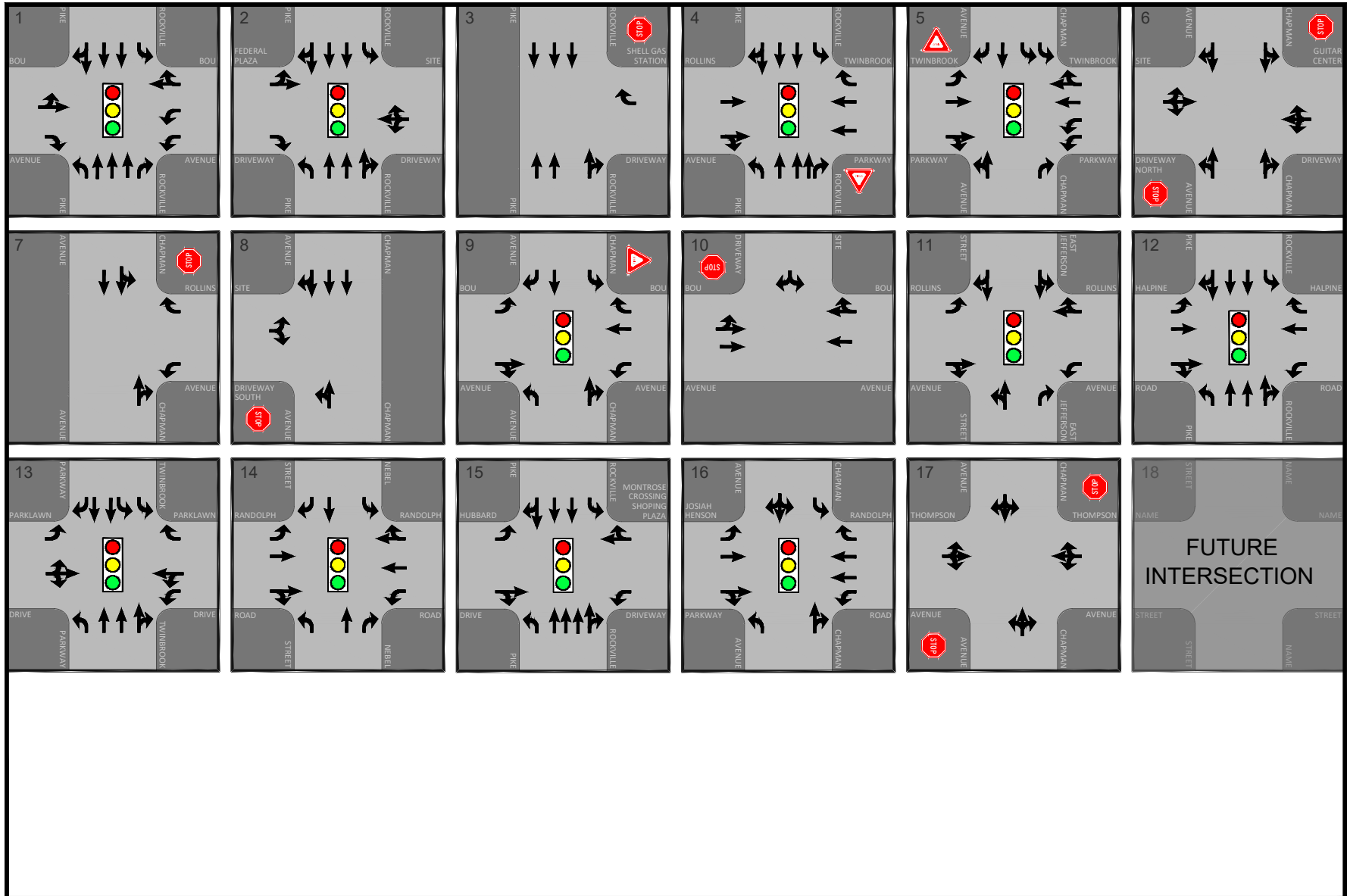


Figure 2-4
Existing Lane Use and Traffic Control



NORTH

Pike Center
Montgomery County, Maryland

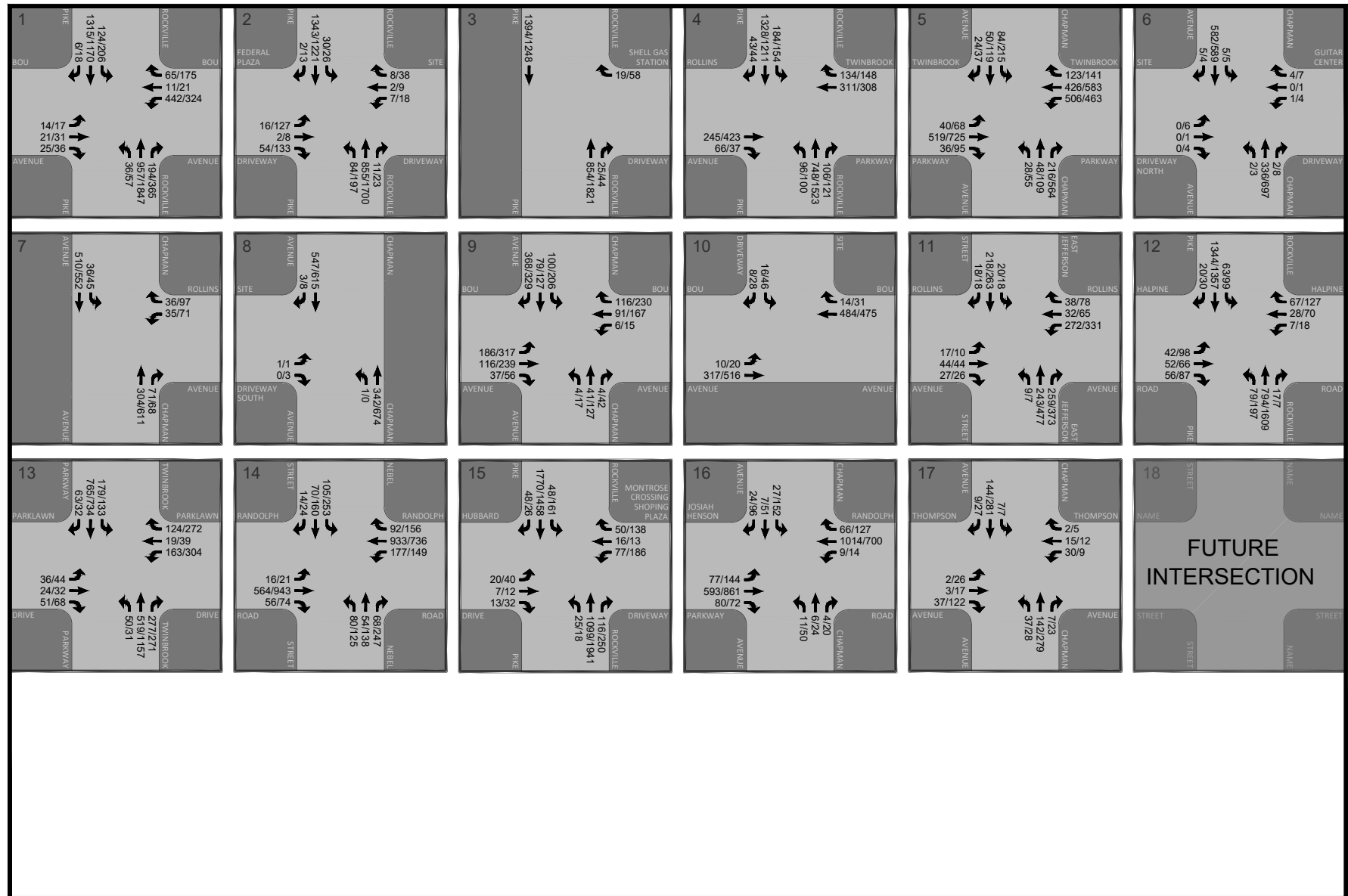


Figure 2-5
Existing Traffic Counts

AM PEAK HOUR
PM PEAK HOUR
000 / 000



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Pike Center

Montgomery County, Maryland

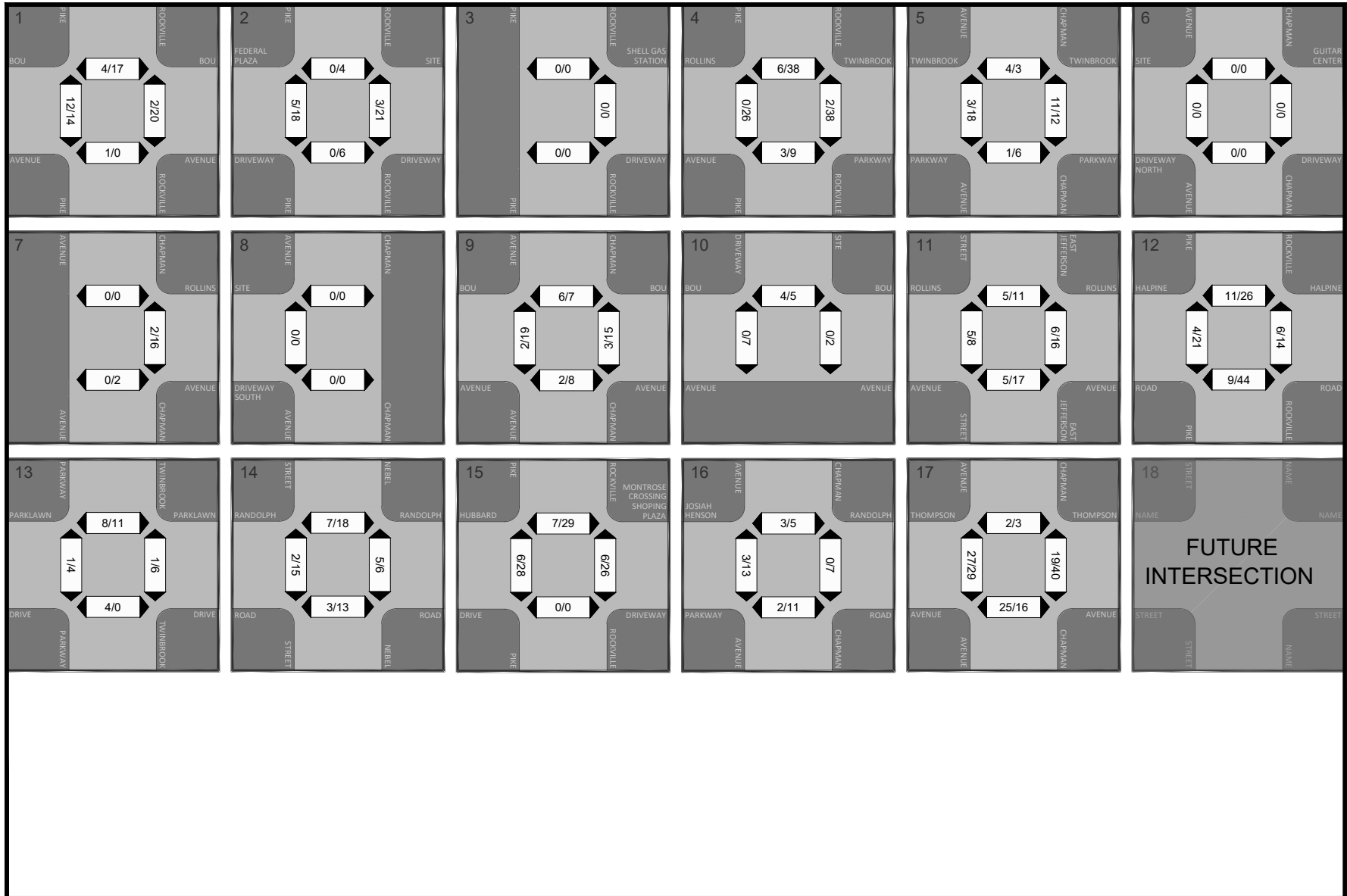


Figure 2-6
Existing Pedestrian Counts

AM PEAK HOUR
PM PEAK HOUR
000 / 000



NORTH

Pike Center

Montgomery County, Maryland

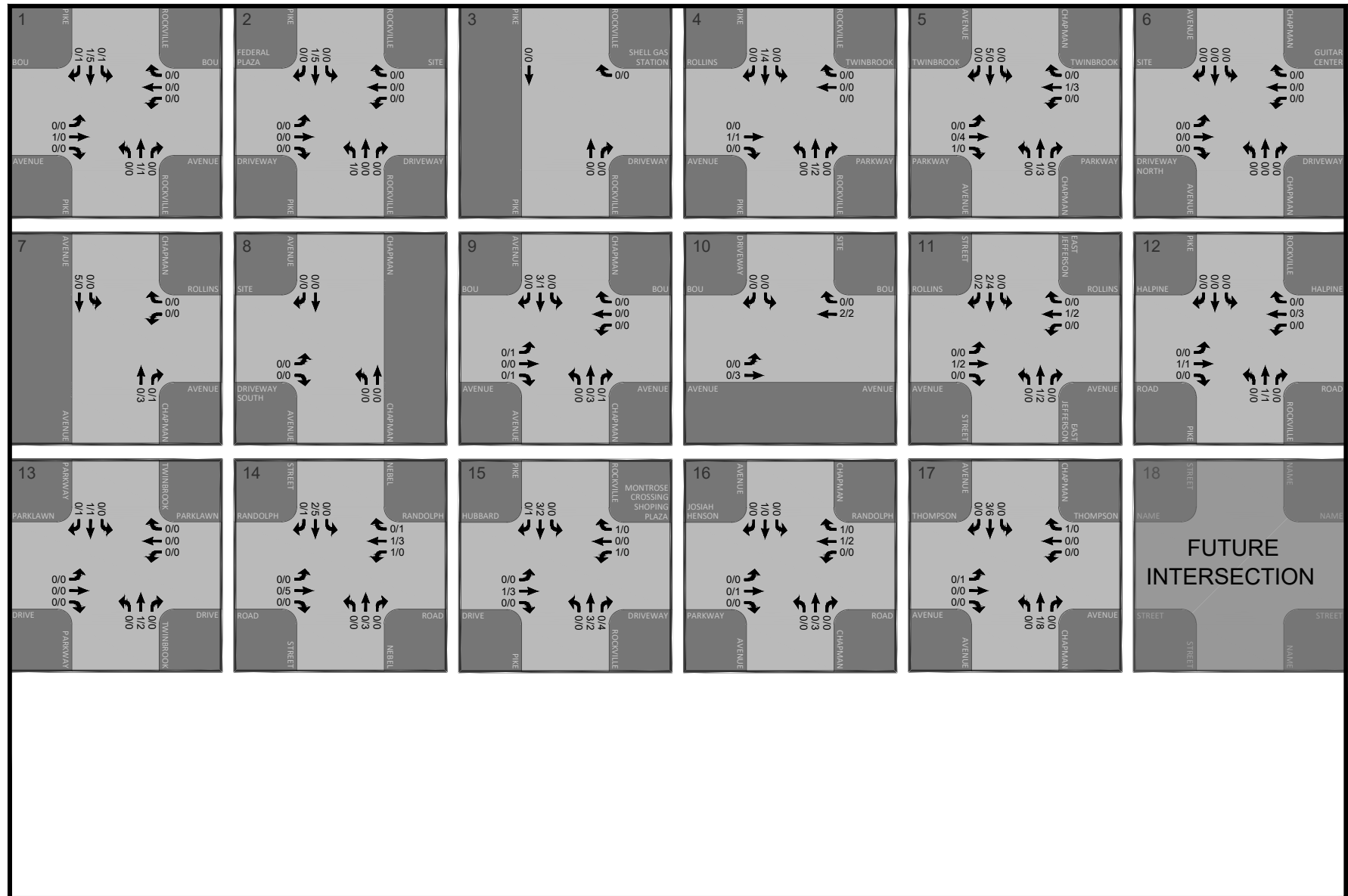


Figure 2-7
Existing Bicycle Counts

AM PEAK HOUR
PM PEAK HOUR
000 / 000



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Pike Center

Montgomery County, Maryland

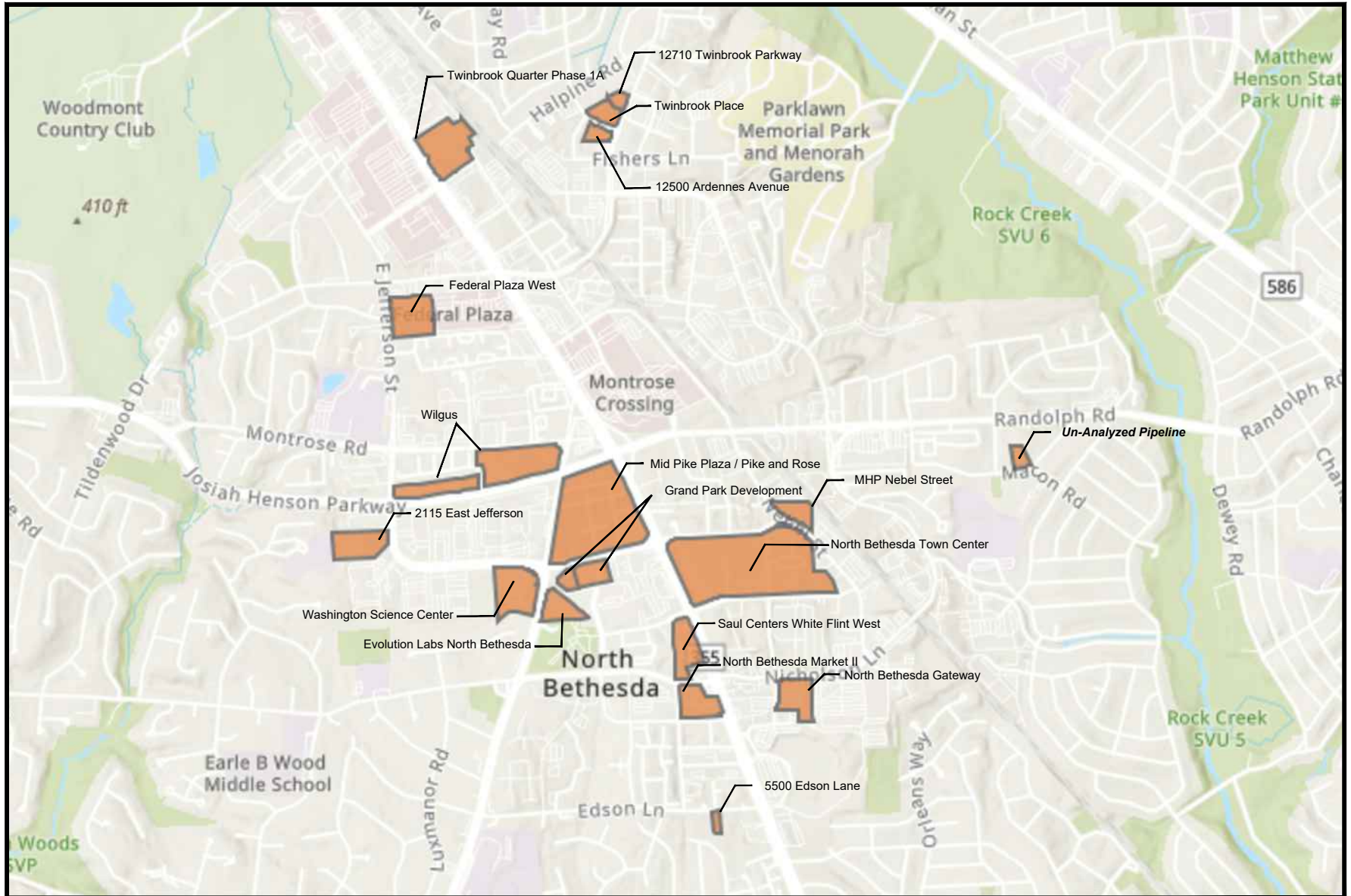


Figure 3-1
Pipeline Development
Source: MCATLAS, "Pipelines"



NORTH

Pike Center
Montgomery County, Maryland

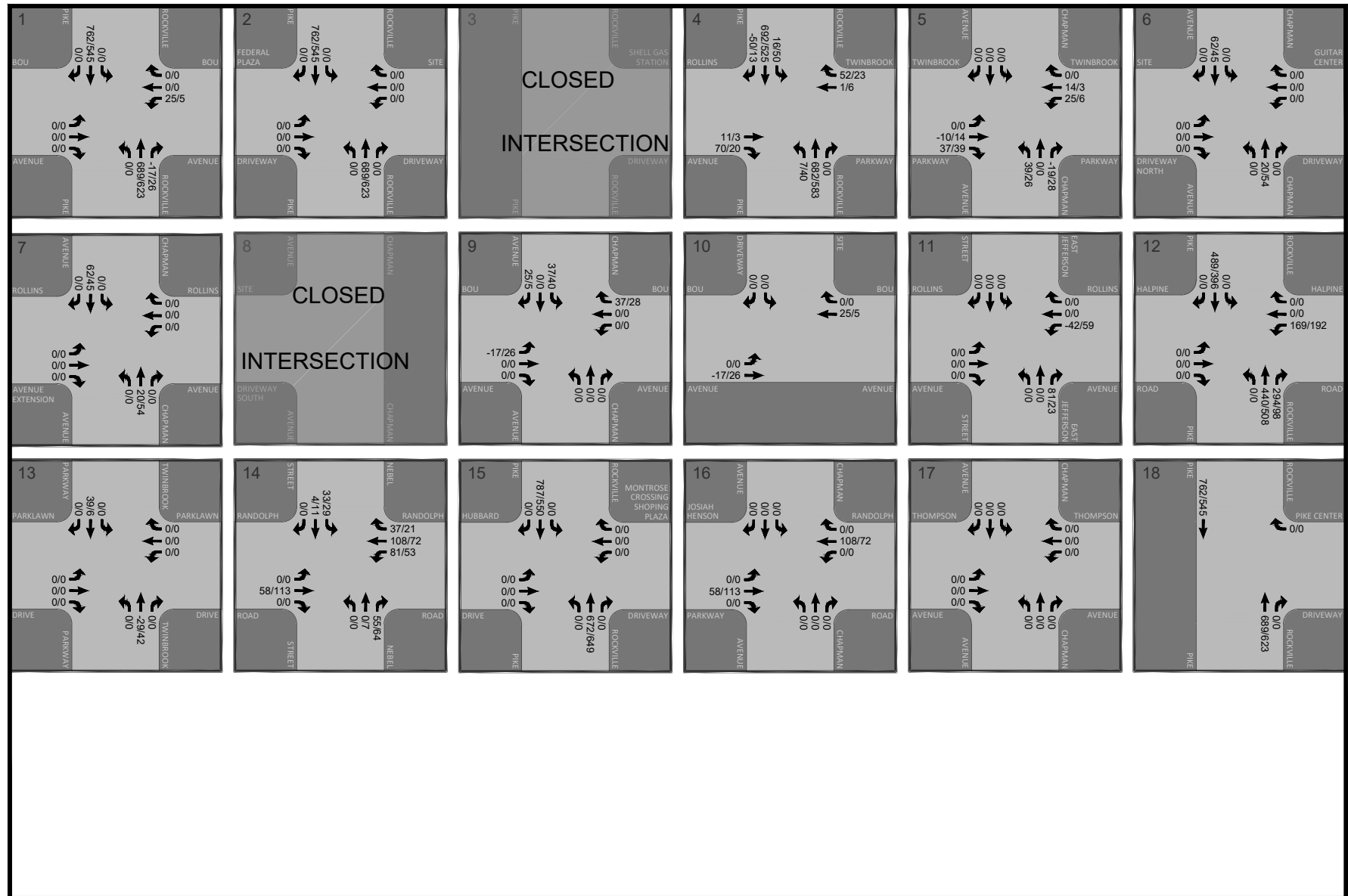


Figure 3-2
Pipeline Trip Assignments

AM PEAK HOUR
PM PEAK HOUR
000 / 000



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Pike Center

Montgomery County, Maryland

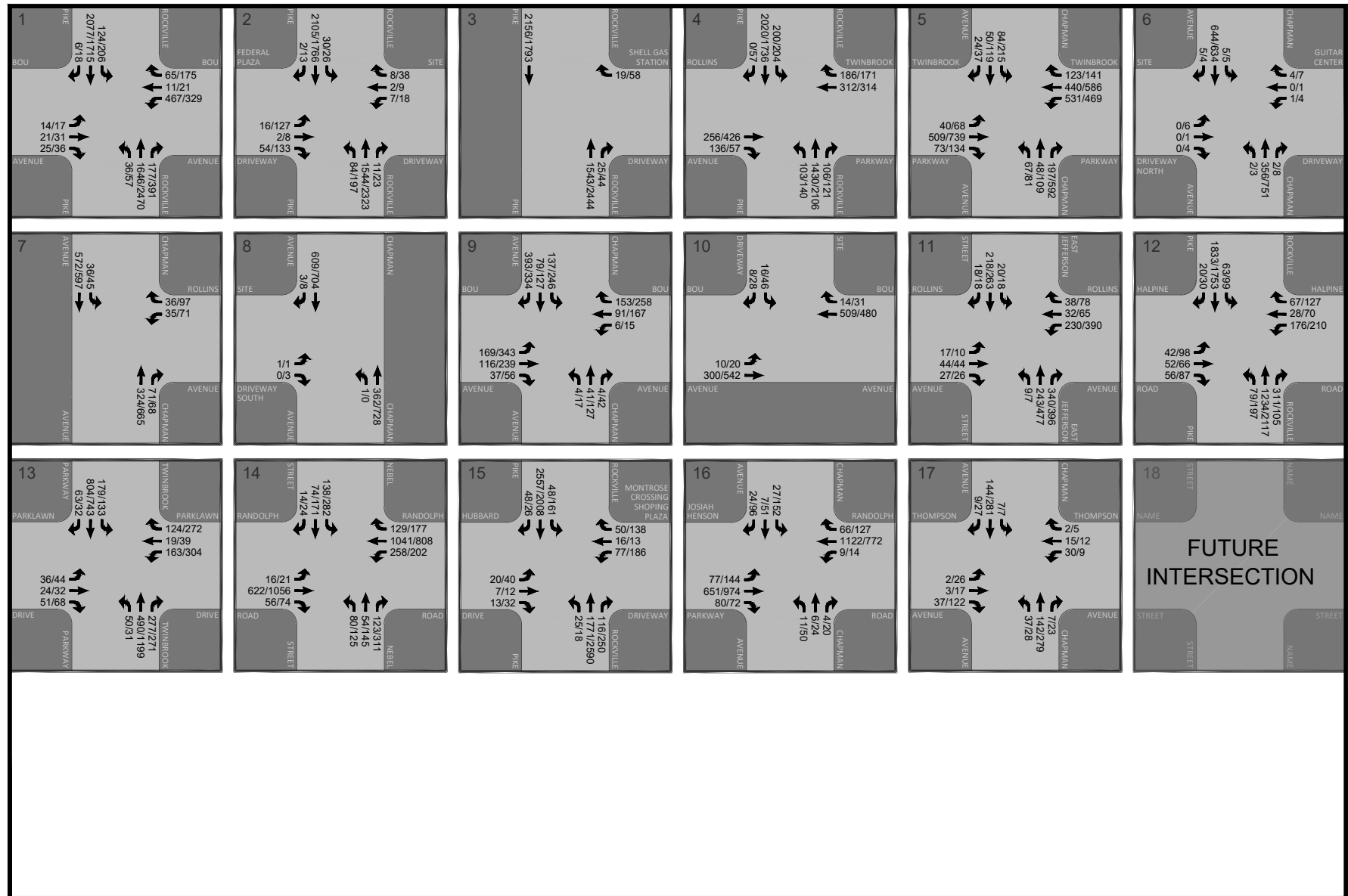


Figure 3-3
Background Traffic Volumes

AM PEAK HOUR
PM PEAK HOUR
000 / 000



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Pike Center
Montgomery County, Maryland

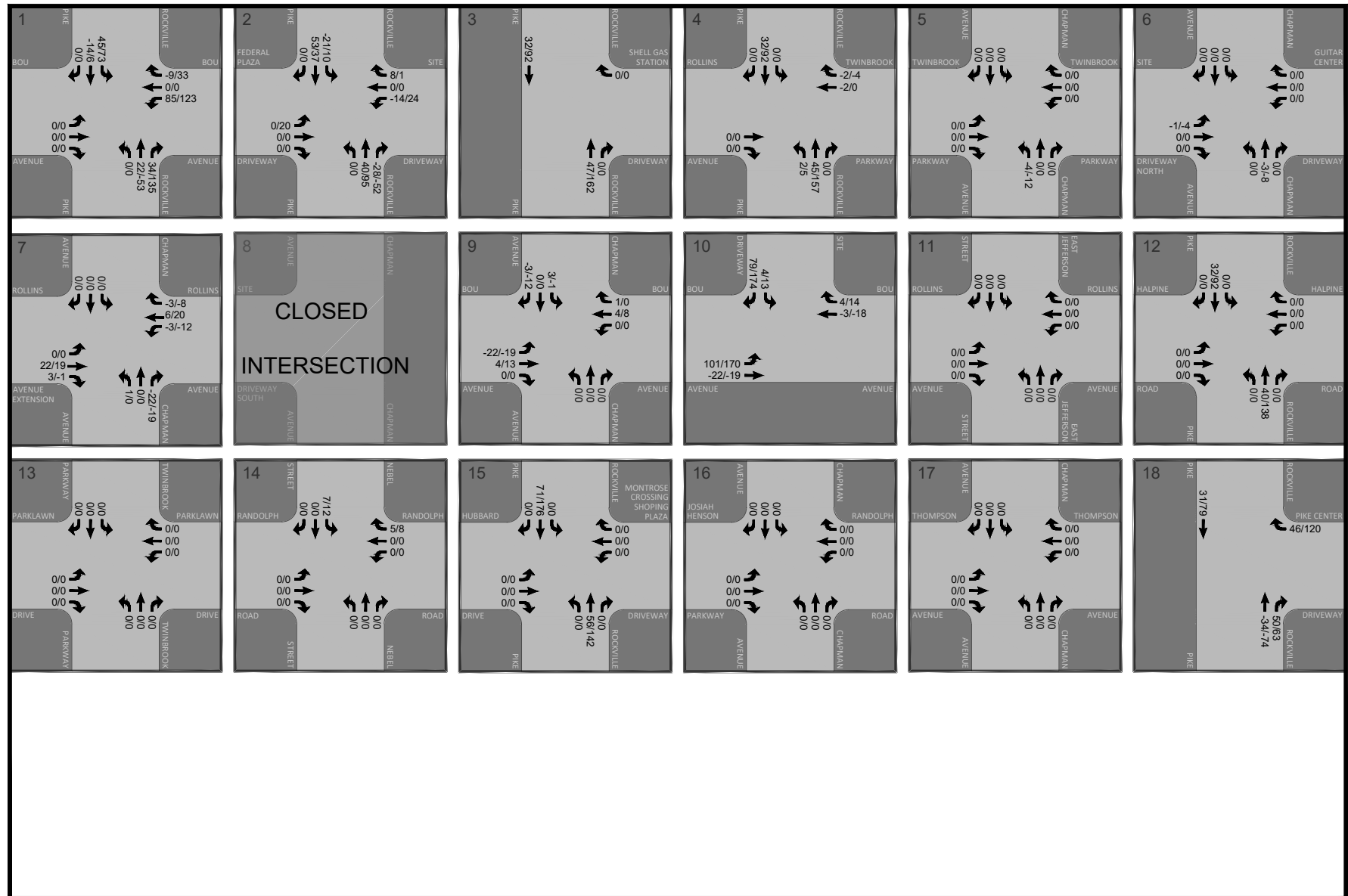


Figure 3-4
Phase 1 Site Trip Assignments

AM PEAK HOUR
PM PEAK HOUR
000 / 000



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Pike Center
Montgomery County, Maryland



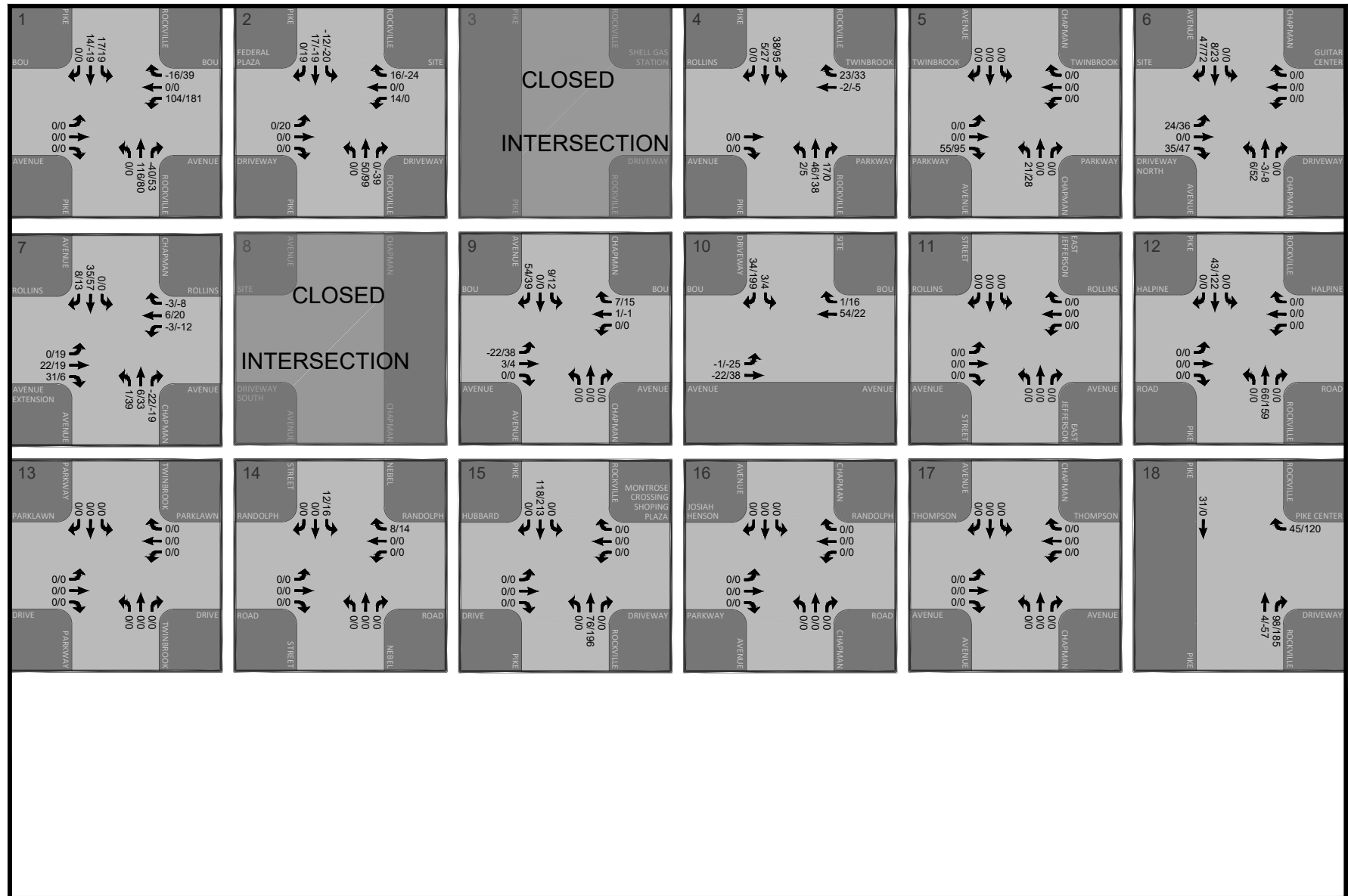


Figure 3-5
Phase 2 Site Trip Assignments

AM PEAK HOUR
PM PEAK HOUR
000 / 000



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Pike Center

Montgomery County, Maryland



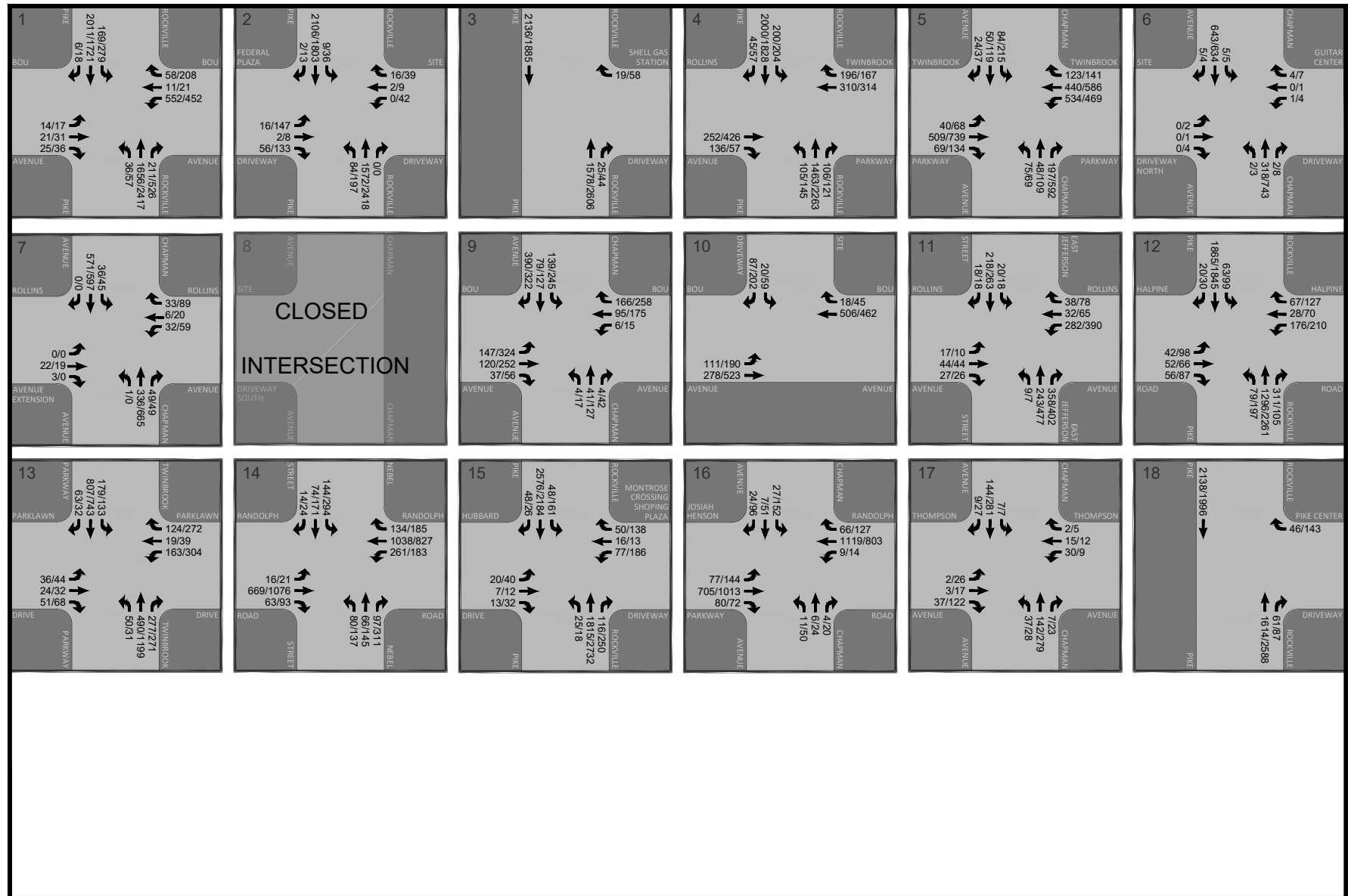


Figure 3-6

Phase 1 Total Future Traffic Forecasts

AM PEAK HOUR
PM PEAK HOUR
000 / 000



NORTH

Pike Center

Montgomery County, Maryland

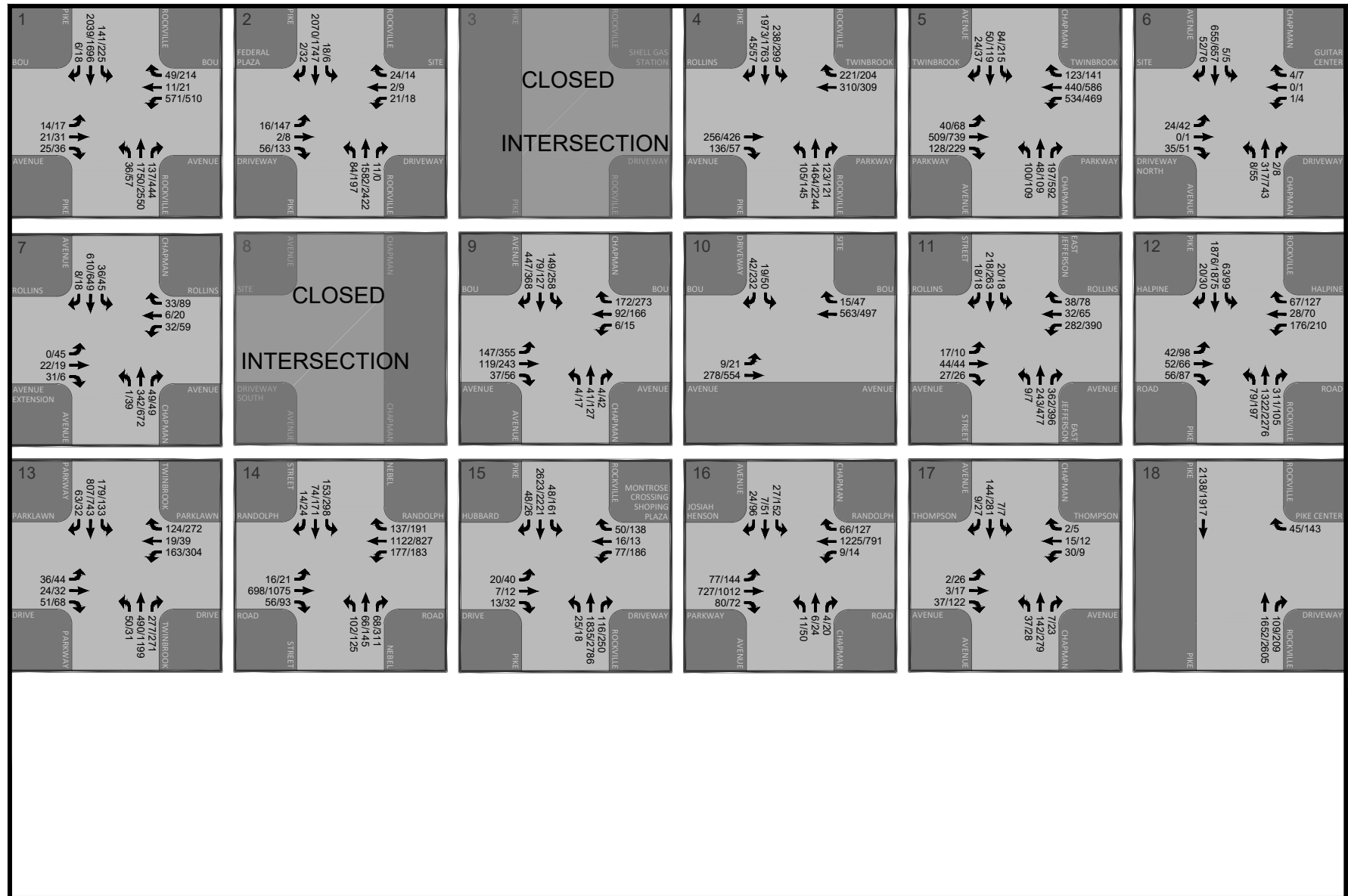


Figure 3-7

Phase 2 Total Future Traffic Forecasts

AM PEAK HOUR
PM PEAK HOUR
000 / 000



NORTH

Pike Center

Montgomery County, Maryland

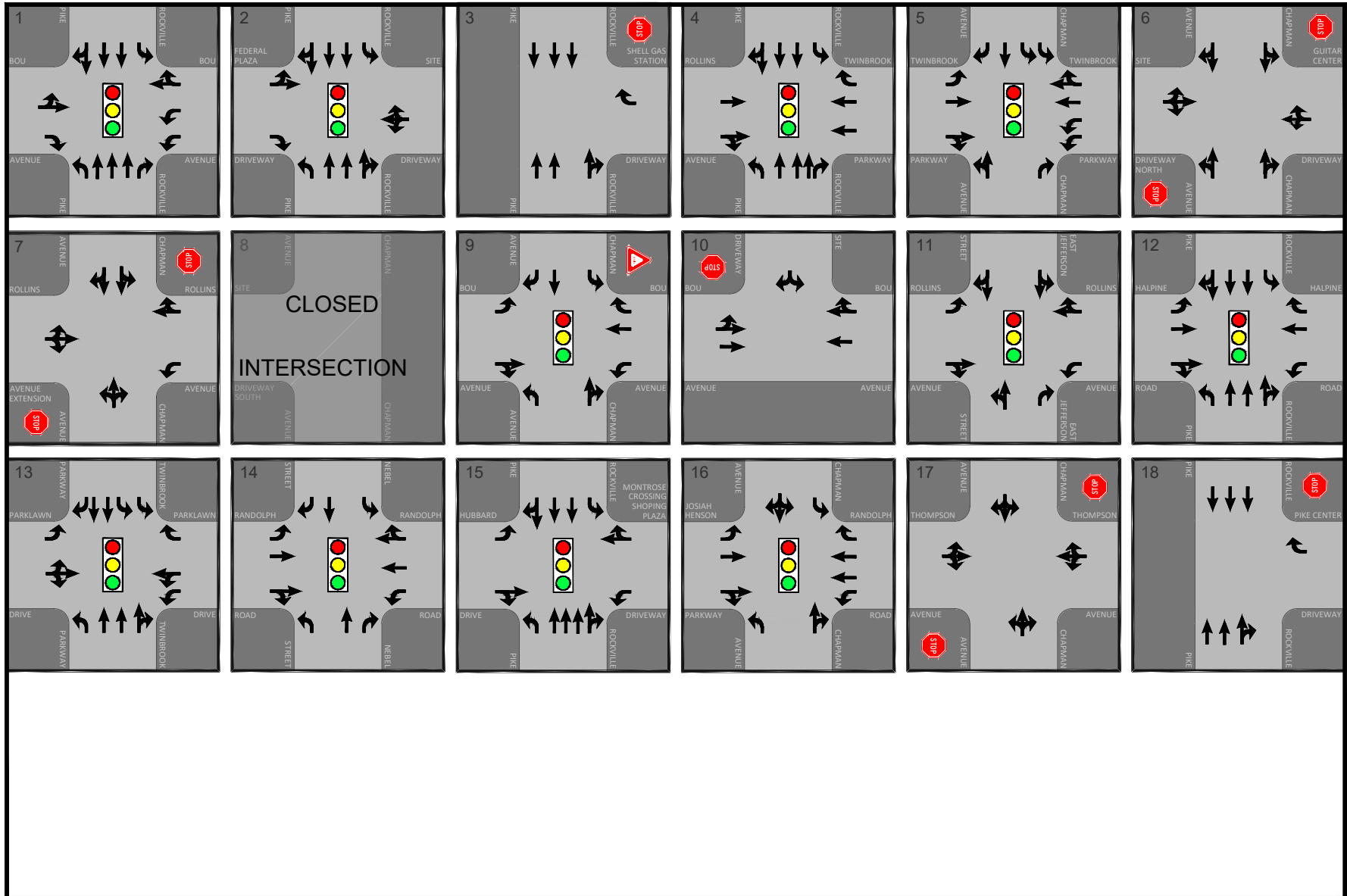


Figure 3-8

Phase 1 Lane Use and Traffic Control



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Pike Center

Montgomery County, Maryland

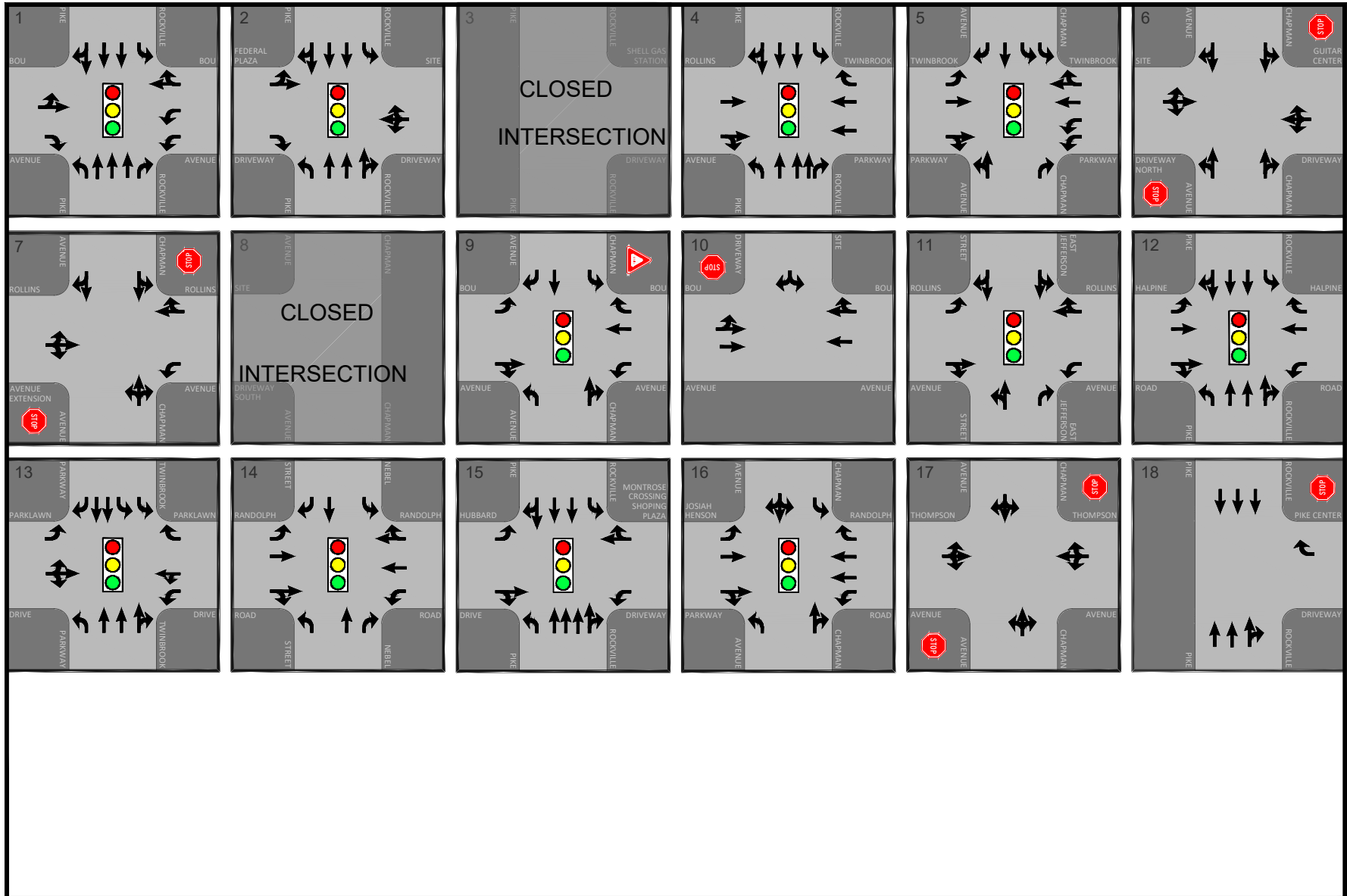


Figure 3-9

Phase 2 Lane Use and Traffic Control



NORTH

Pike Center

Montgomery County, Maryland

ATTACHMENT II
LEVELS OF SERVICE AND
QUEUING ANALYSIS TABLES

Table 1
Pike Center
Total Future Conditions Levels of Service Summary¹

Approach/ Lane Group	Existing Conditions				2034 Future Conditions without Development				2034 Phase 1 Future Conditions with Development				2039 Phase 2 Future Conditions with Development			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)
1. Rockville Pike / Bou Avenue -- Orange Policy Area																
EBLT	E	74.0	F	81.6	E	74.0	F	81.6	E	74.0	F	81.6	E	74.0	F	81.6
EBR	E	68.3	E	68.1	E	68.3	E	68.1	E	68.3	E	68.1	E	68.3	E	68.1
WBL	E	79.8	E	67.5	F	81.9	E	67.7	F	101.5	F	80.9	F	111.3	F	85.0
WBTR	D	53.9	E	57.9	D	53.2	E	57.8	D	51.8	E	56.3	D	51.7	D	54.6
NBL	F	103.8	F	100.2	F	103.8	F	96.1	F	103.0	F	95.5	F	104.4	F	95.1
NBT	B	13.3	B	11.6	B	16.2	B	18.5	B	17.3	B	19.2	B	18.0	C	27.9
NBR	A	5.6	A	5.8	A	6.2	B	12.0	A	8.1	B	13.5	A	5.5	B	14.0
SBL	A	7.9	F	110.2	C	25.2	F	165.1	D	46.2	F	347.0	D	35.1	F	215.2
SBTR	A	8.0	A	3.5	A	9.3	A	2.4	B	10.1	A	3.8	A	8.7	A	3.8
Overall	C	22.6	C	22.4	C	21.6	C	24.5	C	26.5	D	37.7	C	27.0	C	34.4
2. Rockville Pike / Pike Center Driveway / Federal Plaza Driveway -- Orange Policy Area																
EBLT	E	72.0	E	73.6	E	72.0	E	73.6	E	72.0	E	74.6	E	72.0	E	74.6
EBR	E	69.3	E	58.9	E	69.3	E	58.9	E	69.3	E	57.4	E	69.3	E	57.4
WBLTR	E	72.8	E	71.6	E	72.8	E	71.6	E	71.6	E	70.1	E	74.9	E	71.7
NBL	A	5.2	C	31.4	D	40.5	E	76.2	D	44.1	E	79.0	D	41.2	E	74.0
NBTR	A	0.7	A	4.2	A	0.5	A	5.2	A	0.6	B	10.6	A	0.7	A	7.3
SBL	A	2.9	B	14.3	A	3.3	C	27.3	A	3.5	D	38.3	A	3.2	A	5.3
SBTR	A	4.0	B	15.2	A	4.6	B	11.6	A	4.8	B	16.7	A	4.3	B	10.5
Overall	A	5.3	B	15.6	A	5.3	C	15.1	A	5.5	C	20.3	A	5.7	B	15.4
3. Rockville Pike/ Shell Gas Station Driveway - Unsignalized -- Orange Policy Area																
WBR	A	9.5	A	9.5	A	9.7	B	10.7	B	10.1	B	11.5	NONE			
Overall	A	0.1	A	0.2	A	0.0	B	0.1	A	0.1	B	0.1				
6. Chapman Ave / Pike Center Driveway North - Unsignalized -- Orange Policy Area																
EBLTR	A	0.0	C	22.4	A	0.0	C	25.0	A	0.0	C	20.2	C	22.2	E	46.5
WBLTR	B	11.1	C	18.6	B	11.4	C	20.4	B	11.1	C	20.2	B	11.6	D	27.0
NBLT	A	0.2	A	0.1	A	0.2	A	0.1	A	0.2	A	0.1	A	0.6	A	2.1
SBLT	A	0.2	A	0.3	A	0.2	A	0.3	A	0.2	A	0.2	A	0.2	A	0.2
Overall	A	0.1	A	0.4	A	0.1	A	0.4	A	0.1	A	0.3	A	1.4	B	3.5

Table 1 (cont.)
Total Future Conditions Levels of Service Summary¹

Approach/ Lane Group	Existing Conditions				2034 Future Conditions without Development				2034 Phase 1 Future Conditions with Development				2039 Phase 2 Future Conditions with Development			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)
7. Chapman Ave / Rollins Ave - Unsignalized -- Orange Policy Area																
EBLTR	-	-	-	-	-	-	-	-	C	23.1	E	46.4	C	18.1		707.0
WBL	C	16.1	D	33.3	C	17.2	E	40.3	C	21.1	F	63.1	C	24.1		128.0
WBR/WBTR	B	11.1	C	17.2	B	11.3	C	18.7	B	13.2	D	29.5	B	13.5		38.7
NBTR/NBLTR	-	-	-	-	-	-	-	-	A	0.0	-	-	A	0.0		1.2
SBLT	A	1.7	A	2.3	A	1.6	A	2.3	A	1.2	A	1.9	A	1.2		1.8
Overall	A	1.3	B	3.2	A	1.3	B	3.4	B	2.0	C	5.5	B	2.3		36.7
8. Chapman Ave / Pike Center Driveway South - Unsignalized -- Orange Policy Area																
EBLR	E	35.4	C	21.1	E	42.5	D	27.5	NONE							
NBLT	A	0.1	-	-	A	0.1	-	-								
Overall	A	0.1	A	0.1	A	0.1	A	0.1								
9. Chapman Ave / Bou Ave -- Orange Policy Area																
EBL	B	10.0	B	12.2	A	9.9	B	13.4	A	9.6	B	12.5	A	9.6	B	13.1
EBTR	A	8.8	A	9.7	A	8.8	A	9.7	A	8.9	A	9.8	A	8.9	A	9.7
WBL	B	18.9	B	19.7	B	18.8	B	19.9	B	18.7	B	19.8	B	18.8	B	19.9
WBT	C	20.5	C	22.8	C	20.4	C	23.3	C	20.4	C	23.1	C	20.4	C	23.0
WBR	B	19.6	C	21.0	B	19.8	C	21.5	B	19.8	C	21.3	B	19.9	C	21.5
NBL	B	19.1	B	19.8	B	19.1	B	20.0	B	18.9	B	19.8	B	19.0	B	20.0
NBTR	B	19.6	C	21.9	B	19.6	C	22.2	B	19.4	C	21.9	B	19.5	C	22.1
SBL	C	22.6	C	33.4	C	24.4	D	46.7	C	24.3	D	40.9	C	24.9	D	45.4
SBT	C	20.6	C	22.2	C	20.6	C	22.5	C	20.4	C	22.2	C	20.5	C	22.4
SBR	A	9.8	A	9.5	B	10.0	A	9.6	B	10.0	A	9.4	B	10.4	A	9.7
Overall	B	13.9	B	17.4	B	14.5	B	19.7	B	14.6	B	18.8	B	14.7	B	19.4
10. Bou Ave / Pike Center Driveway - Unsignalized -- Orange Policy Area																
EBLT	A	0.9	A	1.1	A	0.9	A	1.0	A	5.5	A	5.8	A	0.9	A	1.1
SBLR	B	13.9	C	16.4	B	14.1	C	16.8	B	14.1	D	32.9	B	13.2	C	18.4
Overall	A	0.5	A	1.3	A	0.5	A	1.3	A	2.6	B	7.2	A	1.0	A	3.9

Table 1 (cont.)

Total Future Conditions Levels of Service Summary¹

Approach/ Lane Group	Existing Conditions				2034 Future Conditions without Development				2034 Phase 1 Future Conditions with Development				2039 Phase 2 Future Conditions with Development			
	AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)
15. Rockville Pike / Hubbard Dr / Plaza Driveway -- Orange Policy Area																
EBL	E	62.2	D	53.8	E	62.2	D	53.8	E	62.2	D	53.8	E	62.2	D	53.8
EBTR	E	60.6	D	50.7	E	60.6	D	50.7	E	60.6	D	50.7	E	60.6	D	50.7
WBL	E	70.9	E	74.3	E	70.9	E	74.3	E	70.9	E	74.3	E	70.9	E	74.3
WBTR	E	61.6	D	51.8	E	61.6	D	51.8	E	61.6	D	51.8	E	61.6	D	51.8
NBL	A	6.3	B	12.1	B	13.8	B	14.5	B	14.0	B	16.2	B	14.6	B	16.6
NBTR	A	7.3	C	22.6	A	8.7	C	28.9	A	8.8	C	31.2	A	8.8	C	32.3
SBL	A	1.4	E	65.4	A	2.6	E	71.0	A	3.0	E	64.4	A	3.0	E	65.0
SBTR	A	4.9	A	9.4	A	4.2	A	8.1	A	4.9	B	10.5	A	4.9	B	10.1
Overall	A	9.1	C	23.4	A	8.4	C	24.9	A	8.8	C	26.4	A	8.8	C	26.8
18. Rockville Pike (MD 355) / Rollins Ave Extension - Unsignalized -- Orange Policy Area																
WBR	FUTURE				FUTURE				A	9.7	B	13.5	A	9.8	C	15.2
Overall									A	0.1	C	0.4	A	0.1	C	0.4

Notes:

1. Capacity analysis based on Highway Capacity Manual 2000 methodology, using Synchro 11 unless otherwise noted.
2. **Bold** roadways indicate N/S direction.

Table 2
Pike Center
Total Future Conditions Queuing Summary ¹

Approach/ Lane Group	Storage Length (ft)	Existing Conditions				2034 Future Conditions without Development				2034 Phase 1 Future Conditions with Development				2039 Phase 2 Future Conditions with Development			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile
1. Rockville Pike / Bou Avenue -- Orange Policy Area																	
EBLT	69	66	133	120	177	55	120	109	175	67	138	108	167	50	106	89	110
EBR	90	32	73	44	84	32	74	43	83	34	76	46	82	34	83	34	60
WBL	192	185	246	176	250	188	237	181	251	186	233	185	236	183	250	89	175
WBL	192	184	247	185	259	188	242	188	256	190	234	191	234	192	242	158	225
WBTR	200	62	172	145	237	55	164	151	236	55	170	128	234	70	177	139	180
NBL	175	51	114	99	185	54	130	88	186	43	111	94	199	42	118	57	85
NBT	394	100	258	257	491	190	425	361	515	197	438	373	513	212	455	327	366
NBT	394	122	286	285	506	225	455	377	502	226	459	387	507	276	492	404	411
NBT	394	113	269	275	498	221	447	377	515	230	453	389	507	304	516	402	425
NBR	394	62	165	160	351	61	164	151	381	89	230	207	465	97	290	222	335
SBL	245	89	190	247	331	128	244	249	337	145	214	166	299	118	203	165	192
SBT	511	112	279	413	675	198	450	451	704	173	278	209	274	150	268	210	242
SBT	511	131	315	175	421	228	484	221	529	157	263	118	240	142	254	53	178
SBTR	511	142	334	165	396	239	492	214	507	152	257	121	243	138	250	53	180
2. Rockville Pike / Pike Center Driveway / Federal Plaza Driveway -- Orange Policy Area																	
EBLT	79	44	107	131	185	54	117	137	190	20	53	112	169	19	55	53	104
EBR	150	43	83	66	94	47	79	66	93	60	113	119	173	55	106	103	126
WBLTR	42	13	40	50	99	16	44	51	98	14	40	70	119	25	61	29	41
NBL	245	49	103	141	267	57	118	147	284	62	134	111	226	51	126	50	84
NBT	511	14	45	212	478	54	227	317	555	70	226	199	345	61	197	83	148
NBT	511	25	76	353	608	148	420	445	627	140	342	274	358	126	310	130	231
NBR	511	31	97	360	613	162	444	453	626	148	345	278	354	158	348	124	233
SBL	175	19	53	25	77	21	55	14	65	8	40	27	100	13	48	8	18
SBT	160	31	72	140	210	87	165	149	209	115	204	154	205	104	218	215	265
SBT	160	34	78	99	181	97	178	124	206	122	213	112	206	112	229	105	190
SBTR	160	31	76	105	185	97	182	130	204	121	210	116	204	112	235	108	197
3. Rockville Pike / Shell Gas Station Driveway - Unsignalized -- Orange Policy Area																	
WBR	50	16	34	33	58	14	41	33	59	14	40	30	58	None			
NBT	160	1	8	3	29	2	15	3	20	7	43	5	36				
NBT	160	0	0	33	121	26	106	39	137	55	172	39	137				
NBR	160	0	0	30	123	25	118	32	130	57	182	31	131				
SBT	238	0	0	162	358	11	62	219	397	68	212	239	391				
SBT	238	0	0	55	195	15	76	104	294	74	222	73	241				
SBT	238	0	0	37	149	18	81	99	282	80	241	70	226				
6. Chapman Ave / Pike Center Driveway North - Unsignalized -- Orange Policy Area																	
EBLTR	50	2	13	21	54	0	0	13	40	0	0	12	39	42	74	45	66
WBLTR	50	1	14	10	32	4	18	15	44	4	20	23	58	4	17	26	52
NBLT	97	3	26	8	40	4	23	7	40	2	15	7	39	7	35	7	37
NBTR	97	6	37	92	137	5	28	87	139	4	23	91	157	5	29	20	82
SBLT	167	132	264	16	73	13	74	20	84	7	55	11	64	8	52	2	17
SBTR	167	0	0	118	257	135	267	115	254	156	267	144	271	158	272	150	269
7. Chapman Ave / Rollins Ave - Unsignalized -- Orange Policy Area																	
EBLTR	75	56	121	90	154	0	0	0	0	28	71	11	36	48	70	9	36
WBL	56	21	44	60	135	54	119	98	162	67	141	96	153	72	127	20	51
WBR	56	1	10	95	159	22	46	46	105	23	46	57	117	14	49	71	100
NBR	112	20	68	42	108	3	19	76	155	8	38	83	170	5	35	159	239
SBLT	97	92	161	84	163	21	71	51	122	8	35	29	90	9	40	25	53
SBT	97	0	0	0	0	94	161	80	161	99	157	95	163	92	156	86	149
8. Chapman Ave / Pike Center Driveway South - Unsignalized -- Orange Policy Area																	
EBLR	35	2	11	10	29	2	12	5	23	None							
NBLT	46	2	12	81	158	1	16	52	139								
SBT	122	37	61	56	125	27	80	77	148								
SBT	122	34	47	24	78	8	37	25	80								
SBTR	122	111	143.6	101	155	106	153	102	153								
9. Chapman Ave / Bou Ave -- Orange Policy Area																	
EBL	201	49	80	84	137	43	75	98	161	32	64	90	138	35	62	98	158
EBTR	201	28	60	66	114	28	60	75	127	28	65	73	126	27	59	68	119
WBL	270	3	12	6	22	6	12	6	25	4	8	7	22	5	12	9	16
WBT	817	34	70	65	113	31	72	71	126	31	69	70	120	35	70	68	120
WBR	817	0	38	6	42	4	43	5	51	5	47	4	52	3	43	2	52
NBL	70	1	8	3	22	6	7.6	7	25	3	7	6	20	5	7	6	20
NBR	130	14	39	59	113	15	37	66	116	15	45	60	112	11	40	59	112
SBL	46	43	82	95	178	57	109	123	251	56	106	117	235	65	114	120	256
SBT	46	31	60	53	94	28	62	55	96	33	65	54	91	33	64	49	92
SBTR	46	4	33	6	37	4	38	5	29	5	39	3	39	4	43	7	36
10. Bou Ave / Pike Center Driveway - Unsignalized -- Orange Policy Area																	
EBLT	100	1	11	42	114	2	17	6	36	14	57	14	60	5	32	83	153
EBT	192	1	12	51	161	0	0	3	33	7	51	13	90	4	31	148	280
WBT	201	148	263	114	237	155	261	118	241	169	273	160	265	172	262	45	153
WBTR	201	166	280	170	284	173	276	171	286	184	284	191	281	192	274	112	226
SBLR	300	81	191	223	409	60	167	180	342	63	81	67	82	57	77	59	71
15. Rockville Pike / Hubbard Dr / Plaza Driveway -- Orange Policy Area																	
EBL	148	20	35	33	73	17	51	38	90	13	41	35	83	35	97	95	195
EBTR	148	18	21	24	60	11	33	23	60	8	28	20	50	8	28	10	36
WBL	134	88	117	150	230	70	132	142	223	61	121	161	263	58	120	39	140
WBTR	134	52	75	89	162	50	100	114	202	47	98	164	313	78	155	147	192
NBL	1538	26	37	9	27	17	42	1149	2193	15	41	1228	2181	11	35	2	13
NBT	1538	89	129	238	391	155	303	1317	2030	156	294	1334	2041	159	273	144	237
NBT	1538	107	141	261	426	185	327	1323	2027	179	313	1338	2027	194	271	167	244
NBT	1538	62	96	222	378	142	282	1300	2041	140	270	1326	2027	196	275	184	244
NBR	1538	81	115	235	419	76	164	1268	2063	76	168	1329	2010	145	279	217	237
SBL	180	59	58	92	189	40	118	89	187	37	105	77	183	33	116	28	109
SBT	394	160	187	117	248	173	360	158	296	166	348	142	283	180	335	84	220
SBT	394	147	201	137	270	186	378	184	328	190	381	159	302	199	363	80	237
SBTR	394	156	210	140	261	197	387	193	341	204	395	171	316	210	373	80	255
18. Rockville Pike (MD 355) / Rollins Ave Extension - Unsignalized -- Orange Policy Area																	
WBR	80	FUTURE				FUTURE				11	38	74	143	13	41	26	73
NBT	178									17	90	105	240	29	120	19	102
NBT	178									45	150	135	250	73	202	84	190
NBTR	178									53	165	140	246	120	247	162	243
SBT	276									161	352	264	381	115	311	255	371
SBT	276									168	362	107	299	120	322	59	237
SBT	276									154	349	105	297	123	314	47	207

Table 3
Pike Center
Critical Lane Volumes

Intersection	Policy Area	Operating Condition	Measure of Performance	Existing Conditions		Future Background Conditions		P1 Total Future Conditions		P2 Total Future Conditions		Background vs. Total Future	
				AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
01. Rockville Pike / Bou Ave	Orange	Signalized	CLV Pass/Fail (1550 CLV Max)	829 Pass	1154 Pass	1126 Pass	1386 Pass	1165 Pass	1520 Pass	1181 Pass	1546 Pass	+55 +4.9%	+160 +11.5%
02. Rockville Pike / Pike Center / Federal Plaza	Orange	Signalized	CLV Pass/Fail (1550 CLV Max)	625 Pass	874 Pass	907 Pass	1097 Pass	908 Pass	1180 Pass	924 Pass	1099 Pass	+17 +1.9%	+2 +0.2%
03. Rockville Pike / Gas Station	Orange	Unignalized	CLV Pass/Fail (1550 CLV Max)	535 Pass	748 Pass	817 Pass	979 Pass	809 Pass	1039 Pass	0 Pass	0 Pass	-817 -100.0%	-979 -100.0%
04. Rockville Pike / Twinbrook Park / Rollins Ave	Red	Signalized	CLV Pass/Fail (1550 CLV Max)	778 Pass	977 Pass	1068 Pass	1259 Pass	1079 Pass	1317 Pass	1084 Pass	1415 Pass	+16 +1.5%	+156 +12.4%
05. Twinbrook Park / Chapman Ave	Red	Signalized	CLV Pass/Fail (1550 CLV Max)	724 Pass	1128 Pass	792 Pass	1184 Pass	799 Pass	1184 Pass	856 Pass	1234 Pass	+64 +8.1%	+50 +4.2%
06. Chapman Ave / Site Drive North	Orange	Unignalized	CLV Pass/Fail (1550 CLV Max)	318 Pass	399 Pass	351 Pass	427 Pass	350 Pass	418 Pass	420 Pass	507 Pass	+69 +19.7%	+80 +18.7%
07. Chapman Ave / Rollins Ave	Orange	Unignalized	CLV Pass/Fail (1550 CLV Max)	454 Pass	826 Pass	3 474 Pass	880 Pass	486 Pass	853 Pass	520 Pass	949 Pass	+46 +9.7%	+69 +7.8%
08. Chapman Ave / Site Drive South	Orange	Unignalized	CLV Pass/Fail (1550 CLV Max)	343 Pass	675 Pass	363 Pass	729 Pass	353 Pass	728 Pass	0 Pass	0 Pass	-363 -100.0%	-729 -100.0%
09. Chapman Ave / Bou Ave	Orange	Signalized	CLV Pass/Fail (1550 CLV Max)	479 Pass	912 Pass	509 Pass	984 Pass	512 Pass	970 Pass	572 Pass	1010 Pass	+63 +12.4%	+26 +2.6%
10. Bou Ave / Site Drive	Orange	Unignalized	CLV Pass/Fail (1550 CLV Max)	343 Pass	597 Pass	326 Pass	623 Pass	518 Pass	810 Pass	383 Pass	864 Pass	+57 +17.5%	+241 +38.7%
11. Rollins Ave / East Jefferson St	City of Rockville	Signalized	CLV Pass/Fail (1550 CLV Max)	729 Pass	1106 Pass	750 Pass	1165 Pass	820 Pass	1165 Pass	807 Pass	1155 Pass	+57 +7.6%	-10 -0.9%
12. Rockville Pike / Halpine Rd	Red	Signalized	CLV Pass/Fail (1550 CLV Max)	657 Pass	877 Pass	1024 Pass	1243 Pass	1035 Pass	1296 Pass	1040 Pass	1302 Pass	+16 +1.6%	+59 +4.7%
13. Twinbrook Park / Parklawn Dr	Red	Signalized	CLV Pass/Fail (1550 CLV Max)	636 Pass	900 Pass	657 Pass	916 Pass	659 Pass	916 Pass	684 Pass	916 Pass	+27 +4.1%	- -
14. Nebel St / Randolph Rd	Red	Signalized	CLV Pass/Fail (1550 CLV Max)	745 Pass	1228 Pass	849 Pass	1442 Pass	899 Pass	1455 Pass	919 Pass	1459 Pass	+70 +8.2%	+17 +1.2%
15. Rockville Pike / Hubbard Dr	Orange	Signalized	CLV Pass/Fail (1550 CLV Max)	806 Pass	1083 Pass	1097 Pass	1278 Pass	1104 Pass	1321 Pass	1121 Pass	1337 Pass	+24 +2.2%	+59 +4.6%
16. Chapman Ave / Randolph Rd	Red	Signalized	CLV Pass/Fail (1550 CLV Max)	678 Pass	802 Pass	736 Pass	842 Pass	734 Pass	863 Pass	790 Pass	863 Pass	+54 +7.3%	+21 +2.5%
17. Chapman Ave / Thompson Ave	Red	Unsignalized	CLV Pass/Fail (1550 CLV Max)	233 Pass	495 Pass	233 Pass	495 Pass	233 Pass	495 Pass	233 Pass	495 Pass	- -	- -
18. Rockville Pike / Rollins Ave Ext	Orange	Unsignalized	CLV Pass/Fail (1550 CLV Max)	0 Pass	0 Pass	0 Pass	0 Pass	837 Pass	1133 Pass	836 Pass	1184 Pass		

APPENDIX A
EXISTING 2024 CONDITIONS
CAPACITY ANALYSES

HCM Signalized Intersection Capacity Analysis

1: Rockville Pike - 355 & Bou Ave

Existing AM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	14	21	25	442	11	65	36	957	194	124	1315	6
Future Volume (vph)	14	21	25	442	11	65	36	957	194	124	1315	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	0.98		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	0.87		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1704	1478	3204	1489		1711	4916	1531	1766	5081	
Flt Permitted		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.28	1.00	
Satd. Flow (perm)		1704	1478	3204	1489		1711	4916	1531	512	5081	
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)	15	22	26	460	11	68	38	997	202	129	1370	6
RTOR Reduction (vph)	0	0	25	0	57	0	0	0	89	0	0	0
Lane Group Flow (vph)	0	37	1	460	22	0	38	997	113	129	1376	0
Confl. Peds. (#/hr)	4					4	5		9	9		5
Confl. Bikes (#/hr)			1									
Turn Type	Split	NA	Prot	Split	NA		Prot	NA	Prot	pm+pt	NA	
Protected Phases	3	3	3	4	4		1	5	5	6	2	
Permitted Phases										2		
Actuated Green, G (s)		7.0	7.0	24.3	24.3		7.6	83.8	83.8	87.1	87.1	
Effective Green, g (s)		7.0	7.0	24.3	24.3		7.6	83.8	83.8	87.1	87.1	
Actuated g/C Ratio		0.05	0.05	0.16	0.16		0.05	0.56	0.56	0.58	0.58	
Clearance Time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	6.0	6.0		3.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)		79	68	519	241		86	2746	855	384	2950	
v/s Ratio Prot		c0.02	0.00	c0.14	0.01		0.02	c0.20	0.07	0.02	c0.27	
v/s Ratio Perm										0.17		
v/c Ratio		0.47	0.02	0.89	0.09		0.44	0.36	0.13	0.34	0.47	
Uniform Delay, d1		69.7	68.2	61.5	53.5		69.1	18.3	15.8	17.6	18.1	
Progression Factor		1.00	1.00	1.00	1.00		1.45	0.70	0.33	0.42	0.41	
Incremental Delay, d2		4.3	0.1	18.3	0.5		3.5	0.4	0.3	0.5	0.5	
Delay (s)		74.0	68.3	79.8	53.9		103.8	13.3	5.6	7.9	8.0	
Level of Service		E	E	E	D		F	B	A	A	A	
Approach Delay (s)		71.7			76.0			14.8			8.0	
Approach LOS		E			E			B			A	
Intersection Summary												
HCM 2000 Control Delay			22.6			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			31.0			
Intersection Capacity Utilization			64.0%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Rockville Pike - 355 & Federal Plaza/Pike Center

Existing AM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Traffic Volume (vph)	16	2	54	7	2	8	84	855	11	30	1343	2
Future Volume (vph)	16	2	54	7	2	8	84	855	11	30	1343	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	16	16	16	11	11	11	10	10	10
Total Lost time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00	1.00		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.94		1.00	1.00		1.00	1.00	
Flt Protected		0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1664	1478		1917		1710	4904		1649	4745	
Flt Permitted		0.96	1.00		0.98		0.16	1.00		0.30	1.00	
Satd. Flow (perm)		1664	1478		1917		284	4904		527	4745	
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)	17	2	56	7	2	8	88	891	11	31	1399	2
RTOR Reduction (vph)	0	0	54	0	8	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	19	2	0	9	0	88	902	0	31	1401	0
Confl. Peds. (#/hr)	1						1	3		7	7	3
Confl. Bikes (#/hr)			1			1						
Turn Type	Split	NA	Prot	Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	8	8	8	4	4		5	2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		6.2	6.2		4.2		119.3	112.2		112.9	109.0	
Effective Green, g (s)		6.2	6.2		4.2		119.3	112.2		112.9	109.0	
Actuated g/C Ratio		0.04	0.04		0.03		0.80	0.75		0.75	0.73	
Clearance Time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		68	61		53		293	3668		425	3448	
v/s Ratio Prot		c0.01	0.00		c0.00		c0.01	0.18		0.00	c0.30	
v/s Ratio Perm							0.22			0.05		
v/c Ratio		0.28	0.04		0.17		0.30	0.25		0.07	0.41	
Uniform Delay, d1		69.7	69.0		71.2		4.2	5.8		4.7	8.0	
Progression Factor		1.00	1.00		1.00		1.10	0.10		0.61	0.45	
Incremental Delay, d2		2.2	0.3		1.6		0.6	0.2		0.1	0.3	
Delay (s)		72.0	69.3		72.8		5.2	0.7		2.9	4.0	
Level of Service		E	E		E		A	A		A	A	
Approach Delay (s)		70.0			72.8			1.1			3.9	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			5.3				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.39									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			23.5		
Intersection Capacity Utilization			52.6%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Rockville Pike - 355 & Gas Station

Existing AM
12/04/2024

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (veh/h)	0	19	854	25	0	1394	
Future Volume (Veh/h)	0	19	854	25	0	1394	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	
Hourly flow rate (vph)	0	24	1081	32	0	1765	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			225			340	
pX, platoon unblocked	0.90	0.95			0.95		
vC, conflicting volume	1685	376			1113		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	952	143			921		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	97			100		
cM capacity (veh/h)	230	832			697		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	24	432	432	248	588	588	588
Volume Left	0	0	0	0	0	0	0
Volume Right	24	0	0	32	0	0	0
cSH	832	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.25	0.25	0.15	0.35	0.35	0.35
Queue Length 95th (ft)	2	0	0	0	0	0	0
Control Delay (s)	9.5	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A						
Approach Delay (s)	9.5	0.0			0.0		
Approach LOS	A						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			30.3%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis

4: Rockville Pike - 355 & Rollins Avenue /Twinbrook Parkway

Existing AM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑	↑	↑	↑↑↑	↑	↑	↑↑↑	
Traffic Volume (vph)	0	245	66	0	311	134	96	748	106	184	1328	43
Future Volume (vph)	0	245	66	0	311	134	96	748	106	184	1328	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	10	10	10	11	11	11
Total Lost time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.97			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3183			3539	1583	1652	4746	1478	1709	4893	
Flt Permitted		1.00			1.00	1.00	0.16	1.00	1.00	0.33	1.00	
Satd. Flow (perm)		3183			3539	1583	274	4746	1478	589	4893	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	250	67	0	317	137	98	763	108	188	1355	44
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	38	0	2	0
Lane Group Flow (vph)	0	317	0	0	317	137	98	763	70	188	1397	0
Confl. Peds. (#/hr)	13		9	9		13			4	4		
Confl. Bikes (#/hr)									1			
Turn Type		NA			NA	Prot	pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		4			8	8	1	6	6	5	2	
Permitted Phases							6			2		
Actuated Green, G (s)		21.7			21.7	21.7	106.0	97.1	97.1	110.6	99.4	
Effective Green, g (s)		21.7			21.7	21.7	106.0	97.1	97.1	110.6	99.4	
Actuated g/C Ratio		0.14			0.14	0.14	0.71	0.65	0.65	0.74	0.66	
Clearance Time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Vehicle Extension (s)		4.0			4.0	4.0	4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)		460			511	229	275	3072	956	517	3242	
v/s Ratio Prot		c0.10			0.09	0.09	0.02	0.16	0.05	c0.03	c0.29	
v/s Ratio Perm							0.23			0.24		
v/c Ratio		0.69			0.62	0.60	0.36	0.25	0.07	0.36	0.43	
Uniform Delay, d1		60.9			60.3	60.1	7.6	11.1	9.8	6.0	11.9	
Progression Factor		1.00			0.89	0.88	0.95	0.41	0.05	0.73	0.50	
Incremental Delay, d2		4.6			2.6	4.8	1.1	0.2	0.1	0.6	0.4	
Delay (s)		65.6			56.3	57.8	8.3	4.8	0.6	5.0	6.4	
Level of Service		E			E	E	A	A	A	A	A	
Approach Delay (s)		65.6			56.8			4.7			6.2	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			18.3		HCM 2000 Level of Service					B		
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			150.0		Sum of lost time (s)					20.0		
Intersection Capacity Utilization			64.7%		ICU Level of Service					C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Chapman Ave & Twinbrook Parkway

Existing AM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	519	36	506	426	123	28	48	216	84	50	24
Future Volume (vph)	40	519	36	506	426	123	28	48	216	84	50	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	10	10	10	10	10	10
Total Lost time (s)	5.5	6.0		5.5	6.0			6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		0.97	0.95			1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1648	3268		3319	3282			1707	1478	3204	1739	1443
Flt Permitted	0.44	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (perm)	762	3268		3319	3282			1707	1478	3204	1739	1443
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	41	535	37	522	439	127	29	49	223	87	52	25
RTOR Reduction (vph)	0	3	0	0	9	0	0	0	151	0	0	23
Lane Group Flow (vph)	41	569	0	522	557	0	0	78	72	87	52	2
Confl. Peds. (#/hr)	4		1	1		4	5		14	14		5
Confl. Bikes (#/hr)			4			1						1
Turn Type	pm+pt	NA		Prot	NA		Split	NA	pt+ov	Split	NA	Perm
Protected Phases	5	2		1	6		4	4	4 1	3	3	
Permitted Phases	2											3
Actuated Green, G (s)	79.1	73.6		29.7	97.8			12.2	48.4	10.0	10.0	10.0
Effective Green, g (s)	79.1	73.6		29.7	97.8			12.2	48.4	10.0	10.0	10.0
Actuated g/C Ratio	0.53	0.49		0.20	0.65			0.08	0.32	0.07	0.07	0.07
Clearance Time (s)	5.5	6.0		5.5	6.0			6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	434	1603		657	2139			138	476	213	115	96
v/s Ratio Prot	0.00	c0.17		c0.16	0.17			c0.05	0.05	0.03	c0.03	
v/s Ratio Perm	0.05											0.00
v/c Ratio	0.09	0.36		0.79	0.26			0.57	0.15	0.41	0.45	0.02
Uniform Delay, d1	17.2	23.6		57.2	10.9			66.3	36.2	67.2	67.4	65.4
Progression Factor	0.88	0.84		1.05	1.13			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.6		6.3	0.3			5.2	0.1	1.3	2.8	0.1
Delay (s)	15.3	20.4		66.3	12.7			71.6	36.3	68.4	70.2	65.5
Level of Service	B	C		E	B			E	D	E	E	E
Approach Delay (s)		20.1			38.4			45.5			68.5	
Approach LOS		C			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			36.5			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			65.7%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Chapman Ave & Pike Center North/Driveway

Existing AM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	1	0	4	2	336	2	5	582	5
Future Volume (Veh/h)	0	0	0	1	0	4	2	336	2	5	582	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	0	0	0	1	0	5	3	425	3	6	737	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								471			256	
pX, platoon unblocked												
vC, conflicting volume	976	1186	372	813	1188	214	743			428		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	976	1186	372	813	1188	214	743			428		
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	100	100	99	100			99		
cM capacity (veh/h)	203	186	626	268	185	791	860			1128		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	0	6	216	216	374	374						
Volume Left	0	1	3	0	6	0						
Volume Right	0	5	0	3	0	6						
cSH	1700	597	860	1700	1128	1700						
Volume to Capacity	0.06	0.01	0.00	0.13	0.01	0.22						
Queue Length 95th (ft)	0	1	0	0	0	0						
Control Delay (s)	0.0	11.1	0.2	0.0	0.2	0.0						
Lane LOS	A	B	A		A							
Approach Delay (s)	0.0	11.1	0.1		0.1							
Approach LOS	A	B										
Intersection Summary												
Average Delay			0.1									
Intersection Capacity Utilization			29.8%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

7: Chapman Ave & Rollins Ave

Existing AM
12/04/2024

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						 
Traffic Volume (veh/h)	35	36	304	71	36	510
Future Volume (Veh/h)	35	36	304	71	36	510
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	36	37	313	73	37	526
Pedestrians	11					3
Lane Width (ft)	12.0					10.0
Walking Speed (ft/s)	3.5					3.5
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			287			440
pX, platoon unblocked	0.99	0.99			0.99	
vC, conflicting volume	698	364			397	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	690	353			387	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	90	94			97	
cM capacity (veh/h)	360	629			1145	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	36	37	386	212	351	
Volume Left	36	0	0	37	0	
Volume Right	0	37	73	0	0	
cSH	360	629	1700	1145	1700	
Volume to Capacity	0.10	0.06	0.23	0.03	0.21	
Queue Length 95th (ft)	8	5	0	3	0	
Control Delay (s)	16.1	11.1	0.0	1.7	0.0	
Lane LOS	C	B		A		
Approach Delay (s)	13.6		0.0	0.6		
Approach LOS	B					
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			50.0%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: Chapman Ave & Pike Center South

Existing AM
12/04/2024

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations					  	
Traffic Volume (veh/h)	1	0	1	342	547	3
Future Volume (Veh/h)	1	0	1	342	547	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.63	0.63	0.63	0.63	0.63	0.63
Hourly flow rate (vph)	2	0	2	543	868	5
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				111	616	
pX, platoon unblocked	0.94					
vC, conflicting volume	1418	292	873			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1412	292	873			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	100			
cM capacity (veh/h)	120	705	768			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2	SB 3	
Volume Total	2	545	347	347	179	
Volume Left	2	2	0	0	0	
Volume Right	0	0	0	0	5	
cSH	120	768	1700	1700	1700	
Volume to Capacity	0.02	0.00	0.20	0.20	0.11	
Queue Length 95th (ft)	1	0	0	0	0	
Control Delay (s)	35.4	0.1	0.0	0.0	0.0	
Lane LOS	E	A				
Approach Delay (s)	35.4	0.1	0.0			
Approach LOS	E					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			28.8%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

Existing AM

9: Chapman Ave & Bou Ave

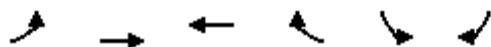
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	186	116	37	6	91	116	4	41	4	100	79	368
Future Volume (vph)	186	116	37	6	91	116	4	41	4	100	79	368
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		0.99	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1645	1661		1630	1739	1433	1648	1713		1632	1739	1478
Flt Permitted	0.57	1.00		0.66	1.00	1.00	0.70	1.00		0.73	1.00	1.00
Satd. Flow (perm)	982	1661		1124	1739	1433	1220	1713		1248	1739	1478
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	196	122	39	6	96	122	4	43	4	105	83	387
RTOR Reduction (vph)	0	14	0	0	0	84	0	3	0	0	0	174
Lane Group Flow (vph)	196	147	0	6	96	38	4	44	0	105	83	213
Confl. Peds. (#/hr)	5		8	8		5	2		11	11		2
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	pt+ov
Protected Phases	1	6			2			4			8	8 1
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	43.3	43.3		24.5	24.5	24.5	24.0	24.0		24.0	24.0	43.3
Effective Green, g (s)	43.3	43.3		24.5	24.5	24.5	24.0	24.0		24.0	24.0	43.3
Actuated g/C Ratio	0.55	0.55		0.31	0.31	0.31	0.30	0.30		0.30	0.30	0.55
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	6.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	651	912		349	540	445	371	521		380	529	812
v/s Ratio Prot	c0.05	0.09			0.06			0.03			0.05	c0.14
v/s Ratio Perm	c0.11			0.01		0.03	0.00			0.08		
v/c Ratio	0.30	0.16		0.02	0.18	0.09	0.01	0.08		0.28	0.16	0.26
Uniform Delay, d1	9.3	8.8		18.8	19.8	19.2	19.1	19.6		20.8	20.0	9.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.7	0.0		0.1	0.7	0.4	0.0	0.1		1.8	0.6	0.5
Delay (s)	10.0	8.8		18.9	20.5	19.6	19.1	19.6		22.6	20.6	9.8
Level of Service	B	A		B	C	B	B	B		C	C	A
Approach Delay (s)		9.5			20.0			19.6			13.7	
Approach LOS		A			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			13.9									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.32									
Actuated Cycle Length (s)			78.8									Sum of lost time (s) 17.0
Intersection Capacity Utilization			57.6%									ICU Level of Service B
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

10: Bou Ave & Pike Center

Existing AM
12/04/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	10	317	484	14	16	8
Future Volume (Veh/h)	10	317	484	14	16	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	11	337	515	15	17	9
Pedestrians		4			7	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		278	280			
pX, platoon unblocked						
vC, conflicting volume	537				720	276
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	537				720	276
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				95	99
cM capacity (veh/h)	1020				356	714
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	123	225	343	187	26	
Volume Left	11	0	0	0	17	
Volume Right	0	0	0	15	9	
cSH	1020	1700	1700	1700	431	
Volume to Capacity	0.01	0.13	0.20	0.11	0.06	
Queue Length 95th (ft)	1	0	0	0	5	
Control Delay (s)	0.9	0.0	0.0	0.0	13.9	
Lane LOS	A				B	
Approach Delay (s)	0.3		0.0		13.9	
Approach LOS					B	
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			27.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

11: East Jefferson Street & Rollins Avenue

Existing AM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	44	27	272	32	38	9	243	259	20	218	18
Future Volume (vph)	17	44	27	272	32	38	9	243	259	20	218	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.94		1.00	0.92			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1711	1682		1711	1624			1797	1509		3362	
Flt Permitted	0.95	1.00		0.95	1.00			0.99	1.00		0.92	
Satd. Flow (perm)	1711	1682		1711	1624			1778	1509		3112	
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)	18	48	29	296	35	41	10	264	282	22	237	20
RTOR Reduction (vph)	0	27	0	0	33	0	0	0	67	0	4	0
Lane Group Flow (vph)	18	50	0	296	43	0	0	274	215	0	275	0
Confl. Peds. (#/hr)	7		10	10		7	7		6	6		7
Confl. Bikes (#/hr)			1			1			1			1
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		3	3			2	3		6	
Permitted Phases							2		2	6		
Actuated Green, G (s)	6.3	6.3		17.6	17.6			47.1	64.7		47.1	
Effective Green, g (s)	6.3	6.3		17.6	17.6			47.1	64.7		47.1	
Actuated g/C Ratio	0.07	0.07		0.21	0.21			0.55	0.76		0.55	
Clearance Time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Vehicle Extension (s)	2.0	2.0		1.0	1.0			5.0	1.0		5.0	
Lane Grp Cap (vph)	126	124		354	336			985	1148		1724	
v/s Ratio Prot	0.01	c0.03		c0.17	0.03				0.04			
v/s Ratio Perm								c0.15	0.10		0.09	
v/c Ratio	0.14	0.40		0.84	0.13			0.28	0.19		0.16	
Uniform Delay, d1	36.8	37.6		32.3	27.5			10.0	2.8		9.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.8		15.0	0.1			0.7	0.0		0.2	
Delay (s)	37.0	38.3		47.3	27.5			10.7	2.9		9.5	
Level of Service	D	D		D	C			B	A		A	
Approach Delay (s)		38.1			43.2			6.7			9.5	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			20.0			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			60.2%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Existing AM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	52	56	7	28	67	79	794	17	63	1344	20
Future Volume (vph)	42	52	56	7	28	67	79	794	17	63	1344	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		0.96	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1765	3174		1706	1863	1583	1711	4898		1709	4903	
Flt Permitted	0.74	1.00		0.68	1.00	1.00	0.16	1.00		0.32	1.00	
Satd. Flow (perm)	1371	3174		1223	1863	1583	280	4898		579	4903	
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)	44	54	58	7	29	70	82	827	18	66	1400	21
RTOR Reduction (vph)	0	53	0	0	0	64	0	1	0	0	1	0
Lane Group Flow (vph)	44	59	0	7	29	6	82	844	0	66	1420	0
Confl. Peds. (#/hr)	2		28	28		2	1		7	7		1
Confl. Bikes (#/hr)						1						
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	8	1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	12.2	12.2		12.2	12.2	12.2	123.2	113.3		117.4	110.4	
Effective Green, g (s)	12.2	12.2		12.2	12.2	12.2	123.2	113.3		117.4	110.4	
Actuated g/C Ratio	0.08	0.08		0.08	0.08	0.08	0.82	0.76		0.78	0.74	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	111	258		99	151	128	324	3699		505	3608	
v/s Ratio Prot		0.02			0.02	0.00	c0.02	0.17		0.01	c0.29	
v/s Ratio Perm	c0.03			0.01			c0.19			0.10		
v/c Ratio	0.40	0.23		0.07	0.19	0.04	0.25	0.23		0.13	0.39	
Uniform Delay, d1	65.4	64.5		63.7	64.3	63.5	3.3	5.4		3.7	7.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.04	0.75		1.00	1.00	
Incremental Delay, d2	4.8	0.9		0.6	1.3	0.3	0.8	0.1		0.2	0.3	
Delay (s)	70.2	65.4		64.3	65.6	63.8	4.3	4.2		3.9	7.7	
Level of Service	E	E		E	E	E	A	A		A	A	
Approach Delay (s)		66.8			64.3			4.2			7.5	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay		12.1										
HCM 2000 Volume to Capacity ratio		0.38										
Actuated Cycle Length (s)		150.0								17.5		
Intersection Capacity Utilization		64.1%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Twinbrook Parkway & Parklawn Drive

Existing AM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	24	51	163	19	124	50	519	277	179	765	63
Future Volume (vph)	36	24	51	163	19	124	50	519	277	179	765	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	10	10	10	10	10
Total Lost time (s)	6.5	6.5		7.0	7.0	7.0	8.0	6.0		8.0	6.0	6.0
Lane Util. Factor	0.95	0.95		0.95	0.95	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	1.00		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1573		1625	1645	1531	1651	4476		3203	3303	1437
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.31	1.00		0.29	1.00	1.00
Satd. Flow (perm)	1681	1573		1625	1645	1531	536	4476		979	3303	1437
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	38	26	54	173	20	132	53	552	295	190	814	67
RTOR Reduction (vph)	0	46	0	0	0	106	0	35	0	0	0	26
Lane Group Flow (vph)	34	38	0	97	96	26	53	812	0	190	814	41
Confl. Peds. (#/hr)	10		2	2		10	2		1	1		2
Confl. Bikes (#/hr)												1
Turn Type	Split	NA		Split	NA	pt+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	9.4	9.4		14.5	14.5	30.0	96.1	90.1		101.1	92.6	92.6
Effective Green, g (s)	9.4	9.4		14.5	14.5	30.0	96.1	90.1		101.1	92.6	92.6
Actuated g/C Ratio	0.06	0.06		0.10	0.10	0.20	0.64	0.60		0.67	0.62	0.62
Clearance Time (s)	6.5	6.5		7.0	7.0		8.0	6.0		8.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	105	98		157	159	306	387	2688		785	2039	887
v/s Ratio Prot	0.02	c0.02		c0.06	0.06	0.02	0.01	0.18		c0.01	c0.25	
v/s Ratio Perm							0.08			0.15		0.03
v/c Ratio	0.32	0.39		0.62	0.60	0.09	0.14	0.30		0.24	0.40	0.05
Uniform Delay, d1	67.3	67.5		65.1	65.0	48.8	10.3	14.6		8.8	14.6	11.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.87	0.59		1.00	1.00	1.00
Incremental Delay, d2	1.8	2.5		7.1	6.3	0.1	0.2	0.3		0.2	0.6	0.1
Delay (s)	69.1	70.1		72.1	71.3	49.0	9.1	8.9		9.0	15.2	11.4
Level of Service	E	E		E	E	D	A	A		A	B	B
Approach Delay (s)		69.8			62.5			9.0			13.8	
Approach LOS		E			E			A			B	
Intersection Summary												
HCM 2000 Control Delay			21.3									
HCM 2000 Volume to Capacity ratio			0.42									
Actuated Cycle Length (s)			150.0									
Intersection Capacity Utilization			57.7%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

14: Nebel Street & Randolph Road

Existing AM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	564	56	177	933	92	80	54	68	105	70	14
Future Volume (vph)	16	564	56	177	933	92	80	54	68	105	70	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	12	12	12
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1652	3249		1768	3487		1711	1801	1531	1766	1863	1583
Flt Permitted	0.23	1.00		0.34	1.00		0.71	1.00	1.00	0.63	1.00	1.00
Satd. Flow (perm)	403	3249		630	3487		1276	1801	1531	1180	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	17	594	59	186	982	97	84	57	72	111	74	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	17	653	0	186	1079	0	84	57	72	111	74	15
Confl. Peds. (#/hr)	1		4	4		1			2	2		
Confl. Bikes (#/hr)									1			
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Prot	pm+pt	NA	Prot
Protected Phases	1	6		5	2		3	8	8	7	4	4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	88.2	85.5		102.8	94.1		25.9	13.4	13.4	29.5	15.2	15.2
Effective Green, g (s)	88.2	85.5		102.8	94.1		25.9	13.4	13.4	29.5	15.2	15.2
Actuated g/C Ratio	0.59	0.57		0.69	0.63		0.17	0.09	0.09	0.20	0.10	0.10
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	259	1851		517	2187		256	160	136	287	188	160
v/s Ratio Prot	0.00	0.20		c0.03	c0.31		0.03	0.03	c0.05	c0.04	0.04	0.01
v/s Ratio Perm	0.04			0.22			0.03			0.04		
v/c Ratio	0.07	0.35		0.36	0.49		0.33	0.36	0.53	0.39	0.39	0.09
Uniform Delay, d1	13.3	17.4		9.3	15.1		54.0	64.2	65.3	51.7	63.1	61.2
Progression Factor	0.79	0.69		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.5		0.4	0.8		1.0	1.9	4.8	1.2	1.9	0.3
Delay (s)	10.5	12.4		9.7	15.9		55.0	66.1	70.1	52.8	64.9	61.5
Level of Service	B	B		A	B		E	E	E	D	E	E
Approach Delay (s)		12.4			15.0			63.1			58.0	
Approach LOS		B			B			E			E	
Intersection Summary												
HCM 2000 Control Delay			22.3			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			25.5			
Intersection Capacity Utilization			60.4%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Existing AM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	7	13	77	16	50	25	1099	116	48	1770	48
Future Volume (vph)	20	7	13	77	16	50	25	1099	116	48	1770	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.96		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.97	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	0.89		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	1604		1770	1581		1710	6068		1709	4883	
Flt Permitted	0.71	1.00		0.74	1.00		0.09	1.00		0.19	1.00	
Satd. Flow (perm)	1241	1604		1386	1581		169	6068		335	4883	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	20	7	13	79	16	51	26	1121	118	49	1806	49
RTOR Reduction (vph)	0	12	0	0	46	0	0	6	0	0	1	0
Lane Group Flow (vph)	20	8	0	79	21	0	26	1233	0	49	1854	0
Confl. Peds. (#/hr)	25					25	29		16	16		29
Confl. Bikes (#/hr)			4			3						
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8		113.8	108.8		117.6	110.7	
Effective Green, g (s)	15.8	15.8		15.8	15.8		113.8	108.8		117.6	110.7	
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.76	0.73		0.78	0.74	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	130	168		145	166		179	4401		325	3603	
v/s Ratio Prot		0.01			0.01		0.00	0.20		c0.01	c0.38	
v/s Ratio Perm	0.02			c0.06			0.10			0.11		
v/c Ratio	0.15	0.05		0.54	0.13		0.15	0.28		0.15	0.51	
Uniform Delay, d1	61.0	60.3		63.7	60.9		5.5	7.1		3.8	8.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.28	0.54	
Incremental Delay, d2	1.2	0.3		7.2	0.7		0.8	0.2		0.4	0.4	
Delay (s)	62.2	60.6		70.9	61.6		6.3	7.3		1.4	4.9	
Level of Service	E	E		E	E		A	A		A	A	
Approach Delay (s)		61.4			66.6			7.2			4.8	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay		9.1										
HCM 2000 Volume to Capacity ratio		0.51										
Actuated Cycle Length (s)		150.0								18.5		
Intersection Capacity Utilization		69.2%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Existing AM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	593	80	9	1014	66	11	6	4	27	7	24
Future Volume (vph)	77	593	80	9	1014	66	11	6	4	27	7	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.94		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	3222		1645	3303	1428	1711	1675		1681	1545	
Flt Permitted	0.19	1.00		0.36	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	330	3222		621	3303	1428	1711	1675		1681	1545	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	89	682	92	10	1166	76	13	7	5	31	8	28
RTOR Reduction (vph)	0	3	0	0	0	24	0	5	0	0	0	0
Lane Group Flow (vph)	89	771	0	10	1166	52	13	7	0	28	39	0
Confl. Peds. (#/hr)	4		11	11		4	4		3	3		4
Confl. Bikes (#/hr)												1
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	118.0	110.2		105.4	102.6	102.6	5.1	5.1		8.9	8.9	
Effective Green, g (s)	118.0	110.2		105.4	102.6	102.6	5.1	5.1		8.9	8.9	
Actuated g/C Ratio	0.79	0.73		0.70	0.68	0.68	0.03	0.03		0.06	0.06	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	351	2367		455	2259	976	58	56		99	91	
v/s Ratio Prot	c0.02	c0.24		0.00	c0.35		c0.01	0.00		0.02	c0.03	
v/s Ratio Perm	0.18			0.02		0.04						
v/c Ratio	0.25	0.33		0.02	0.52	0.05	0.22	0.13		0.28	0.43	
Uniform Delay, d1	5.9	6.9		6.7	11.6	7.8	70.5	70.3		67.5	68.1	
Progression Factor	1.00	1.00		0.52	0.46	0.09	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.4		0.0	0.8	0.1	2.7	1.4		2.1	4.4	
Delay (s)	6.5	7.3		3.5	6.1	0.8	73.2	71.7		69.6	72.5	
Level of Service	A	A		A	A	A	E	E		E	E	
Approach Delay (s)		7.2			5.8			72.5			71.3	
Approach LOS		A			A			E			E	
Intersection Summary												
HCM 2000 Control Delay		9.1				HCM 2000 Level of Service		A				
HCM 2000 Volume to Capacity ratio		0.48										
Actuated Cycle Length (s)		150.0				Sum of lost time (s)		23.0				
Intersection Capacity Utilization		56.0%				ICU Level of Service		B				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 17: Chapman Ave/Chapman Road & Thompson Ave

Existing AM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	3	37	30	15	2	37	142	7	7	144	9
Future Volume (Veh/h)	2	3	37	30	15	2	37	142	7	7	144	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	3	43	34	17	2	43	163	8	8	166	10
Pedestrians		71			19			50			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		7			2			5			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								638				
pX, platoon unblocked												
vC, conflicting volume	524	534	292	554	535	188	247			190		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	524	534	292	554	535	188	247			190		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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	99	94	90	96	100	97			99		
cM capacity (veh/h)	378	397	664	350	397	837	1230			1359		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	48	53	214	184								
Volume Left	2	34	43	8								
Volume Right	43	2	8	10								
cSH	618	372	1230	1359								
Volume to Capacity	0.08	0.14	0.03	0.01								
Queue Length 95th (ft)	6	12	3	0								
Control Delay (s)	11.3	16.3	1.9	0.4								
Lane LOS	B	C	A	A								
Approach Delay (s)	11.3	16.3	1.9	0.4								
Approach LOS	B	C										
Intersection Summary												
Average Delay			3.8									
Intersection Capacity Utilization			41.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

Existing PM

1: Rockville Pike - 355 & Bou Ave

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰↱	↰		↱	↰↱↰	↱	↱	↰↱↰	
Traffic Volume (vph)	17	31	36	324	21	175	57	1847	365	206	1170	18
Future Volume (vph)	17	31	36	324	21	175	57	1847	365	206	1170	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	0.94		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	0.87		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1708	1478	3204	1422		1711	4916	1531	1770	5063	
Flt Permitted		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.08	1.00	
Satd. Flow (perm)		1708	1478	3204	1422		1711	4916	1531	142	5063	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.92
Adj. Flow (vph)	18	32	37	334	22	180	59	1904	376	212	1206	20
RTOR Reduction (vph)	0	0	35	0	153	0	0	0	96	0	1	0
Lane Group Flow (vph)	0	50	2	334	49	0	59	1904	280	212	1225	0
Confl. Peds. (#/hr)	25					25	25		25	25		25
Confl. Bikes (#/hr)			1			1			1			
Turn Type	Split	NA	Prot	Split	NA		Prot	NA	Prot	pm+pt	NA	
Protected Phases	3	3	3	4	4		1	5	5	6	2	
Permitted Phases										2		
Actuated Green, G (s)		7.3	7.3	22.3	22.3		9.2	85.4	85.4	87.2	87.2	
Effective Green, g (s)		7.3	7.3	22.3	22.3		9.2	85.4	85.4	87.2	87.2	
Actuated g/C Ratio		0.05	0.05	0.15	0.15		0.06	0.57	0.57	0.58	0.58	
Clearance Time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	6.0	6.0		3.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)		83	71	476	211		104	2798	871	196	2943	
v/s Ratio Prot		c0.03	0.00	c0.10	0.03		0.03	c0.39	0.18	c0.08	0.24	
v/s Ratio Perm										c0.55		
v/c Ratio		0.60	0.03	0.70	0.23		0.57	0.68	0.32	1.08	0.42	
Uniform Delay, d1		69.9	68.0	60.7	56.3		68.5	22.7	17.0	42.2	17.3	
Progression Factor		1.00	1.00	1.00	1.00		1.38	0.46	0.29	0.60	0.18	
Incremental Delay, d2		11.7	0.1	6.8	1.6		5.6	1.1	0.8	84.8	0.4	
Delay (s)		81.6	68.1	67.5	57.9		100.2	11.6	5.8	110.2	3.5	
Level of Service		F	E	E	E		F	B	A	F	A	
Approach Delay (s)		75.9			63.8			12.9			19.2	
Approach LOS		E			E			B			B	
Intersection Summary												
HCM 2000 Control Delay			22.4			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			31.0			
Intersection Capacity Utilization			78.4%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Rockville Pike - 355 & Federal Plaza/Pike Center

Existing PM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Traffic Volume (vph)	127	8	133	18	9	38	197	1700	23	26	1221	13
Future Volume (vph)	127	8	133	18	9	38	197	1700	23	26	1221	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	16	16	16	11	11	11	10	10	10
Total Lost time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00	1.00		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.92		1.00	1.00		1.00	1.00	
Flt Protected		0.95	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1660	1478		1892		1709	4901		1651	4734	
Flt Permitted		0.95	1.00		0.99		0.15	1.00		0.10	1.00	
Satd. Flow (perm)		1660	1478		1892		279	4901		172	4734	
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)	132	8	139	19	9	40	205	1771	24	27	1272	14
RTOR Reduction (vph)	0	0	122	0	38	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	140	17	0	30	0	205	1795	0	27	1286	0
Confl. Peds. (#/hr)	3		5	5		3	23		16	16		23
Confl. Bikes (#/hr)						1						
Turn Type	Split	NA	Prot	Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	8	8	8	4	4		5	2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		18.1	18.1		7.0		106.4	97.3		90.9	86.8	
Effective Green, g (s)		18.1	18.1		7.0		106.4	97.3		90.9	86.8	
Actuated g/C Ratio		0.12	0.12		0.05		0.71	0.65		0.61	0.58	
Clearance Time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		200	178		88		337	3179		144	2739	
v/s Ratio Prot		c0.08	0.01		c0.02		c0.06	0.37		0.01	0.27	
v/s Ratio Perm							c0.37			0.11		
v/c Ratio		0.70	0.09		0.34		0.61	0.56		0.19	0.47	
Uniform Delay, d1		63.3	58.7		69.3		10.8	14.6		12.6	18.3	
Progression Factor		1.00	1.00		1.00		2.68	0.25		1.08	0.80	
Incremental Delay, d2		10.2	0.2		2.3		2.4	0.6		0.6	0.5	
Delay (s)		73.6	58.9		71.6		31.4	4.2		14.3	15.2	
Level of Service		E	E		E		C	A		B	B	
Approach Delay (s)		66.3			71.6			7.0			15.2	
Approach LOS		E			E			A			B	
Intersection Summary												
HCM 2000 Control Delay			15.6				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			23.5		
Intersection Capacity Utilization			67.1%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Rockville Pike - 355 & Gas Station

Existing PM
12/04/2024

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			   			  	
Traffic Volume (veh/h)	0	58	1821	44	0	1248	
Future Volume (Veh/h)	0	58	1821	44	0	1248	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	
Hourly flow rate (vph)	0	66	2069	50	0	1418	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			225			340	
pX, platoon unblocked	0.86	0.80			0.80		
vC, conflicting volume	2567	715			2119		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1236	0			1514		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	92			100		
cM capacity (veh/h)	145	865			349		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	66	828	828	464	473	473	473
Volume Left	0	0	0	0	0	0	0
Volume Right	66	0	0	50	0	0	0
cSH	865	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.08	0.49	0.49	0.27	0.28	0.28	0.28
Queue Length 95th (ft)	6	0	0	0	0	0	0
Control Delay (s)	9.5	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A						
Approach Delay (s)	9.5	0.0			0.0		
Approach LOS	A						
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization			46.4%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis

4: Rockville Pike - 355 & Rollins Avenue /Twinbrook Parkway

Existing PM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑	↑	↑	↑↑↑	↑	↑	↑↑↑	
Traffic Volume (vph)	0	423	37	0	308	148	100	1523	121	154	1211	44
Future Volume (vph)	0	423	37	0	308	148	100	1523	121	154	1211	44
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	10	10	10	11	11	11
Total Lost time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.99			1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3255			3539	1583	1650	4746	1478	1711	4880	
Flt Permitted		1.00			1.00	1.00	0.18	1.00	1.00	0.11	1.00	
Satd. Flow (perm)		3255			3539	1583	319	4746	1478	196	4880	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	427	37	0	311	149	101	1538	122	156	1223	44
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	51	0	2	0
Lane Group Flow (vph)	0	464	0	0	311	149	101	1538	71	156	1265	0
Confl. Peds. (#/hr)	24		18	18		24	26		36	36		26
Confl. Bikes (#/hr)			1			1			2			
Turn Type		NA			NA	Prot	pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		4			8	8	1	6	6	5	2	
Permitted Phases							6			2		
Actuated Green, G (s)		28.5			28.5	28.5	96.9	87.5	87.5	106.1	92.1	
Effective Green, g (s)		28.5			28.5	28.5	96.9	87.5	87.5	106.1	92.1	
Actuated g/C Ratio		0.19			0.19	0.19	0.65	0.58	0.58	0.71	0.61	
Clearance Time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Vehicle Extension (s)		4.0			4.0	4.0	4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)		618			672	300	289	2768	862	280	2996	
v/s Ratio Prot		c0.14			0.09	0.09	0.02	0.32	0.05	c0.05	c0.26	
v/s Ratio Perm							0.20			c0.34		
v/c Ratio		0.75			0.46	0.50	0.35	0.56	0.08	0.56	0.42	
Uniform Delay, d1		57.4			54.0	54.3	10.5	19.3	13.7	12.8	15.1	
Progression Factor		1.00			0.63	0.64	0.60	0.44	0.08	2.68	1.32	
Incremental Delay, d2		5.4			0.6	1.6	0.9	0.7	0.2	2.7	0.4	
Delay (s)		62.8			34.8	36.4	7.2	9.2	1.3	36.9	20.3	
Level of Service		E			C	D	A	A	A	D	C	
Approach Delay (s)		62.8			35.3			8.5			22.1	
Approach LOS		E			D			A			C	
Intersection Summary												
HCM 2000 Control Delay		22.4			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.62										
Actuated Cycle Length (s)		150.0			Sum of lost time (s)			20.0				
Intersection Capacity Utilization		75.3%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Chapman Ave & Twinbrook Parkway

Existing PM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	725	95	463	583	141	55	109	564	215	119	37
Future Volume (vph)	68	725	95	463	583	141	55	109	564	215	119	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	10	10	10	10	10	10
Total Lost time (s)	5.5	6.0		5.5	6.0			6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		0.97	0.95			1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1650	3235		3319	3305			1710	1478	3204	1739	1421
Flt Permitted	0.37	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (perm)	637	3235		3319	3305			1710	1478	3204	1739	1421
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	70	747	98	477	601	145	57	112	581	222	123	38
RTOR Reduction (vph)	0	7	0	0	12	0	0	0	55	0	0	34
Lane Group Flow (vph)	70	838	0	477	734	0	0	169	526	222	123	4
Confl. Peds. (#/hr)	2		9	9		2	15		14	14		15
Confl. Bikes (#/hr)									1			1
Turn Type	pm+pt	NA		Prot	NA		Split	NA	pt+ov	Split	NA	Perm
Protected Phases	5	2		1	6		4	4	4 1	3	3	
Permitted Phases	2											3
Actuated Green, G (s)	53.7	46.2		25.3	64.0			37.5	69.3	16.5	16.5	16.5
Effective Green, g (s)	53.7	46.2		25.3	64.0			37.5	69.3	16.5	16.5	16.5
Actuated g/C Ratio	0.36	0.31		0.17	0.43			0.25	0.46	0.11	0.11	0.11
Clearance Time (s)	5.5	6.0		5.5	6.0			6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	278	996		559	1410			427	682	352	191	156
v/s Ratio Prot	0.01	c0.26		c0.14	0.22			0.10	c0.36	0.07	c0.07	
v/s Ratio Perm	0.08											0.00
v/c Ratio	0.25	0.84		0.85	0.52			0.40	0.77	0.63	0.64	0.03
Uniform Delay, d1	32.3	48.5		60.5	31.7			46.8	33.7	63.8	63.9	59.6
Progression Factor	0.88	0.67		1.06	0.78			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	8.3		11.2	1.3			0.6	5.4	3.7	7.2	0.1
Delay (s)	28.7	40.8		75.4	26.0			47.4	39.1	67.5	71.2	59.7
Level of Service	C	D		E	C			D	D	E	E	E
Approach Delay (s)		39.9			45.3			41.0			67.9	
Approach LOS		D			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			45.4			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			88.0%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

6: Chapman Ave & Pike Center North/Driveway

Existing PM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	1	4	4	1	7	3	697	8	5	589	4
Future Volume (Veh/h)	6	1	4	4	1	7	3	697	8	5	589	4
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	1	4	4	1	8	3	774	9	6	654	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)							471			256		
pX, platoon unblocked												
vC, conflicting volume	1070	1457	329	1128	1454	392	658				783	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1070	1457	329	1128	1454	392	658				783	
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 %	96	99	99	97	99	99	100				99	
cM capacity (veh/h)	171	127	667	156	128	607	926				831	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	12	13	390	396	333	331						
Volume Left	7	4	3	0	6	0						
Volume Right	4	8	0	9	0	4						
cSH	219	279	926	1700	831	1700						
Volume to Capacity	0.05	0.05	0.00	0.23	0.01	0.19						
Queue Length 95th (ft)	4	4	0	0	1	0						
Control Delay (s)	22.4	18.6	0.1	0.0	0.3	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	22.4	18.6	0.1		0.1							
Approach LOS	C	C										
Intersection Summary												
Average Delay				0.4								
Intersection Capacity Utilization				31.6%	ICU Level of Service			A				
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

7: Chapman Ave & Rollins Ave

Existing PM
12/04/2024

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	71	97	611	68	45	552
Future Volume (Veh/h)	71	97	611	68	45	552
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	73	100	630	70	46	569
Pedestrians	18					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	2					
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)			287			440
pX, platoon unblocked	0.92	0.92			0.92	
vC, conflicting volume	1060	683			718	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1022	613			651	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	63	75			95	
cM capacity (veh/h)	199	394			843	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	73	100	700	236	379	
Volume Left	73	0	0	46	0	
Volume Right	0	100	70	0	0	
cSH	199	394	1700	843	1700	
Volume to Capacity	0.37	0.25	0.41	0.05	0.22	
Queue Length 95th (ft)	40	25	0	4	0	
Control Delay (s)	33.3	17.2	0.0	2.3	0.0	
Lane LOS	D	C		A		
Approach Delay (s)	24.0		0.0	0.9		
Approach LOS	C					
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			60.3%	ICU Level of Service		B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: Chapman Ave & Pike Center South

Existing PM
12/04/2024

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations					  	
Traffic Volume (veh/h)	1	3	0	674	615	8
Future Volume (Veh/h)	1	3	0	674	615	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	1	4	0	899	820	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (ft)				111	616	
pX, platoon unblocked	0.83					
vC, conflicting volume	1724	279	831			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1771	279	831			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	100			
cM capacity (veh/h)	62	718	797			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2	SB 3	
Volume Total	5	899	328	328	175	
Volume Left	1	0	0	0	0	
Volume Right	4	0	0	0	11	
cSH	229	797	1700	1700	1700	
Volume to Capacity	0.02	0.00	0.19	0.19	0.10	
Queue Length 95th (ft)	2	0	0	0	0	
Control Delay (s)	21.1	0.0	0.0	0.0	0.0	
Lane LOS	C					
Approach Delay (s)	21.1	0.0	0.0			
Approach LOS	C					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			45.5%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

Existing PM

9: Chapman Ave & Bou Ave

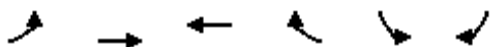
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	317	239	56	15	167	230	17	127	42	206	127	329
Future Volume (vph)	317	239	56	15	167	230	17	127	42	206	127	329
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00		0.99	1.00	1.00	0.99	1.00		0.98	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1643	1679		1640	1739	1422	1636	1660		1627	1739	1478
Flt Permitted	0.52	1.00		0.57	1.00	1.00	0.67	1.00		0.65	1.00	1.00
Satd. Flow (perm)	899	1679		990	1739	1422	1158	1660		1105	1739	1478
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)	330	249	58	16	174	240	18	132	44	215	132	343
RTOR Reduction (vph)	0	11	0	0	0	166	0	15	0	0	0	153
Lane Group Flow (vph)	330	296	0	16	174	74	18	161	0	215	132	190
Confl. Peds. (#/hr)	8		5	5		8	10		17	17		10
Confl. Bikes (#/hr)			2			1						
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	pt+ov
Protected Phases	1	6			2			4			8	8 1
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	44.1	44.1		24.5	24.5	24.5	24.0	24.0		24.0	24.0	44.1
Effective Green, g (s)	44.1	44.1		24.5	24.5	24.5	24.0	24.0		24.0	24.0	44.1
Actuated g/C Ratio	0.55	0.55		0.31	0.31	0.31	0.30	0.30		0.30	0.30	0.55
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	6.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	629	930		304	535	437	349	500		333	524	818
v/s Ratio Prot	c0.09	0.18			0.10			0.10			0.08	0.13
v/s Ratio Perm	c0.20			0.02		0.05	0.02			c0.19		
v/c Ratio	0.52	0.32		0.05	0.33	0.17	0.05	0.32		0.65	0.25	0.23
Uniform Delay, d1	10.2	9.6		19.4	21.2	20.1	19.7	21.5		24.1	21.0	9.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.0	0.1		0.3	1.6	0.8	0.1	0.4		9.3	1.2	0.4
Delay (s)	12.2	9.7		19.7	22.8	21.0	19.8	21.9		33.4	22.2	9.5
Level of Service	B	A		B	C	C	B	C		C	C	A
Approach Delay (s)		11.0			21.7			21.7			19.4	
Approach LOS		B			C			C			B	
Intersection Summary												
HCM 2000 Control Delay			17.4									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			79.6							17.0		
Intersection Capacity Utilization			77.0%									ICU Level of Service D
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

10: Bou Ave & Pike Center

Existing PM
12/04/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	20	516	475	31	46	28
Future Volume (Veh/h)	20	516	475	31	46	28
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	21	532	490	32	47	29
Pedestrians		1			7	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		278	280			
pX, platoon unblocked						
vC, conflicting volume	529				821	269
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	529				821	269
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				85	96
cM capacity (veh/h)	1027				304	723
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	198	355	327	195	76	
Volume Left	21	0	0	0	47	
Volume Right	0	0	0	32	29	
cSH	1027	1700	1700	1700	391	
Volume to Capacity	0.02	0.21	0.19	0.11	0.19	
Queue Length 95th (ft)	2	0	0	0	18	
Control Delay (s)	1.1	0.0	0.0	0.0	16.4	
Lane LOS	A				C	
Approach Delay (s)	0.4		0.0		16.4	
Approach LOS					C	
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			40.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

11: East Jefferson Street & Rollins Avenue

Existing PM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	44	26	331	65	78	7	477	373	18	263	18
Future Volume (vph)	10	44	26	331	65	78	7	477	373	18	263	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.97			1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.94		1.00	0.92			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1711	1678		1711	1599			1799	1499		3368	
Flt Permitted	0.95	1.00		0.95	1.00			1.00	1.00		0.92	
Satd. Flow (perm)	1711	1678		1711	1599			1792	1499		3098	
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)	10	46	27	345	68	81	7	497	389	19	274	19
RTOR Reduction (vph)	0	25	0	0	52	0	0	0	92	0	4	0
Lane Group Flow (vph)	10	48	0	345	97	0	0	504	297	0	308	0
Confl. Peds. (#/hr)	19		20	20		19	18		15	15		18
Confl. Bikes (#/hr)			1			3			2			3
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		3	3			2	3		6	
Permitted Phases							2		2		6	
Actuated Green, G (s)	6.2	6.2		19.7	19.7			45.1	64.8		45.1	
Effective Green, g (s)	6.2	6.2		19.7	19.7			45.1	64.8		45.1	
Actuated g/C Ratio	0.07	0.07		0.23	0.23			0.53	0.76		0.53	
Clearance Time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Vehicle Extension (s)	2.0	2.0		1.0	1.0			5.0	1.0		5.0	
Lane Grp Cap (vph)	124	122		396	370			950	1142		1643	
v/s Ratio Prot	0.01	c0.03		c0.20	0.06				0.06			
v/s Ratio Perm								c0.28	0.14		0.10	
v/c Ratio	0.08	0.39		0.87	0.26			0.53	0.26		0.19	
Uniform Delay, d1	36.7	37.6		31.4	26.7			13.0	3.0		10.4	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.1	0.8		18.0	0.1			2.1	0.0		0.3	
Delay (s)	36.8	38.4		49.4	26.8			15.2	3.0		10.7	
Level of Service	D	D		D	C			B	A		B	
Approach Delay (s)		38.2			42.6			9.9			10.7	
Approach LOS		D			D			A			B	
Intersection Summary												
HCM 2000 Control Delay			20.4			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			69.6%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Existing PM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	66	87	18	70	127	197	1609	7	99	1357	30
Future Volume (vph)	98	66	87	18	70	127	197	1609	7	99	1357	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.96	1.00		0.97	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1698	3148		1719	1863	1583	1710	4912		1710	4894	
Flt Permitted	0.71	1.00		0.65	1.00	1.00	0.13	1.00		0.12	1.00	
Satd. Flow (perm)	1267	3148		1176	1863	1583	230	4912		211	4894	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	103	69	92	19	74	134	207	1694	7	104	1428	32
RTOR Reduction (vph)	0	80	0	0	0	116	0	0	0	0	1	0
Lane Group Flow (vph)	103	81	0	19	74	18	207	1701	0	104	1459	0
Confl. Peds. (#/hr)	30		24	24		30	12		16	16		12
Confl. Bikes (#/hr)												1
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	8	1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	19.8	19.8		19.8	19.8	19.8	118.2	102.9		102.9	93.1	
Effective Green, g (s)	19.8	19.8		19.8	19.8	19.8	118.2	102.9		102.9	93.1	
Actuated g/C Ratio	0.13	0.13		0.13	0.13	0.13	0.79	0.69		0.69	0.62	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	167	415		155	245	208	374	3369		242	3037	
v/s Ratio Prot		0.03			0.04	0.01	c0.07	0.35		0.03	0.30	
v/s Ratio Perm	c0.08			0.02			c0.36			0.27		
v/c Ratio	0.62	0.20		0.12	0.30	0.09	0.55	0.50		0.43	0.48	
Uniform Delay, d1	61.5	58.0		57.4	58.9	57.1	9.9	11.3		8.4	15.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	2.48	0.24		1.00	1.00	
Incremental Delay, d2	9.4	0.5		0.7	1.5	0.4	2.7	0.5		2.6	0.5	
Delay (s)	70.9	58.5		58.2	60.3	57.5	27.1	3.2		11.0	15.9	
Level of Service	E	E		E	E	E	C	A		B	B	
Approach Delay (s)		63.3			58.5			5.8			15.6	
Approach LOS		E			E			A			B	
Intersection Summary												
HCM 2000 Control Delay		16.5										
HCM 2000 Volume to Capacity ratio		0.57										
Actuated Cycle Length (s)		150.0								17.5		
Intersection Capacity Utilization		73.7%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Twinbrook Parkway & Parklawn Drive

Existing PM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	32	68	304	39	272	31	1157	271	133	734	32
Future Volume (vph)	44	32	68	304	39	272	31	1157	271	133	734	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	10	10	10	10	10
Total Lost time (s)	6.5	6.5		7.0	7.0	7.0	8.0	6.0		8.0	6.0	6.0
Lane Util. Factor	0.95	0.95		0.95	0.95	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1573		1625	1647	1531	1650	4571		3204	3303	1428
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.30	1.00		0.10	1.00	1.00
Satd. Flow (perm)	1681	1573		1625	1647	1531	529	4571		352	3303	1428
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	47	34	72	323	41	289	33	1231	288	141	781	34
RTOR Reduction (vph)	0	47	0	0	0	160	0	16	0	0	0	15
Lane Group Flow (vph)	42	64	0	181	183	129	33	1503	0	141	781	19
Confl. Peds. (#/hr)	12		2	2		12	4		17	17		4
Turn Type	Split	NA		Split	NA	pt+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	3		4	4	4	1	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	11.3	11.3		23.5	23.5	38.8	85.1	79.4		90.3	82.0	82.0
Effective Green, g (s)	11.3	11.3		23.5	23.5	38.8	85.1	79.4		90.3	82.0	82.0
Actuated g/C Ratio	0.08	0.08		0.16	0.16	0.26	0.57	0.53		0.60	0.55	0.55
Clearance Time (s)	6.5	6.5		7.0	7.0		8.0	6.0		8.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	126	118		254	258	396	342	2419		369	1805	780
v/s Ratio Prot	0.02	c0.04		c0.11	0.11	c0.08	0.00	c0.33		0.02	c0.24	
v/s Ratio Perm							0.05			0.21		0.01
v/c Ratio	0.33	0.54		0.71	0.71	0.33	0.10	0.62		0.38	0.43	0.02
Uniform Delay, d1	65.8	66.9		60.0	60.0	45.0	14.8	24.8		16.0	20.2	15.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.26	1.13		1.00	1.00	1.00
Incremental Delay, d2	1.6	5.0		9.1	8.6	0.5	0.1	0.8		0.7	0.8	0.1
Delay (s)	67.3	71.8		69.1	68.6	45.5	18.7	28.8		16.7	20.9	15.7
Level of Service	E	E		E	E	D	B	C		B	C	B
Approach Delay (s)		70.6			58.5			28.6			20.1	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			34.0									
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			150.0									
Intersection Capacity Utilization			69.8%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

14: Nebel Street & Randolph Road

Existing PM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	943	74	149	736	156	125	138	247	253	160	24
Future Volume (vph)	21	943	74	149	736	156	125	138	247	253	160	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	12	12	12
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1650	3248		1770	3425		1683	1801	1531	1763	1863	1583
Flt Permitted	0.23	1.00		0.11	1.00		0.65	1.00	1.00	0.45	1.00	1.00
Satd. Flow (perm)	407	3248		201	3425		1153	1801	1531	835	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	22	993	78	157	775	164	132	145	260	266	168	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	22	1071	0	157	939	0	132	145	260	266	168	25
Confl. Peds. (#/hr)	12		18	18		12	17		8	8		17
Confl. Bikes (#/hr)			4			3			3			3
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Prot	pm+pt	NA	Prot
Protected Phases	1	6		5	2		3	8	8	7	4	4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	65.3	61.1		80.8	70.6		41.3	26.9	26.9	56.2	35.3	35.3
Effective Green, g (s)	65.3	61.1		80.8	70.6		41.3	26.9	26.9	56.2	35.3	35.3
Actuated g/C Ratio	0.44	0.41		0.54	0.47		0.28	0.18	0.18	0.37	0.24	0.24
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	211	1323		251	1612		368	322	274	453	438	372
v/s Ratio Prot	0.00	c0.33		c0.06	c0.27		0.03	0.08	c0.17	c0.09	0.09	0.02
v/s Ratio Perm	0.04			0.28			0.06			0.13		
v/c Ratio	0.10	0.81		0.63	0.58		0.36	0.45	0.95	0.59	0.38	0.07
Uniform Delay, d1	24.9	39.3		25.3	29.0		42.7	54.9	60.9	35.0	48.2	44.6
Progression Factor	0.73	0.74		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	5.0		4.8	1.5		0.8	1.4	40.5	2.3	0.8	0.1
Delay (s)	18.5	33.9		30.1	30.5		43.6	56.3	101.4	37.3	49.0	44.7
Level of Service	B	C		C	C		D	E	F	D	D	D
Approach Delay (s)		33.6			30.4			75.0			42.0	
Approach LOS		C			C			E			D	
Intersection Summary												
HCM 2000 Control Delay			40.7			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.79									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			25.5			
Intersection Capacity Utilization			82.3%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Existing PM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	12	32	186	13	138	18	1941	250	161	1458	26
Future Volume (vph)	40	12	32	186	13	138	18	1941	250	161	1458	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.93		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.95	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	0.86		1.00	0.98		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1627	1589		1770	1496		1709	6035		1711	4895	
Flt Permitted	0.54	1.00		0.73	1.00		0.14	1.00		0.04	1.00	
Satd. Flow (perm)	931	1589		1354	1496		260	6035		78	4895	
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)	42	12	33	194	14	144	19	2022	260	168	1519	27
RTOR Reduction (vph)	0	27	0	0	117	0	0	12	0	0	1	0
Lane Group Flow (vph)	42	19	0	194	41	0	19	2270	0	168	1545	0
Confl. Peds. (#/hr)	44					44	25		20	20		25
Confl. Bikes (#/hr)			3						1			3
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	27.7	27.7		27.7	27.7		91.4	86.4		109.8	98.8	
Effective Green, g (s)	27.7	27.7		27.7	27.7		91.4	86.4		109.8	98.8	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.61	0.58		0.73	0.66	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	171	293		250	276		206	3476		246	3224	
v/s Ratio Prot		0.01			0.03		0.00	0.38		0.08	0.32	
v/s Ratio Perm	0.05			0.14			0.05			0.42		
v/c Ratio	0.25	0.07		0.78	0.15		0.09	0.65		0.68	0.48	
Uniform Delay, d1	52.2	50.5		58.2	51.2		11.7	21.6		42.2	12.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.34	0.70	
Incremental Delay, d2	1.6	0.2		16.1	0.5		0.4	1.0		9.0	0.5	
Delay (s)	53.8	50.7		74.3	51.8		12.1	22.6		65.4	9.4	
Level of Service	D	D		E	D		B	C		E	A	
Approach Delay (s)		52.2			64.2			22.5			14.9	
Approach LOS		D			E			C			B	
Intersection Summary												
HCM 2000 Control Delay			23.4				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			18.5		
Intersection Capacity Utilization			89.0%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Existing PM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	861	72	14	700	127	50	24	20	152	51	96
Future Volume (vph)	144	861	72	14	700	127	50	24	20	152	51	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1651	3252		1649	3303	1432	1711	1665		1681	1573	
Flt Permitted	0.30	1.00		0.27	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	525	3252		460	3303	1432	1711	1665		1681	1573	
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)	150	897	75	15	729	132	52	25	21	158	53	100
RTOR Reduction (vph)	0	3	0	0	0	55	0	20	0	0	0	0
Lane Group Flow (vph)	150	969	0	15	729	77	52	26	0	142	169	0
Confl. Peds. (#/hr)	3		10	10		3	9		2	2		9
Confl. Bikes (#/hr)						1						1
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	100.0	91.9		86.3	83.2	83.2	9.5	9.5		22.5	22.5	
Effective Green, g (s)	100.0	91.9		86.3	83.2	83.2	9.5	9.5		22.5	22.5	
Actuated g/C Ratio	0.67	0.61		0.58	0.55	0.55	0.06	0.06		0.15	0.15	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	438	1992		289	1832	794	108	105		252	235	
v/s Ratio Prot	c0.03	c0.30		0.00	0.22		c0.03	0.02		0.08	c0.11	
v/s Ratio Perm	0.20			0.03		0.05						
v/c Ratio	0.34	0.49		0.05	0.40	0.10	0.48	0.25		0.56	0.72	
Uniform Delay, d1	10.4	16.0		13.9	19.1	15.7	67.9	66.9		59.2	60.7	
Progression Factor	1.00	1.00		0.62	0.51	0.15	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.9		0.1	0.6	0.2	4.6	1.7		3.5	10.7	
Delay (s)	11.1	16.9		8.6	10.2	2.6	72.4	68.6		62.7	71.5	
Level of Service	B	B		A	B	A	E	E		E	E	
Approach Delay (s)		16.1			9.0			70.6			67.5	
Approach LOS		B			A			E			E	
Intersection Summary												
HCM 2000 Control Delay		22.4				HCM 2000 Level of Service		C				
HCM 2000 Volume to Capacity ratio		0.53										
Actuated Cycle Length (s)		150.0				Sum of lost time (s)		23.0				
Intersection Capacity Utilization		65.4%				ICU Level of Service		C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

17: Chapman Ave/Chapman Road & Thompson Ave

Existing PM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	17	122	9	12	5	28	279	23	7	281	27
Future Volume (Veh/h)	26	17	122	9	12	5	28	279	23	7	281	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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)	28	18	130	10	13	5	30	297	24	7	299	29
Pedestrians		66			56			51			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		6			5			5			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								638				
pX, platoon unblocked	0.98	0.98		0.98	0.98	0.98				0.98		
vC, conflicting volume	775	830	430	942	833	366	394			377		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	759	816	430	930	819	341	394			353		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	89	93	77	93	95	99	97			99		
cM capacity (veh/h)	252	261	557	141	260	649	1091			1118		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	176	28	351	335								
Volume Left	28	10	30	7								
Volume Right	130	5	24	29								
cSH	426	218	1091	1118								
Volume to Capacity	0.41	0.13	0.03	0.01								
Queue Length 95th (ft)	50	11	2	0								
Control Delay (s)	19.3	23.9	1.0	0.2								
Lane LOS	C	C	A	A								
Approach Delay (s)	19.3	23.9	1.0	0.2								
Approach LOS	C	C										
Intersection Summary												
Average Delay			5.0									
Intersection Capacity Utilization			51.4%		ICU Level of Service					A		
Analysis Period (min)			15									

APPENDIX B
BACKGROUND CONDITIONS
CAPACITY ANALYSES

HCM Signalized Intersection Capacity Analysis

1: Rockville Pike - 355 & Bou Ave

Background Future AM

12/04/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗	↖↗	↖		↖	↖↗↘	↗	↖	↖↗↘	
Traffic Volume (vph)	14	21	25	467	11	65	36	1646	177	124	2077	6
Future Volume (vph)	14	21	25	467	11	65	36	1646	177	124	2077	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	0.98		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	0.87		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1704	1478	3204	1489		1711	4916	1531	1769	5083	
Flt Permitted		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.10	1.00	
Satd. Flow (perm)		1704	1478	3204	1489		1711	4916	1531	183	5083	
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)	15	22	26	486	11	68	38	1715	184	129	2164	6
RTOR Reduction (vph)	0	0	25	0	57	0	0	0	73	0	0	0
Lane Group Flow (vph)	0	37	1	486	22	0	38	1715	111	129	2170	0
Confl. Peds. (#/hr)	4					4	5		9	9		5
Confl. Bikes (#/hr)			1									
Turn Type	Split	NA	Prot	Split	NA		Prot	NA	Prot	pm+pt	NA	
Protected Phases	3	3	3	4	4		1	5	5	6	2	
Permitted Phases										2		
Actuated Green, G (s)		7.0	7.0	25.1	25.1		7.6	82.9	82.9	86.3	86.3	
Effective Green, g (s)		7.0	7.0	25.1	25.1		7.6	82.9	82.9	86.3	86.3	
Actuated g/C Ratio		0.05	0.05	0.17	0.17		0.05	0.55	0.55	0.58	0.58	
Clearance Time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	6.0	6.0		3.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)		79	68	536	249		86	2716	846	216	2924	
v/s Ratio Prot		c0.02	0.00	c0.15	0.02		0.02	c0.35	0.07	0.04	c0.43	
v/s Ratio Perm										0.30		
v/c Ratio		0.47	0.02	0.91	0.09		0.44	0.63	0.13	0.60	0.74	
Uniform Delay, d1		69.7	68.2	61.3	52.8		69.1	23.1	16.2	38.4	23.6	
Progression Factor		1.00	1.00	1.00	1.00		1.45	0.66	0.37	0.56	0.33	
Incremental Delay, d2		4.3	0.1	20.6	0.4		3.3	1.0	0.3	3.6	1.4	
Delay (s)		74.0	68.3	81.9	53.2		103.8	16.2	6.2	25.2	9.3	
Level of Service		E	E	F	D		F	B	A	C	A	
Approach Delay (s)		71.7			77.9			17.0			10.2	
Approach LOS		E			E			B			B	
Intersection Summary												
HCM 2000 Control Delay			21.6			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			31.0			
Intersection Capacity Utilization			79.4%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Rockville Pike - 355 & Federal Plaza/Pike Center

Background Future AM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	2	54	7	2	8	84	1544	11	30	2105	2
Future Volume (vph)	16	2	54	7	2	8	84	1544	11	30	2105	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	16	16	16	11	11	11	10	10	10
Total Lost time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00	1.00		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.94		1.00	1.00		1.00	1.00	
Flt Protected		0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1664	1478		1917		1711	4909		1651	4745	
Flt Permitted		0.96	1.00		0.98		0.06	1.00		0.13	1.00	
Satd. Flow (perm)		1664	1478		1917		100	4909		226	4745	
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)	17	2	56	7	2	8	88	1608	11	31	2193	2
RTOR Reduction (vph)	0	0	54	0	8	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	19	2	0	9	0	88	1619	0	31	2195	0
Confl. Peds. (#/hr)	1						1	3		7	7	3
Confl. Bikes (#/hr)			1			1						
Turn Type	Split	NA	Prot	Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	8	8	8	4	4		5	2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		6.2	6.2		4.2		119.5	112.2		112.7	108.8	
Effective Green, g (s)		6.2	6.2		4.2		119.5	112.2		112.7	108.8	
Actuated g/C Ratio		0.04	0.04		0.03		0.80	0.75		0.75	0.73	
Clearance Time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		68	61		53		158	3671		206	3441	
v/s Ratio Prot		c0.01	0.00		c0.00		c0.03	0.33		0.00	c0.46	
v/s Ratio Perm							0.42			0.11		
v/c Ratio		0.28	0.04		0.17		0.56	0.44		0.15	0.64	
Uniform Delay, d1		69.7	69.0		71.2		12.2	7.1		5.1	10.5	
Progression Factor		1.00	1.00		1.00		3.04	0.03		0.58	0.37	
Incremental Delay, d2		2.2	0.3		1.6		3.4	0.3		0.3	0.8	
Delay (s)		72.0	69.3		72.8		40.5	0.5		3.3	4.6	
Level of Service		E	E		E		D	A		A	A	
Approach Delay (s)		70.0			72.8			2.6			4.6	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			5.3				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			23.5		
Intersection Capacity Utilization			67.4%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Rockville Pike - 355 & Gas Station

Background Future AM
12/04/2024

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			 			 	
Traffic Volume (veh/h)	0	19	1543	25	0	2156	
Future Volume (Veh/h)	0	19	1543	25	0	2156	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	
Hourly flow rate (vph)	0	24	1953	32	0	2729	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			225			340	
pX, platoon unblocked	0.78	0.88			0.88		
vC, conflicting volume	2879	667			1985		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1346	129			1632		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	97			100		
cM capacity (veh/h)	111	786			345		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	24	781	781	423	910	910	910
Volume Left	0	0	0	0	0	0	0
Volume Right	24	0	0	32	0	0	0
cSH	786	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.46	0.46	0.25	0.54	0.54	0.54
Queue Length 95th (ft)	2	0	0	0	0	0	0
Control Delay (s)	9.7	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A						
Approach Delay (s)	9.7	0.0			0.0		
Approach LOS	A						
Intersection Summary							
Average Delay			0.0				
Intersection Capacity Utilization			45.0%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis

4: Rockville Pike - 355 & Rollins Avenue /Twinbrook Parkway

Background Future AM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑	↑	↑	↑↑↑	↑	↑	↑↑↑	
Traffic Volume (vph)	0	256	136	0	312	186	103	1430	106	200	2020	0
Future Volume (vph)	0	256	136	0	312	186	103	1430	106	200	2020	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	10	10	10	11	11	11
Total Lost time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		0.99			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.95			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3106			3539	1583	1652	4746	1478	1711	4916	
Flt Permitted		1.00			1.00	1.00	0.06	1.00	1.00	0.12	1.00	
Satd. Flow (perm)		3106			3539	1583	98	4746	1478	213	4916	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	261	139	0	318	190	105	1459	108	204	2061	0
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	46	0	0	0
Lane Group Flow (vph)	0	400	0	0	318	190	105	1459	62	204	2061	0
Confl. Peds. (#/hr)	13		9	9		13			4			
Confl. Bikes (#/hr)									1			
Turn Type		NA			NA	Prot	pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		4			8	8	1	6	6	5	2	
Permitted Phases							6			2		
Actuated Green, G (s)		26.7			26.7	26.7	97.4	85.5	85.5	109.2	91.4	
Effective Green, g (s)		26.7			26.7	26.7	97.4	85.5	85.5	109.2	91.4	
Actuated g/C Ratio		0.18			0.18	0.18	0.65	0.57	0.57	0.73	0.61	
Clearance Time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Vehicle Extension (s)		4.0			4.0	4.0	4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)		552			629	281	186	2705	842	332	2995	
v/s Ratio Prot		c0.13			0.09	0.12	0.04	0.31	0.04	c0.07	c0.42	
v/s Ratio Perm							0.32			0.37		
v/c Ratio		0.72			0.51	0.68	0.56	0.54	0.07	0.61	0.69	
Uniform Delay, d1		58.2			55.7	57.6	21.7	20.0	14.5	14.0	19.7	
Progression Factor		1.00			0.88	0.87	1.71	0.36	0.07	2.80	0.40	
Incremental Delay, d2		5.0			0.9	6.7	4.5	0.7	0.2	3.1	1.1	
Delay (s)		63.2			49.8	56.7	41.7	7.9	1.2	42.3	8.9	
Level of Service		E			D	E	D	A	A	D	A	
Approach Delay (s)		63.2			52.4			9.6			11.9	
Approach LOS		E			D			A			B	
Intersection Summary												
HCM 2000 Control Delay		19.6			HCM 2000 Level of Service			B				
HCM 2000 Volume to Capacity ratio		0.71										
Actuated Cycle Length (s)		150.0			Sum of lost time (s)			20.0				
Intersection Capacity Utilization		77.9%			ICU Level of Service			D				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Chapman Ave & Twinbrook Parkway

Background Future AM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	509	73	531	440	123	67	48	197	84	50	24
Future Volume (vph)	40	509	73	531	440	123	67	48	197	84	50	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	10	10	10	10	10	10
Total Lost time (s)	5.5	6.0		5.5	6.0			6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		0.97	0.95			1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1648	3235		3319	3286			1689	1478	3204	1739	1443
Flt Permitted	0.43	1.00		0.95	1.00			0.97	1.00	0.95	1.00	1.00
Satd. Flow (perm)	751	3235		3319	3286			1689	1478	3204	1739	1443
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	41	525	75	547	454	127	69	49	203	87	52	25
RTOR Reduction (vph)	0	6	0	0	10	0	0	0	130	0	0	23
Lane Group Flow (vph)	41	594	0	547	571	0	0	118	73	87	52	2
Confl. Peds. (#/hr)	4		1	1		4	5		14	14		5
Confl. Bikes (#/hr)			4			1						1
Turn Type	pm+pt	NA		Prot	NA		Split	NA	pt+ov	Split	NA	Perm
Protected Phases	5	2		1	6		4	4	4 1	3	3	
Permitted Phases	2											3
Actuated Green, G (s)	73.7	68.1		31.5	94.0			15.9	53.9	10.0	10.0	10.0
Effective Green, g (s)	73.7	68.1		31.5	94.0			15.9	53.9	10.0	10.0	10.0
Actuated g/C Ratio	0.49	0.45		0.21	0.63			0.11	0.36	0.07	0.07	0.07
Clearance Time (s)	5.5	6.0		5.5	6.0			6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	402	1468		696	2059			179	531	213	115	96
v/s Ratio Prot	0.00	c0.18		c0.16	0.17			c0.07	0.05	0.03	c0.03	
v/s Ratio Perm	0.05											0.00
v/c Ratio	0.10	0.40		0.79	0.28			0.66	0.14	0.41	0.45	0.02
Uniform Delay, d1	19.9	27.4		56.1	12.7			64.4	32.4	67.2	67.4	65.4
Progression Factor	0.75	0.76		1.11	1.14			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.8		5.5	0.3			8.5	0.1	1.3	2.8	0.1
Delay (s)	15.1	21.6		67.8	14.8			72.9	32.5	68.4	70.2	65.5
Level of Service	B	C		E	B			E	C	E	E	E
Approach Delay (s)		21.2			40.5			47.4			68.5	
Approach LOS		C			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			38.0			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			67.8%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Chapman Ave & Pike Center North/Driveway

Background Future AM
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	1	0	4	2	356	2	5	644	5
Future Volume (Veh/h)	0	0	0	1	0	4	2	356	2	5	644	5
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	0	0	0	1	0	5	3	451	3	6	815	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)							471			256		
pX, platoon unblocked												
vC, conflicting volume	1066	1290	410	878	1292	227	821				454	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1066	1290	410	878	1292	227	821				454	
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	100	100	99	100				99	
cM capacity (veh/h)	174	161	590	241	160	776	804				1103	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	0	6	228	228	414	414						
Volume Left	0	1	3	0	6	0						
Volume Right	0	5	0	3	0	6						
cSH	1700	566	804	1700	1103	1700						
Volume to Capacity	0.06	0.01	0.00	0.13	0.01	0.24						
Queue Length 95th (ft)	0	1	0	0	0	0						
Control Delay (s)	0.0	11.4	0.2	0.0	0.2	0.0						
Lane LOS	A	B	A		A							
Approach Delay (s)	0.0	11.4	0.1		0.1							
Approach LOS	A	B										
Intersection Summary												
Average Delay				0.1								
Intersection Capacity Utilization				31.5%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

7: Chapman Ave & Rollins Ave

Background Future AM

12/04/2024

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						 
Traffic Volume (veh/h)	35	36	324	71	36	572
Future Volume (Veh/h)	35	36	324	71	36	572
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	36	37	334	73	37	590
Pedestrians	11					3
Lane Width (ft)	12.0					10.0
Walking Speed (ft/s)	3.5					3.5
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)			287			440
pX, platoon unblocked	1.00	1.00			1.00	
vC, conflicting volume	750	384			418	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	750	384			417	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	94			97	
cM capacity (veh/h)	332	606			1126	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	36	37	407	234	393	
Volume Left	36	0	0	37	0	
Volume Right	0	37	73	0	0	
cSH	332	606	1700	1126	1700	
Volume to Capacity	0.11	0.06	0.24	0.03	0.23	
Queue Length 95th (ft)	9	5	0	3	0	
Control Delay (s)	17.2	11.3	0.0	1.6	0.0	
Lane LOS	C	B		A		
Approach Delay (s)	14.2		0.0	0.6		
Approach LOS	B					
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			52.7%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: Chapman Ave & Pike Center South

Background Future AM

12/04/2024

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations					  	
Traffic Volume (veh/h)	1	0	1	362	609	3
Future Volume (Veh/h)	1	0	1	362	609	3
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.63	0.63	0.63	0.63	0.63	0.85
Hourly flow rate (vph)	2	0	2	575	967	4
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				111	616	
pX, platoon unblocked	0.94					
vC, conflicting volume	1548	324	971			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1551	324	971			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	100	100			
cM capacity (veh/h)	98	671	706			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2	SB 3	
Volume Total	2	577	387	387	197	
Volume Left	2	2	0	0	0	
Volume Right	0	0	0	0	4	
cSH	98	706	1700	1700	1700	
Volume to Capacity	0.02	0.00	0.23	0.23	0.12	
Queue Length 95th (ft)	2	0	0	0	0	
Control Delay (s)	42.5	0.1	0.0	0.0	0.0	
Lane LOS	E	A				
Approach Delay (s)	42.5	0.1	0.0			
Approach LOS	E					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			29.8%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

9: Chapman Ave & Bou Ave

Background Future AM

12/04/2024

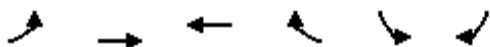
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	116	37	6	91	153	4	41	4	137	79	393
Future Volume (vph)	169	116	37	6	91	153	4	41	4	137	79	393
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		0.99	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1645	1661		1630	1739	1433	1648	1713		1632	1739	1478
Flt Permitted	0.57	1.00		0.66	1.00	1.00	0.70	1.00		0.73	1.00	1.00
Satd. Flow (perm)	983	1661		1124	1739	1433	1220	1713		1248	1739	1478
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	178	122	39	6	96	161	4	43	4	144	83	414
RTOR Reduction (vph)	0	14	0	0	0	111	0	3	0	0	0	187
Lane Group Flow (vph)	178	147	0	6	96	50	4	44	0	144	83	227
Confl. Peds. (#/hr)	5		8	8		5	2		11	11		2
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	pt+ov
Protected Phases	1	6			2			4			8	8 1
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	43.2	43.2		24.6	24.6	24.6	24.0	24.0		24.0	24.0	43.1
Effective Green, g (s)	43.2	43.2		24.6	24.6	24.6	24.0	24.0		24.0	24.0	43.1
Actuated g/C Ratio	0.55	0.55		0.31	0.31	0.31	0.30	0.30		0.30	0.30	0.55
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	6.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	649	911		351	543	447	372	522		380	530	809
v/s Ratio Prot	0.05	0.09			0.06			0.03			0.05	c0.15
v/s Ratio Perm	c0.10			0.01		0.04	0.00			c0.12		
v/c Ratio	0.27	0.16		0.02	0.18	0.11	0.01	0.08		0.38	0.16	0.28
Uniform Delay, d1	9.2	8.8		18.7	19.7	19.3	19.1	19.5		21.5	20.0	9.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	0.0		0.1	0.7	0.5	0.0	0.1		2.9	0.6	0.5
Delay (s)	9.9	8.8		18.8	20.4	19.8	19.1	19.6		24.4	20.6	10.0
Level of Service	A	A		B	C	B	B	B		C	C	B
Approach Delay (s)		9.4			20.0			19.5			14.6	
Approach LOS		A			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.5									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.34									
Actuated Cycle Length (s)			78.7									Sum of lost time (s) 17.0
Intersection Capacity Utilization			59.1%									ICU Level of Service B
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

10: Bou Ave & Pike Center

Background Future AM

12/04/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	10	300	509	14	16	8
Future Volume (Veh/h)	10	300	509	14	16	8
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	11	319	541	15	17	9
Pedestrians		4			7	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		278	280			
pX, platoon unblocked						
vC, conflicting volume	563				737	289
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	563				737	289
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				95	99
cM capacity (veh/h)	998				348	700
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	117	213	361	195	26	
Volume Left	11	0	0	0	17	
Volume Right	0	0	0	15	9	
cSH	998	1700	1700	1700	421	
Volume to Capacity	0.01	0.13	0.21	0.11	0.06	
Queue Length 95th (ft)	1	0	0	0	5	
Control Delay (s)	0.9	0.0	0.0	0.0	14.1	
Lane LOS	A				B	
Approach Delay (s)	0.3		0.0		14.1	
Approach LOS					B	
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			26.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

11: East Jefferson Street & Rollins Avenue

Background Future AM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	44	27	230	32	38	9	243	340	20	218	18
Future Volume (vph)	17	44	27	230	32	38	9	243	340	20	218	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.94		1.00	0.92			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1711	1682		1711	1624			1797	1509		3362	
Flt Permitted	0.95	1.00		0.95	1.00			0.99	1.00		0.92	
Satd. Flow (perm)	1711	1682		1711	1624			1778	1509		3113	
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)	18	48	29	250	35	41	10	264	370	22	237	20
RTOR Reduction (vph)	0	27	0	0	33	0	0	0	88	0	4	0
Lane Group Flow (vph)	18	50	0	250	43	0	0	274	282	0	275	0
Confl. Peds. (#/hr)	7		10	10		7	7		6	6		7
Confl. Bikes (#/hr)			1			1			1			1
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		3	3			2	3		6	
Permitted Phases							2		2	6		
Actuated Green, G (s)	6.3	6.3		16.1	16.1			48.6	64.7		48.6	
Effective Green, g (s)	6.3	6.3		16.1	16.1			48.6	64.7		48.6	
Actuated g/C Ratio	0.07	0.07		0.19	0.19			0.57	0.76		0.57	
Clearance Time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Vehicle Extension (s)	2.0	2.0		1.0	1.0			5.0	1.0		5.0	
Lane Grp Cap (vph)	126	124		324	307			1016	1148		1779	
v/s Ratio Prot	0.01	c0.03		c0.15	0.03				0.05			
v/s Ratio Perm								c0.15	0.14		0.09	
v/c Ratio	0.14	0.40		0.77	0.14			0.27	0.25		0.15	
Uniform Delay, d1	36.8	37.6		32.7	28.7			9.2	3.0		8.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.8		9.9	0.1			0.7	0.0		0.2	
Delay (s)	37.0	38.3		42.6	28.8			9.9	3.0		8.7	
Level of Service	D	D		D	C			A	A		A	
Approach Delay (s)		38.1			39.4			5.9			8.7	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			16.9			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			63.6%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Background Future AM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	52	56	176	28	67	79	1234	311	63	1833	20
Future Volume (vph)	42	52	56	176	28	67	79	1234	311	63	1833	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		0.96	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1765	3174		1706	1863	1583	1711	4744		1711	4907	
Flt Permitted	0.74	1.00		0.68	1.00	1.00	0.07	1.00		0.11	1.00	
Satd. Flow (perm)	1371	3174		1223	1863	1583	118	4744		206	4907	
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)	44	54	58	183	29	70	82	1285	324	66	1909	21
RTOR Reduction (vph)	0	46	0	0	0	56	0	23	0	0	0	0
Lane Group Flow (vph)	44	66	0	183	29	14	82	1586	0	66	1930	0
Confl. Peds. (#/hr)	2		28	28		2	1		7	7		1
Confl. Bikes (#/hr)						1						
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	8	1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	30.0	30.0		30.0	30.0	30.0	104.8	94.7		100.2	92.4	
Effective Green, g (s)	30.0	30.0		30.0	30.0	30.0	104.8	94.7		100.2	92.4	
Actuated g/C Ratio	0.20	0.20		0.20	0.20	0.20	0.70	0.63		0.67	0.62	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	274	634		244	372	316	189	2995		215	3022	
v/s Ratio Prot		0.02			0.02	0.01	c0.03	0.33		0.02	c0.39	
v/s Ratio Perm	0.03			c0.15			0.27			0.19		
v/c Ratio	0.16	0.10		0.75	0.08	0.04	0.43	0.53		0.31	0.64	
Uniform Delay, d1	49.6	49.0		56.5	48.8	48.4	14.1	15.3		10.2	18.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	2.39	0.79		1.00	1.00	
Incremental Delay, d2	0.6	0.2		14.3	0.2	0.1	2.9	0.6		1.7	1.0	
Delay (s)	50.2	49.2		70.8	48.9	48.6	36.6	12.7		11.9	19.3	
Level of Service	D	D		E	D	D	D	B		B	B	
Approach Delay (s)		49.4			63.0			13.9			19.0	
Approach LOS		D			E			B			B	
Intersection Summary												
HCM 2000 Control Delay			21.1									
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			150.0									
Intersection Capacity Utilization			73.5%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Twinbrook Parkway & Parklawn Drive

Background Future AM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	24	51	163	19	124	50	490	277	179	804	63
Future Volume (vph)	36	24	51	163	19	124	50	490	277	179	804	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	10	10	10	10	10
Total Lost time (s)	6.5	6.5		7.0	7.0	7.0	8.0	6.0		8.0	6.0	6.0
Lane Util. Factor	0.95	0.95		0.95	0.95	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1573		1625	1645	1531	1651	4466		3203	3303	1437
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.29	1.00		0.30	1.00	1.00
Satd. Flow (perm)	1681	1573		1625	1645	1531	507	4466		1017	3303	1437
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	38	26	54	173	20	132	53	521	295	190	855	67
RTOR Reduction (vph)	0	46	0	0	0	106	0	37	0	0	0	26
Lane Group Flow (vph)	34	38	0	97	96	26	53	779	0	190	855	41
Confl. Peds. (#/hr)	10		2	2		10	2		1	1		2
Confl. Bikes (#/hr)												1
Turn Type	Split	NA		Split	NA	pt+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	9.4	9.4		14.5	14.5	30.0	96.1	90.1		101.1	92.6	92.6
Effective Green, g (s)	9.4	9.4		14.5	14.5	30.0	96.1	90.1		101.1	92.6	92.6
Actuated g/C Ratio	0.06	0.06		0.10	0.10	0.20	0.64	0.60		0.67	0.62	0.62
Clearance Time (s)	6.5	6.5		7.0	7.0		8.0	6.0		8.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	105	98		157	159	306	370	2682		809	2039	887
v/s Ratio Prot	0.02	c0.02		c0.06	0.06	0.02	0.01	0.17		c0.01	c0.26	
v/s Ratio Perm							0.09			0.14		0.03
v/c Ratio	0.32	0.39		0.62	0.60	0.09	0.14	0.29		0.23	0.42	0.05
Uniform Delay, d1	67.3	67.5		65.1	65.0	48.8	10.4	14.5		8.8	14.8	11.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.87	0.59		1.00	1.00	1.00
Incremental Delay, d2	1.8	2.5		7.1	6.3	0.1	0.2	0.3		0.2	0.6	0.1
Delay (s)	69.1	70.1		72.1	71.3	49.0	9.3	8.8		8.9	15.5	11.4
Level of Service	E	E		E	E	D	A	A		A	B	B
Approach Delay (s)		69.8			62.5			8.9			14.1	
Approach LOS		E			E			A			B	
Intersection Summary												
HCM 2000 Control Delay			21.4			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			27.5			
Intersection Capacity Utilization			58.8%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

14: Nebel Street & Randolph Road

Background Future AM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	622	56	258	1041	129	80	54	123	138	74	14
Future Volume (vph)	16	622	56	258	1041	129	80	54	123	138	74	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	12	12	12
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1652	3254		1768	3475		1711	1801	1531	1767	1863	1583
Flt Permitted	0.18	1.00		0.28	1.00		0.71	1.00	1.00	0.57	1.00	1.00
Satd. Flow (perm)	307	3254		527	3475		1272	1801	1531	1053	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	17	655	59	272	1096	136	84	57	129	145	78	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	17	714	0	272	1232	0	84	57	129	145	78	15
Confl. Peds. (#/hr)	1		4	4		1			2	2		
Confl. Bikes (#/hr)									1			
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Prot	pm+pt	NA	Prot
Protected Phases	1	6		5	2		3	8	8	7	4	4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	75.1	72.4		94.6	85.9		30.8	18.8	18.8	41.0	23.9	23.9
Effective Green, g (s)	75.1	72.4		94.6	85.9		30.8	18.8	18.8	41.0	23.9	23.9
Actuated g/C Ratio	0.50	0.48		0.63	0.57		0.21	0.13	0.13	0.27	0.16	0.16
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	177	1570		466	1990		296	225	191	369	296	252
v/s Ratio Prot	0.00	0.22		c0.06	c0.35		0.02	0.03	c0.08	c0.04	0.04	0.01
v/s Ratio Perm	0.05			0.30			0.04			0.06		
v/c Ratio	0.10	0.45		0.58	0.62		0.28	0.25	0.68	0.39	0.26	0.06
Uniform Delay, d1	19.8	25.7		14.3	21.2		49.8	59.3	62.7	43.2	55.3	53.5
Progression Factor	0.79	0.77		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.9		1.9	1.5		0.7	0.8	9.9	0.9	0.7	0.1
Delay (s)	15.9	20.8		16.1	22.7		50.5	60.1	72.6	44.2	56.0	53.6
Level of Service	B	C		B	C		D	E	E	D	E	D
Approach Delay (s)		20.6			21.5			63.1			48.6	
Approach LOS		C			C			E			D	
Intersection Summary												
HCM 2000 Control Delay		27.7			HCM 2000 Level of Service			C				
HCM 2000 Volume to Capacity ratio		0.62										
Actuated Cycle Length (s)		150.0			Sum of lost time (s)			25.5				
Intersection Capacity Utilization		66.4%			ICU Level of Service			C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Background Future AM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	7	13	77	16	50	25	1771	116	48	2557	48
Future Volume (vph)	20	7	13	77	16	50	25	1771	116	48	2557	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.96		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.97	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	0.89		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	1604		1770	1581		1711	6113		1711	4893	
Flt Permitted	0.71	1.00		0.74	1.00		0.04	1.00		0.08	1.00	
Satd. Flow (perm)	1241	1604		1386	1581		66	6113		141	4893	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	20	7	13	79	16	51	26	1807	118	49	2609	49
RTOR Reduction (vph)	0	12	0	0	46	0	0	3	0	0	1	0
Lane Group Flow (vph)	20	8	0	79	21	0	26	1922	0	49	2657	0
Confl. Peds. (#/hr)	25					25	29		16	16		29
Confl. Bikes (#/hr)			4			3						
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8		113.5	108.5		117.9	110.7	
Effective Green, g (s)	15.8	15.8		15.8	15.8		113.5	108.5		117.9	110.7	
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.76	0.72		0.79	0.74	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	130	168		145	166		104	4421		186	3611	
v/s Ratio Prot		0.01			0.01		0.01	0.31		c0.01	c0.54	
v/s Ratio Perm	0.02			c0.06			0.18			0.19		
v/c Ratio	0.15	0.05		0.54	0.13		0.25	0.43		0.26	0.74	
Uniform Delay, d1	61.0	60.3		63.7	60.9		11.2	8.4		4.7	11.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.33	0.30	
Incremental Delay, d2	1.2	0.3		7.2	0.7		2.6	0.3		1.0	0.9	
Delay (s)	62.2	60.6		70.9	61.6		13.8	8.7		2.6	4.2	
Level of Service	E	E		E	E		B	A		A	A	
Approach Delay (s)		61.4			66.6			8.8			4.2	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay		8.4					HCM 2000 Level of Service		A			
HCM 2000 Volume to Capacity ratio		0.70										
Actuated Cycle Length (s)		150.0					Sum of lost time (s)		18.5			
Intersection Capacity Utilization		79.8%					ICU Level of Service		D			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Background Future AM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	651	80	9	1122	66	11	6	4	27	7	24
Future Volume (vph)	77	651	80	9	1122	66	11	6	4	27	7	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.94		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	3229		1646	3303	1428	1711	1675		1681	1545	
Flt Permitted	0.16	1.00		0.34	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	277	3229		582	3303	1428	1711	1675		1681	1545	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	89	748	92	10	1290	76	13	7	5	31	8	28
RTOR Reduction (vph)	0	3	0	0	0	24	0	5	0	0	0	0
Lane Group Flow (vph)	89	837	0	10	1290	52	13	7	0	28	39	0
Confl. Peds. (#/hr)	4		11	11		4	4		3	3		4
Confl. Bikes (#/hr)												1
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	118.0	110.2		105.4	102.6	102.6	5.1	5.1		8.9	8.9	
Effective Green, g (s)	118.0	110.2		105.4	102.6	102.6	5.1	5.1		8.9	8.9	
Actuated g/C Ratio	0.79	0.73		0.70	0.68	0.68	0.03	0.03		0.06	0.06	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	313	2372		428	2259	976	58	56		99	91	
v/s Ratio Prot	c0.02	c0.26		0.00	c0.39		c0.01	0.00		0.02	c0.03	
v/s Ratio Perm	0.20			0.02		0.04						
v/c Ratio	0.28	0.35		0.02	0.57	0.05	0.22	0.13		0.28	0.43	
Uniform Delay, d1	7.0	7.1		6.7	12.3	7.8	70.5	70.3		67.5	68.1	
Progression Factor	1.00	1.00		0.47	0.31	0.01	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.4		0.0	0.9	0.1	2.7	1.4		2.1	4.4	
Delay (s)	7.7	7.5		3.1	4.7	0.2	73.2	71.7		69.6	72.5	
Level of Service	A	A		A	A	A	E	E		E	E	
Approach Delay (s)		7.6			4.5			72.5			71.3	
Approach LOS		A			A			E			E	
Intersection Summary												
HCM 2000 Control Delay		8.2										
HCM 2000 Volume to Capacity ratio		0.53										
Actuated Cycle Length (s)		150.0								23.0		
Intersection Capacity Utilization		59.0%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

17: Chapman Ave/Chapman Road & Thompson Ave

Background Future AM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	3	37	30	15	2	37	142	7	7	144	9
Future Volume (Veh/h)	2	3	37	30	15	2	37	142	7	7	144	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	3	43	34	17	2	43	163	8	8	166	10
Pedestrians		71			19			50			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		7			2			5			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								638				
pX, platoon unblocked												
vC, conflicting volume	524	534	292	554	535	188	247			190		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	524	534	292	554	535	188	247			190		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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	99	94	90	96	100	97			99		
cM capacity (veh/h)	378	397	664	350	397	837	1230			1359		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	48	53	214	184								
Volume Left	2	34	43	8								
Volume Right	43	2	8	10								
cSH	618	372	1230	1359								
Volume to Capacity	0.08	0.14	0.03	0.01								
Queue Length 95th (ft)	6	12	3	0								
Control Delay (s)	11.3	16.3	1.9	0.4								
Lane LOS	B	C	A	A								
Approach Delay (s)	11.3	16.3	1.9	0.4								
Approach LOS	B	C										
Intersection Summary												
Average Delay			3.8									
Intersection Capacity Utilization			41.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

1: Rockville Pike - 355 & Bou Ave

Background Future PM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	31	36	329	21	175	57	2470	391	206	1715	18
Future Volume (vph)	17	31	36	329	21	175	57	2470	391	206	1715	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	0.94		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	0.87		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1708	1478	3204	1422		1711	4916	1531	1770	5071	
Flt Permitted		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.05	1.00	
Satd. Flow (perm)		1708	1478	3204	1422		1711	4916	1531	97	5071	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	18	32	37	339	22	180	59	2546	403	212	1768	19
RTOR Reduction (vph)	0	0	35	0	153	0	0	0	77	0	0	0
Lane Group Flow (vph)	0	50	2	339	49	0	59	2546	326	212	1787	0
Confl. Peds. (#/hr)	25					25	25		25	25		25
Confl. Bikes (#/hr)			1			1			1			
Turn Type	Split	NA	Prot	Split	NA		Prot	NA	Prot	pm+pt	NA	
Protected Phases	3	3	3	4	4		1	5	5	6	2	
Permitted Phases										2		
Actuated Green, G (s)		7.3	7.3	22.4	22.4		9.2	85.3	85.3	87.1	87.1	
Effective Green, g (s)		7.3	7.3	22.4	22.4		9.2	85.3	85.3	87.1	87.1	
Actuated g/C Ratio		0.05	0.05	0.15	0.15		0.06	0.57	0.57	0.58	0.58	
Clearance Time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	6.0	6.0		3.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)		83	71	478	212		104	2795	870	173	2944	
v/s Ratio Prot		c0.03	0.00	c0.11	0.03		0.03	c0.52	0.21	c0.09	0.35	
v/s Ratio Perm										c0.62		
v/c Ratio		0.60	0.03	0.71	0.23		0.57	0.91	0.37	1.23	0.61	
Uniform Delay, d1		69.9	68.0	60.7	56.2		68.5	28.9	17.7	55.9	20.4	
Progression Factor		1.00	1.00	1.00	1.00		1.34	0.51	0.64	0.57	0.09	
Incremental Delay, d2		11.7	0.1	7.0	1.6		4.2	3.6	0.7	133.2	0.7	
Delay (s)		81.6	68.1	67.7	57.8		96.1	18.5	12.0	165.1	2.4	
Level of Service		F	E	E	E		F	B	B	F	A	
Approach Delay (s)		75.9			64.0			19.1			19.7	
Approach LOS		E			E			B			B	
Intersection Summary												
HCM 2000 Control Delay			24.5			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			1.13									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			31.0			
Intersection Capacity Utilization			90.6%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Rockville Pike - 355 & Federal Plaza/Pike Center

Background Future PM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	127	8	133	18	9	38	197	2323	23	26	1766	13
Future Volume (vph)	127	8	133	18	9	38	197	2323	23	26	1766	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	16	16	16	11	11	11	10	10	10
Total Lost time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00	1.00		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.92		1.00	1.00		1.00	1.00	
Flt Protected		0.95	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1660	1478		1892		1711	4905		1652	4738	
Flt Permitted		0.95	1.00		0.99		0.06	1.00		0.05	1.00	
Satd. Flow (perm)		1660	1478		1892		108	4905		84	4738	
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)	132	8	139	19	9	40	205	2420	24	27	1840	14
RTOR Reduction (vph)	0	0	122	0	38	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	140	17	0	30	0	205	2444	0	27	1854	0
Confl. Peds. (#/hr)	3		5	5		3	23		16	16		23
Confl. Bikes (#/hr)						1						
Turn Type	Split	NA	Prot	Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	8	8	8	4	4		5	2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		18.1	18.1		7.0		106.4	97.3		86.8	82.7	
Effective Green, g (s)		18.1	18.1		7.0		106.4	97.3		86.8	82.7	
Actuated g/C Ratio		0.12	0.12		0.05		0.71	0.65		0.58	0.55	
Clearance Time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		200	178		88		276	3181		91	2612	
v/s Ratio Prot		c0.08	0.01		c0.02		c0.09	c0.50		0.01	0.39	
v/s Ratio Perm							0.43			0.16		
v/c Ratio		0.70	0.09		0.34		0.74	0.77		0.30	0.71	
Uniform Delay, d1		63.3	58.7		69.3		40.0	18.5		17.8	24.8	
Progression Factor		1.00	1.00		1.00		1.78	0.23		1.45	0.41	
Incremental Delay, d2		10.2	0.2		2.3		5.2	0.9		1.5	1.4	
Delay (s)		73.6	58.9		71.6		76.2	5.2		27.3	11.6	
Level of Service		E	E		E		E	A		C	B	
Approach Delay (s)		66.3			71.6			10.7			11.8	
Approach LOS		E			E			B			B	
Intersection Summary												
HCM 2000 Control Delay			15.1				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			23.5		
Intersection Capacity Utilization			79.2%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Rockville Pike - 355 & Gas Station

Background Future PM

12/04/2024

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			  			  	
Traffic Volume (veh/h)	0	58	2444	44	0	1793	
Future Volume (Veh/h)	0	58	2444	44	0	1793	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	
Hourly flow rate (vph)	0	66	2777	50	0	2038	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			225			340	
pX, platoon unblocked	0.77	0.65			0.65		
vC, conflicting volume	3481	951			2827		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	984	0			1914		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	91			100		
cM capacity (veh/h)	190	702			198		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	66	1111	1111	605	679	679	679
Volume Left	0	0	0	0	0	0	0
Volume Right	66	0	0	50	0	0	0
cSH	702	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.09	0.65	0.65	0.36	0.40	0.40	0.40
Queue Length 95th (ft)	8	0	0	0	0	0	0
Control Delay (s)	10.7	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.7	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			58.5%		ICU Level of Service		B
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis

4: Rockville Pike - 355 & Rollins Avenue /Twinbrook Parkway

Background Future PM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱			↑↑	↱	↱	↑↑↑	↱	↱	↑↑↑	
Traffic Volume (vph)	0	426	57	0	314	171	140	2106	121	204	1736	57
Future Volume (vph)	0	426	57	0	314	171	140	2106	121	204	1736	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	10	10	10	11	11	11
Total Lost time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.98			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3231			3539	1583	1652	4746	1478	1711	4882	
Flt Permitted		1.00			1.00	1.00	0.08	1.00	1.00	0.05	1.00	
Satd. Flow (perm)		3231			3539	1583	132	4746	1478	84	4882	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	430	58	0	317	173	141	2127	122	206	1754	58
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	56	0	2	0
Lane Group Flow (vph)	0	488	0	0	317	173	141	2127	66	206	1810	0
Confl. Peds. (#/hr)	24		18	18		24	26		36	36		26
Confl. Bikes (#/hr)			1			1			2			
Turn Type		NA			NA	Prot	pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		4			8	8	1	6	6	5	2	
Permitted Phases							6			2		
Actuated Green, G (s)		29.9			29.9	29.9	96.2	81.7	81.7	104.0	85.6	
Effective Green, g (s)		29.9			29.9	29.9	96.2	81.7	81.7	104.0	85.6	
Actuated g/C Ratio		0.20			0.20	0.20	0.64	0.54	0.54	0.69	0.57	
Clearance Time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Vehicle Extension (s)		4.0			4.0	4.0	4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)		644			705	315	231	2584	805	257	2785	
v/s Ratio Prot		c0.15			0.09	0.11	0.06	0.45	0.04	c0.10	0.37	
v/s Ratio Perm							0.33			c0.46		
v/c Ratio		0.76			0.45	0.55	0.61	0.82	0.08	0.80	0.65	
Uniform Delay, d1		56.6			52.8	54.0	21.2	28.2	16.3	47.2	22.0	
Progression Factor		1.00			0.62	0.63	1.61	0.43	0.13	0.67	1.81	
Incremental Delay, d2		5.4			0.6	2.2	4.1	2.4	0.2	12.4	0.8	
Delay (s)		62.0			33.3	36.2	38.3	14.6	2.3	44.1	40.7	
Level of Service		E			C	D	D	B	A	D	D	
Approach Delay (s)		62.0			34.4			15.4			41.0	
Approach LOS		E			C			B			D	
Intersection Summary												
HCM 2000 Control Delay			30.9		HCM 2000 Level of Service				C			
HCM 2000 Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			150.0		Sum of lost time (s)				20.0			
Intersection Capacity Utilization			89.8%		ICU Level of Service				E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Chapman Ave & Twinbrook Parkway

Background Future PM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	739	134	469	586	141	81	109	592	215	119	37
Future Volume (vph)	68	739	134	469	586	141	81	109	592	215	119	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	10	10	10	10	10	10
Total Lost time (s)	5.5	6.0		5.5	6.0			6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		0.97	0.95			1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1650	3213		3319	3305			1702	1478	3204	1739	1421
Flt Permitted	0.36	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (perm)	632	3213		3319	3305			1702	1478	3204	1739	1421
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	70	762	138	484	604	145	84	112	610	222	123	38
RTOR Reduction (vph)	0	10	0	0	12	0	0	0	54	0	0	34
Lane Group Flow (vph)	70	890	0	484	737	0	0	196	556	222	123	4
Confl. Peds. (#/hr)	2		9	9		2	15		14	14		15
Confl. Bikes (#/hr)									1			1
Turn Type	pm+pt	NA		Prot	NA		Split	NA	pt+ov	Split	NA	Perm
Protected Phases	5	2		1	6		4	4	4 1	3	3	
Permitted Phases	2											3
Actuated Green, G (s)	52.7	45.2		25.4	63.1			38.4	70.3	16.5	16.5	16.5
Effective Green, g (s)	52.7	45.2		25.4	63.1			38.4	70.3	16.5	16.5	16.5
Actuated g/C Ratio	0.35	0.30		0.17	0.42			0.26	0.47	0.11	0.11	0.11
Clearance Time (s)	5.5	6.0		5.5	6.0			6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	272	968		562	1390			435	692	352	191	156
v/s Ratio Prot	0.01	c0.28		c0.15	0.22			0.12	c0.38	0.07	c0.07	
v/s Ratio Perm	0.08											0.00
v/c Ratio	0.26	0.92		0.86	0.53			0.45	0.80	0.63	0.64	0.03
Uniform Delay, d1	33.0	50.6		60.6	32.4			46.9	34.0	63.8	63.9	59.6
Progression Factor	0.99	0.78		1.07	0.79			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	14.4		11.9	1.3			0.7	6.7	3.7	7.2	0.1
Delay (s)	33.1	54.0		76.4	26.8			47.7	40.7	67.5	71.2	59.7
Level of Service	C	D		E	C			D	D	E	E	E
Approach Delay (s)		52.5			46.3			42.4			67.9	
Approach LOS		D			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			49.6			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			91.4%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

6: Chapman Ave & Pike Center North/Driveway

Background Future PM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	6	1	4	4	1	7	3	751	8	5	634	4
Future Volume (Veh/h)	6	1	4	4	1	7	3	751	8	5	634	4
Sign Control	Stop				Stop				Free		Free	
Grade	0%				0%				0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	7	1	4	4	1	8	3	834	9	6	704	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)							471			256		
pX, platoon unblocked												
vC, conflicting volume	1150	1567	354	1213	1564	422	708				843	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1150	1567	354	1213	1564	422	708				843	
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 %	95	99	99	97	99	99	100				99	
cM capacity (veh/h)	149	109	642	135	109	581	887				789	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	12	13	420	426	358	356						
Volume Left	7	4	3	0	6	0						
Volume Right	4	8	0	9	0	4						
cSH	192	247	887	1700	789	1700						
Volume to Capacity	0.06	0.05	0.00	0.25	0.01	0.21						
Queue Length 95th (ft)	5	4	0	0	1	0						
Control Delay (s)	25.0	20.4	0.1	0.0	0.3	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	25.0	20.4	0.1		0.1							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.4									
Intersection Capacity Utilization			33.1%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

7: Chapman Ave & Rollins Ave

Background Future PM

12/04/2024

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	71	97	665	68	45	597
Future Volume (Veh/h)	71	97	665	68	45	597
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	73	100	686	70	46	615
Pedestrians	18					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	3.5					
Percent Blockage	2					
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (ft)			287			440
pX, platoon unblocked	0.90	0.90			0.90	
vC, conflicting volume	1138	739			774	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1099	657			695	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	58	72			94	
cM capacity (veh/h)	173	362			795	
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2	
Volume Total	73	100	756	251	410	
Volume Left	73	0	0	46	0	
Volume Right	0	100	70	0	0	
cSH	173	362	1700	795	1700	
Volume to Capacity	0.42	0.28	0.44	0.06	0.24	
Queue Length 95th (ft)	48	28	0	5	0	
Control Delay (s)	40.3	18.7	0.0	2.3	0.0	
Lane LOS	E	C		A		
Approach Delay (s)	27.8		0.0	0.9		
Approach LOS	D					
Intersection Summary						
Average Delay			3.4			
Intersection Capacity Utilization			61.3%	ICU Level of Service		B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

8: Chapman Ave & Pike Center South

Background Future PM

12/04/2024

						
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations					  	
Traffic Volume (veh/h)	1	3	0	728	704	8
Future Volume (Veh/h)	1	3	0	728	704	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Hourly flow rate (vph)	1	4	0	971	939	11
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)				111	616	
pX, platoon unblocked	0.80					
vC, conflicting volume	1916	318	950			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2016	318	950			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	98	99	100			
cM capacity (veh/h)	41	677	719			
Direction, Lane #	EB 1	NB 1	SB 1	SB 2	SB 3	
Volume Total	5	971	376	376	199	
Volume Left	1	0	0	0	0	
Volume Right	4	0	0	0	11	
cSH	165	719	1700	1700	1700	
Volume to Capacity	0.03	0.00	0.22	0.22	0.12	
Queue Length 95th (ft)	2	0	0	0	0	
Control Delay (s)	27.5	0.0	0.0	0.0	0.0	
Lane LOS	D					
Approach Delay (s)	27.5	0.0	0.0			
Approach LOS	D					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			48.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

9: Chapman Ave & Bou Ave

Background Future PM

12/04/2024

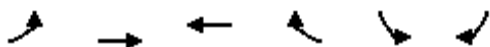
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	343	239	56	15	167	258	17	127	42	246	127	334
Future Volume (vph)	343	239	56	15	167	258	17	127	42	246	127	334
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00		0.99	1.00	1.00	0.99	1.00		0.99	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1643	1679		1641	1739	1422	1636	1660		1627	1739	1478
Flt Permitted	0.51	1.00		0.57	1.00	1.00	0.67	1.00		0.63	1.00	1.00
Satd. Flow (perm)	880	1679		977	1739	1422	1152	1660		1081	1739	1478
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)	373	260	61	16	182	280	18	138	46	267	138	363
RTOR Reduction (vph)	0	11	0	0	0	194	0	15	0	0	0	161
Lane Group Flow (vph)	373	310	0	16	182	86	18	169	0	267	138	202
Confl. Peds. (#/hr)	8		5	5		8	10		17	17		10
Confl. Bikes (#/hr)			2			1						
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	pt+ov
Protected Phases	1	6			2			4			8	8 1
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	44.5	44.5		24.5	24.5	24.5	24.0	24.0		24.0	24.0	44.5
Effective Green, g (s)	44.5	44.5		24.5	24.5	24.5	24.0	24.0		24.0	24.0	44.5
Actuated g/C Ratio	0.56	0.56		0.31	0.31	0.31	0.30	0.30		0.30	0.30	0.56
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	6.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	627	933		299	532	435	345	498		324	521	822
v/s Ratio Prot	c0.11	0.18			0.10			0.10			0.08	0.14
v/s Ratio Perm	c0.22			0.02		0.06	0.02			c0.25		
v/c Ratio	0.59	0.33		0.05	0.34	0.20	0.05	0.34		0.82	0.26	0.25
Uniform Delay, d1	10.6	9.7		19.6	21.5	20.5	19.9	21.8		26.0	21.3	9.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.8	0.1		0.3	1.7	1.0	0.1	0.4		20.6	1.2	0.4
Delay (s)	13.4	9.7		19.9	23.3	21.5	20.0	22.2		46.7	22.5	9.6
Level of Service	B	A		B	C	C	B	C		D	C	A
Approach Delay (s)		11.7			22.1			22.0			24.8	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			19.7	HCM 2000 Level of Service					B			
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			80.0	Sum of lost time (s)					17.0			
Intersection Capacity Utilization			80.7%	ICU Level of Service					D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

10: Bou Ave & Pike Center

Background Future PM

12/04/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	20	542	480	31	46	28
Future Volume (Veh/h)	20	542	480	31	46	28
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	21	559	495	32	47	29
Pedestrians		1			7	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		278	280			
pX, platoon unblocked						
vC, conflicting volume	534				840	272
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	534				840	272
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				84	96
cM capacity (veh/h)	1023				296	721
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	207	373	330	197	76	
Volume Left	21	0	0	0	47	
Volume Right	0	0	0	32	29	
cSH	1023	1700	1700	1700	382	
Volume to Capacity	0.02	0.22	0.19	0.12	0.20	
Queue Length 95th (ft)	2	0	0	0	18	
Control Delay (s)	1.0	0.0	0.0	0.0	16.8	
Lane LOS	A				C	
Approach Delay (s)	0.4		0.0		16.8	
Approach LOS					C	
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			40.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

11: East Jefferson Street & Rollins Avenue

Background Future PM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	44	26	390	65	78	7	477	396	18	263	18
Future Volume (vph)	10	44	26	390	65	78	7	477	396	18	263	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.97			1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.94		1.00	0.92			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1711	1678		1711	1600			1799	1500		3368	
Flt Permitted	0.95	1.00		0.95	1.00			1.00	1.00		0.92	
Satd. Flow (perm)	1711	1678		1711	1600			1792	1500		3097	
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)	10	46	27	406	68	81	7	497	412	19	274	19
RTOR Reduction (vph)	0	25	0	0	51	0	0	0	98	0	4	0
Lane Group Flow (vph)	10	48	0	406	98	0	0	504	315	0	308	0
Confl. Peds. (#/hr)	19		20	20		19	18		15	15		18
Confl. Bikes (#/hr)			1			3			2			3
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		3	3			2	3		6	
Permitted Phases							2		2		6	
Actuated Green, G (s)	6.2	6.2		21.3	21.3			43.5	64.8		43.5	
Effective Green, g (s)	6.2	6.2		21.3	21.3			43.5	64.8		43.5	
Actuated g/C Ratio	0.07	0.07		0.25	0.25			0.51	0.76		0.51	
Clearance Time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Vehicle Extension (s)	2.0	2.0		1.0	1.0			5.0	1.0		5.0	
Lane Grp Cap (vph)	124	122		428	400			917	1143		1584	
v/s Ratio Prot	0.01	c0.03		c0.24	0.06				0.07			
v/s Ratio Perm								c0.28	0.14		0.10	
v/c Ratio	0.08	0.39		0.95	0.25			0.55	0.28		0.19	
Uniform Delay, d1	36.7	37.6		31.3	25.4			14.1	3.0		11.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.1	0.8		30.1	0.1			2.4	0.0		0.3	
Delay (s)	36.8	38.4		61.4	25.5			16.5	3.1		11.5	
Level of Service	D	D		E	C			B	A		B	
Approach Delay (s)		38.2			51.8			10.4			11.5	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			24.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			71.0%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Background Future PM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	66	87	210	70	127	197	2117	105	99	1753	30
Future Volume (vph)	98	66	87	210	70	127	197	2117	105	99	1753	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.96	1.00		0.97	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1698	3148		1719	1863	1583	1711	4871		1711	4899	
Flt Permitted	0.71	1.00		0.65	1.00	1.00	0.05	1.00		0.05	1.00	
Satd. Flow (perm)	1267	3148		1176	1863	1583	90	4871		93	4899	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	103	69	92	221	74	134	207	2228	111	104	1845	32
RTOR Reduction (vph)	0	70	0	0	0	97	0	3	0	0	1	0
Lane Group Flow (vph)	103	91	0	221	74	37	207	2336	0	104	1876	0
Confl. Peds. (#/hr)	30		24	24		30	12		16	16		12
Confl. Bikes (#/hr)												1
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	8	1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	35.1	35.1		35.1	35.1	35.1	102.9	87.3		87.8	77.7	
Effective Green, g (s)	35.1	35.1		35.1	35.1	35.1	102.9	87.3		87.8	77.7	
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.69	0.58		0.59	0.52	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	296	736		275	435	370	274	2834		163	2537	
v/s Ratio Prot		0.03			0.04	0.02	c0.10	c0.48		0.04	0.38	
v/s Ratio Perm	0.08			c0.19			0.42			0.33		
v/c Ratio	0.35	0.12		0.80	0.17	0.10	0.76	0.82		0.64	0.74	
Uniform Delay, d1	47.9	45.3		54.2	45.8	45.1	44.6	25.2		29.3	28.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.39	0.45		1.00	1.00	
Incremental Delay, d2	1.5	0.2		17.4	0.4	0.2	9.4	2.0		10.9	2.0	
Delay (s)	49.4	45.5		71.6	46.2	45.3	71.2	13.3		40.2	30.2	
Level of Service	D	D		E	D	D	E	B		D	C	
Approach Delay (s)		47.0			59.0			18.0			30.7	
Approach LOS		D			E			B			C	
Intersection Summary												
HCM 2000 Control Delay		27.7										
HCM 2000 Volume to Capacity ratio		0.83										
Actuated Cycle Length (s)		150.0								17.5		
Intersection Capacity Utilization		96.9%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Twinbrook Parkway & Parklawn Drive

Background Future PM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	32	68	304	39	272	31	1199	271	133	743	32
Future Volume (vph)	44	32	68	304	39	272	31	1199	271	133	743	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	10	10	10	10	10
Total Lost time (s)	6.5	6.5		7.0	7.0	7.0	8.0	6.0		8.0	6.0	6.0
Lane Util. Factor	0.95	0.95		0.95	0.95	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1573		1625	1647	1531	1650	4576		3204	3303	1428
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.30	1.00		0.10	1.00	1.00
Satd. Flow (perm)	1681	1573		1625	1647	1531	522	4576		327	3303	1428
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	47	34	72	323	41	289	33	1276	288	141	790	34
RTOR Reduction (vph)	0	47	0	0	0	160	0	16	0	0	0	15
Lane Group Flow (vph)	42	64	0	181	183	129	33	1548	0	141	790	19
Confl. Peds. (#/hr)	12		2	2		12	4		17	17		4
Turn Type	Split	NA		Split	NA	pt+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	11.3	11.3		23.5	23.5	38.8	85.1	79.4		90.3	82.0	82.0
Effective Green, g (s)	11.3	11.3		23.5	23.5	38.8	85.1	79.4		90.3	82.0	82.0
Actuated g/C Ratio	0.08	0.08		0.16	0.16	0.26	0.57	0.53		0.60	0.55	0.55
Clearance Time (s)	6.5	6.5		7.0	7.0		8.0	6.0		8.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	126	118		254	258	396	339	2422		356	1805	780
v/s Ratio Prot	0.02	c0.04		c0.11	0.11	c0.08	0.00	c0.34		0.02	c0.24	
v/s Ratio Perm							0.05			0.22		0.01
v/c Ratio	0.33	0.54		0.71	0.71	0.33	0.10	0.64		0.40	0.44	0.02
Uniform Delay, d1	65.8	66.9		60.0	60.0	45.0	14.8	25.1		16.5	20.3	15.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.24	1.10		1.00	1.00	1.00
Incremental Delay, d2	1.6	5.0		9.1	8.6	0.5	0.1	0.7		0.7	0.8	0.1
Delay (s)	67.3	71.8		69.1	68.6	45.5	18.4	28.3		17.2	21.0	15.7
Level of Service	E	E		E	E	D	B	C		B	C	B
Approach Delay (s)		70.6			58.5			28.1			20.3	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			33.7									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			150.0							27.5		
Intersection Capacity Utilization			70.6%									ICU Level of Service C
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

14: Nebel Street & Randolph Road

Background Future PM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1056	74	202	808	177	125	145	311	282	171	24
Future Volume (vph)	21	1056	74	202	808	177	125	145	311	282	171	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	12	12	12
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1651	3254		1770	3422		1684	1801	1531	1763	1863	1583
Flt Permitted	0.21	1.00		0.06	1.00		0.64	1.00	1.00	0.43	1.00	1.00
Satd. Flow (perm)	359	3254		120	3422		1141	1801	1531	800	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	22	1112	78	213	851	186	132	153	327	297	180	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	22	1190	0	213	1037	0	132	153	327	297	180	25
Confl. Peds. (#/hr)	12		18	18		12	17		8	8		17
Confl. Bikes (#/hr)			4			3			3			3
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Prot	pm+pt	NA	Prot
Protected Phases	1	6		5	2		3	8	8	7	4	4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	60.5	56.3		80.5	70.3		41.0	26.6	26.6	56.5	35.6	35.6
Effective Green, g (s)	60.5	56.3		80.5	70.3		41.0	26.6	26.6	56.5	35.6	35.6
Actuated g/C Ratio	0.40	0.38		0.54	0.47		0.27	0.18	0.18	0.38	0.24	0.24
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	180	1221		264	1603		364	319	271	451	442	375
v/s Ratio Prot	0.00	c0.37		c0.10	0.30		0.03	0.08	c0.21	c0.10	0.10	0.02
v/s Ratio Perm	0.05			0.34			0.06			0.15		
v/c Ratio	0.12	0.97		0.81	0.65		0.36	0.48	1.21	0.66	0.41	0.07
Uniform Delay, d1	27.8	46.1		44.5	30.4		43.0	55.5	61.7	35.6	48.3	44.3
Progression Factor	0.81	0.79		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	18.8		16.3	2.0		0.8	1.5	122.4	3.8	0.8	0.1
Delay (s)	22.8	55.2		60.8	32.4		43.8	57.0	184.1	39.5	49.1	44.4
Level of Service	C	E		E	C		D	E	F	D	D	D
Approach Delay (s)		54.7			37.3			122.1			43.2	
Approach LOS		D			D			F			D	
Intersection Summary												
HCM 2000 Control Delay			58.5			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			25.5			
Intersection Capacity Utilization			90.3%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Background Future PM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	12	32	186	13	138	18	2590	250	161	2008	26
Future Volume (vph)	40	12	32	186	13	138	18	2590	250	161	2008	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.93		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.95	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	0.86		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1627	1589		1770	1496		1711	6071		1711	4901	
Flt Permitted	0.54	1.00		0.73	1.00		0.06	1.00		0.04	1.00	
Satd. Flow (perm)	931	1589		1354	1496		114	6071		78	4901	
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)	42	12	33	194	14	144	19	2698	260	168	2092	27
RTOR Reduction (vph)	0	27	0	0	117	0	0	8	0	0	1	0
Lane Group Flow (vph)	42	19	0	194	41	0	19	2950	0	168	2118	0
Confl. Peds. (#/hr)	44					44	25		20	20		25
Confl. Bikes (#/hr)			3						1			3
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	27.7	27.7		27.7	27.7		91.4	86.4		109.8	98.8	
Effective Green, g (s)	27.7	27.7		27.7	27.7		91.4	86.4		109.8	98.8	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.61	0.58		0.73	0.66	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	171	293		250	276		122	3496		246	3228	
v/s Ratio Prot		0.01			0.03		0.01	c0.49		c0.08	c0.43	
v/s Ratio Perm	0.05			c0.14			0.09			0.42		
v/c Ratio	0.25	0.07		0.78	0.15		0.16	0.84		0.68	0.66	
Uniform Delay, d1	52.2	50.5		58.2	51.2		13.2	26.2		45.2	15.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.39	0.47	
Incremental Delay, d2	1.6	0.2		16.1	0.5		1.2	2.7		8.2	0.9	
Delay (s)	53.8	50.7		74.3	51.8		14.5	28.9		71.0	8.1	
Level of Service	D	D		E	D		B	C		E	A	
Approach Delay (s)		52.2			64.2			28.8			12.7	
Approach LOS		D			E			C			B	
Intersection Summary												
HCM 2000 Control Delay		24.9					HCM 2000 Level of Service		C			
HCM 2000 Volume to Capacity ratio		0.81										
Actuated Cycle Length (s)		150.0					Sum of lost time (s)		18.5			
Intersection Capacity Utilization		98.3%					ICU Level of Service		F			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Background Future PM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	974	72	14	772	127	50	24	20	152	51	96
Future Volume (vph)	144	974	72	14	772	127	50	24	20	152	51	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1651	3257		1650	3303	1432	1711	1665		1681	1573	
Flt Permitted	0.27	1.00		0.22	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	471	3257		387	3303	1432	1711	1665		1681	1573	
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)	150	1015	75	15	804	132	52	25	21	158	53	100
RTOR Reduction (vph)	0	2	0	0	0	50	0	20	0	0	0	0
Lane Group Flow (vph)	150	1088	0	15	804	82	52	26	0	142	169	0
Confl. Peds. (#/hr)	3		10	10		3	9		2	2		9
Confl. Bikes (#/hr)						1						1
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	100.0	91.9		86.3	83.2	83.2	9.5	9.5		22.5	22.5	
Effective Green, g (s)	100.0	91.9		86.3	83.2	83.2	9.5	9.5		22.5	22.5	
Actuated g/C Ratio	0.67	0.61		0.58	0.55	0.55	0.06	0.06		0.15	0.15	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	406	1995		248	1832	794	108	105		252	235	
v/s Ratio Prot	c0.03	c0.33		0.00	0.24		c0.03	0.02		0.08	c0.11	
v/s Ratio Perm	0.22			0.03		0.06						
v/c Ratio	0.37	0.55		0.06	0.44	0.10	0.48	0.25		0.56	0.72	
Uniform Delay, d1	10.9	16.9		14.2	19.7	15.8	67.9	66.9		59.2	60.7	
Progression Factor	1.00	1.00		0.56	0.46	0.12	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	1.1		0.1	0.6	0.2	4.6	1.7		3.5	10.7	
Delay (s)	11.6	18.0		8.1	9.6	2.1	72.4	68.6		62.7	71.5	
Level of Service	B	B		A	A	A	E	E		E	E	
Approach Delay (s)		17.2			8.5			70.6			67.5	
Approach LOS		B			A			E			E	
Intersection Summary												
HCM 2000 Control Delay		22.1				HCM 2000 Level of Service		C				
HCM 2000 Volume to Capacity ratio		0.57										
Actuated Cycle Length (s)		150.0				Sum of lost time (s)		23.0				
Intersection Capacity Utilization		68.5%				ICU Level of Service		C				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

17: Chapman Ave/Chapman Road & Thompson Ave

Background Future PM

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	17	122	9	12	5	28	279	23	7	281	27
Future Volume (Veh/h)	26	17	122	9	12	5	28	279	23	7	281	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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)	28	18	130	10	13	5	30	297	24	7	299	29
Pedestrians		66			56			51			6	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		6			5			5			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								638				
pX, platoon unblocked	1.00	1.00		1.00	1.00	1.00				1.00		
vC, conflicting volume	780	830	430	942	833	371	394			377		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	777	828	430	940	831	367	394			373		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	89	93	77	93	95	99	97			99		
cM capacity (veh/h)	248	262	557	142	261	636	1091			1118		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	176	28	351	335								
Volume Left	28	10	30	7								
Volume Right	130	5	24	29								
cSH	424	218	1091	1118								
Volume to Capacity	0.42	0.13	0.03	0.01								
Queue Length 95th (ft)	50	11	2	0								
Control Delay (s)	19.4	23.9	1.0	0.2								
Lane LOS	C	C	A	A								
Approach Delay (s)	19.4	23.9	1.0	0.2								
Approach LOS	C	C										
Intersection Summary												
Average Delay			5.1									
Intersection Capacity Utilization			51.4%		ICU Level of Service				A			
Analysis Period (min)			15									

APPENDIX C
PHASE 1 2034 CONDITIONS
CAPACITY ANALYSES

HCM Signalized Intersection Capacity Analysis

1: Rockville Pike - 355 & Bou Ave

Total Future AM Phase 1

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗	↖↗	↖		↖	↑↑↑	↗	↖	↑↑↑	
Traffic Volume (vph)	14	21	25	552	11	58	36	1656	211	169	2011	6
Future Volume (vph)	14	21	25	552	11	58	36	1656	211	169	2011	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	0.98		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	0.87		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1704	1478	3204	1494		1711	4916	1531	1769	5083	
Flt Permitted		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.09	1.00	
Satd. Flow (perm)		1704	1478	3204	1494		1711	4916	1531	176	5083	
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)	15	22	26	575	11	60	38	1725	220	176	2095	6
RTOR Reduction (vph)	0	0	25	0	49	0	0	0	75	0	0	0
Lane Group Flow (vph)	0	37	1	575	22	0	38	1725	145	176	2101	0
Confl. Peds. (#/hr)	4					4	5		9	9		5
Confl. Bikes (#/hr)			1									
Turn Type	Split	NA	Prot	Split	NA		Prot	NA	Prot	pm+pt	NA	
Protected Phases	3	3	3	4	4		1	5	5	6	2	
Permitted Phases										2		
Actuated Green, G (s)		7.0	7.0	26.7	26.7		7.6	81.3	81.3	84.7	84.7	
Effective Green, g (s)		7.0	7.0	26.7	26.7		7.6	81.3	81.3	84.7	84.7	
Actuated g/C Ratio		0.05	0.05	0.18	0.18		0.05	0.54	0.54	0.56	0.56	
Clearance Time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	6.0	6.0		3.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)		79	68	570	265		86	2664	829	210	2870	
v/s Ratio Prot		c0.02	0.00	c0.18	0.01		0.02	c0.35	0.09	0.06	c0.41	
v/s Ratio Perm										c0.41		
v/c Ratio		0.47	0.02	1.01	0.08		0.44	0.65	0.17	0.84	0.73	
Uniform Delay, d1		69.7	68.2	61.6	51.4		69.1	24.2	17.4	41.0	24.2	
Progression Factor		1.00	1.00	1.00	1.00		1.44	0.67	0.44	0.63	0.36	
Incremental Delay, d2		4.3	0.1	39.9	0.4		3.3	1.1	0.4	20.6	1.4	
Delay (s)		74.0	68.3	101.5	51.8		103.0	17.3	8.1	46.2	10.1	
Level of Service		E	E	F	D		F	B	A	D	B	
Approach Delay (s)		71.7			96.1			17.9			12.9	
Approach LOS		E			F			B			B	
Intersection Summary												
HCM 2000 Control Delay			26.5			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			31.0			
Intersection Capacity Utilization			80.6%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Rockville Pike - 355 & Federal Plaza/Pike Center

Total Future AM Phase 1

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Traffic Volume (vph)	16	2	56	0	2	16	84	1572	0	9	2106	2
Future Volume (vph)	16	2	56	0	2	16	84	1572	0	9	2106	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	16	16	16	11	11	11	10	10	10
Total Lost time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00	1.00		0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.88		1.00	1.00		1.00	1.00	
Flt Protected		0.96	1.00		1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1664	1478		1820		1711	4916		1651	4745	
Flt Permitted		0.96	1.00		1.00		0.05	1.00		0.13	1.00	
Satd. Flow (perm)		1664	1478		1820		98	4916		230	4745	
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)	17	2	58	0	2	17	88	1638	0	9	2194	2
RTOR Reduction (vph)	0	0	56	0	17	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	19	2	0	2	0	88	1638	0	9	2196	0
Confl. Peds. (#/hr)	1						1	3		7	7	3
Confl. Bikes (#/hr)			1			1						
Turn Type	Split	NA	Prot		NA		pm+pt	NA		pm+pt	NA	
Protected Phases	8	8	8	4	4		5	2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		6.2	6.2		4.0		121.3	115.1		110.2	109.0	
Effective Green, g (s)		6.2	6.2		4.0		121.3	115.1		110.2	109.0	
Actuated g/C Ratio		0.04	0.04		0.03		0.81	0.77		0.73	0.73	
Clearance Time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		68	61		48		157	3772		180	3448	
v/s Ratio Prot		c0.01	0.00		c0.00		c0.03	0.33		0.00	c0.46	
v/s Ratio Perm							0.42			0.04		
v/c Ratio		0.28	0.04		0.05		0.56	0.43		0.05	0.64	
Uniform Delay, d1		69.7	69.0		71.2		12.7	6.1		5.4	10.4	
Progression Factor		1.00	1.00		1.00		3.18	0.05		0.63	0.38	
Incremental Delay, d2		2.2	0.3		0.4		3.7	0.3		0.1	0.8	
Delay (s)		72.0	69.3		71.6		44.1	0.6		3.5	4.8	
Level of Service		E	E		E		D	A		A	A	
Approach Delay (s)		70.0			71.6			2.8			4.8	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			5.5				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			23.5		
Intersection Capacity Utilization			67.2%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Rockville Pike - 355 & Gas Station

Total Future AM Phase 1
12/04/2024

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			   			   	
Traffic Volume (veh/h)	0	19	1578	25	0	2136	
Future Volume (Veh/h)	0	19	1578	25	0	2136	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	
Hourly flow rate (vph)	0	24	1997	32	0	2704	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage (veh)							
Upstream signal (ft)			225			340	
pX, platoon unblocked	0.76	0.88			0.88		
vC, conflicting volume	2914	682			2029		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	1403	182			1706		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	97			100		
cM capacity (veh/h)	100	733			326		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	24	799	799	431	901	901	901
Volume Left	0	0	0	0	0	0	0
Volume Right	24	0	0	32	0	0	0
cSH	733	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.03	0.47	0.47	0.25	0.53	0.53	0.53
Queue Length 95th (ft)	3	0	0	0	0	0	0
Control Delay (s)	10.1	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	10.1	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			44.6%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis

Total Future AM Phase 1

4: Rockville Pike - 355/Rockville Pike- 355 & Rollins Ave/Twinbrook Parkway

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱			↑↑	↱	↱	↑↑↑	↱	↱	↑↑↑	
Traffic Volume (vph)	0	252	136	0	310	196	105	1463	106	200	2000	45
Future Volume (vph)	0	252	136	0	310	196	105	1463	106	200	2000	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	10	10	10	11	11	11
Total Lost time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		0.99			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.95			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3104			3539	1583	1652	4746	1478	1711	4897	
Flt Permitted		1.00			1.00	1.00	0.05	1.00	1.00	0.11	1.00	
Satd. Flow (perm)		3104			3539	1583	93	4746	1478	202	4897	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	257	139	0	316	200	107	1493	108	204	2041	46
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	47	0	1	0
Lane Group Flow (vph)	0	396	0	0	316	200	107	1493	61	204	2086	0
Confl. Peds. (#/hr)	13		9	9		13			4			4
Confl. Bikes (#/hr)									1			
Turn Type		NA			NA	Prot	pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		4			8	8	1	6	6	5	2	
Permitted Phases							6			2		
Actuated Green, G (s)		27.0			27.0	27.0	97.3	85.1	85.1	108.7	90.8	
Effective Green, g (s)		27.0			27.0	27.0	97.3	85.1	85.1	108.7	90.8	
Actuated g/C Ratio		0.18			0.18	0.18	0.65	0.57	0.57	0.72	0.61	
Clearance Time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Vehicle Extension (s)		4.0			4.0	4.0	4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)		558			637	284	187	2692	838	326	2964	
v/s Ratio Prot		c0.13			0.09	0.13	0.05	0.31	0.04	c0.07	c0.43	
v/s Ratio Perm							0.33			0.38		
v/c Ratio		0.71			0.50	0.70	0.57	0.55	0.07	0.63	0.70	
Uniform Delay, d1		57.8			55.4	57.8	25.5	20.5	14.6	15.6	20.4	
Progression Factor		1.00			0.87	0.86	1.59	0.41	0.06	2.67	0.40	
Incremental Delay, d2		4.4			0.8	8.0	4.8	0.8	0.2	3.4	1.2	
Delay (s)		62.2			49.2	57.8	45.3	9.3	1.0	45.1	9.3	
Level of Service		E			D	E	D	A	A	D	A	
Approach Delay (s)		62.2			52.5			11.0			12.5	
Approach LOS		E			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			20.2		HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			150.0		Sum of lost time (s)					20.0		
Intersection Capacity Utilization			78.5%		ICU Level of Service					D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Chapman Ave & Twinbrook Parkway

Total Future AM Phase 1

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	509	69	534	440	123	75	48	197	84	50	24
Future Volume (vph)	40	509	69	534	440	123	75	48	197	84	50	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	10	10	10	10	10	10
Total Lost time (s)	5.5	6.0		5.5	6.0			6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		0.97	0.95			1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1648	3238		3319	3286			1687	1478	3204	1739	1443
Flt Permitted	0.43	1.00		0.95	1.00			0.97	1.00	0.95	1.00	1.00
Satd. Flow (perm)	751	3238		3319	3286			1687	1478	3204	1739	1443
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	41	525	71	551	454	127	77	49	203	87	52	25
RTOR Reduction (vph)	0	6	0	0	10	0	0	0	129	0	0	23
Lane Group Flow (vph)	41	590	0	551	571	0	0	126	74	87	52	2
Confl. Peds. (#/hr)	4		1	1		4	5		14	14		5
Confl. Bikes (#/hr)			4			1						1
Turn Type	pm+pt	NA		Prot	NA		Split	NA	pt+ov	Split	NA	Perm
Protected Phases	5	2		1	6		4	4	4 1	3	3	
Permitted Phases	2											3
Actuated Green, G (s)	72.6	67.0		31.8	93.2			16.7	55.0	10.0	10.0	10.0
Effective Green, g (s)	72.6	67.0		31.8	93.2			16.7	55.0	10.0	10.0	10.0
Actuated g/C Ratio	0.48	0.45		0.21	0.62			0.11	0.37	0.07	0.07	0.07
Clearance Time (s)	5.5	6.0		5.5	6.0			6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	396	1446		703	2041			187	541	213	115	96
v/s Ratio Prot	0.00	c0.18		c0.17	0.17			c0.07	0.05	0.03	c0.03	
v/s Ratio Perm	0.05											0.00
v/c Ratio	0.10	0.41		0.78	0.28			0.67	0.14	0.41	0.45	0.02
Uniform Delay, d1	20.5	28.1		55.9	13.0			64.0	31.7	67.2	67.4	65.4
Progression Factor	0.72	0.74		1.12	1.14			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.8		5.4	0.3			9.2	0.1	1.3	2.8	0.1
Delay (s)	14.9	21.6		68.0	15.2			73.2	31.8	68.4	70.2	65.5
Level of Service	B	C		E	B			E	C	E	E	E
Approach Delay (s)		21.2			40.9			47.7			68.5	
Approach LOS		C			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			38.3			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.54									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			68.1%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Chapman Ave & Pike Center North/Driveway

Total Future AM Phase 1
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	1	0	4	2	317	2	5	643	5
Future Volume (Veh/h)	0	0	0	1	0	4	2	317	2	5	643	5
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	0	0	0	1	0	5	3	401	3	6	814	6
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage veh												
Upstream signal (ft)							471			256		
pX, platoon unblocked												
vC, conflicting volume	1040	1239	410	828	1240	202	820				404	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1040	1239	410	828	1240	202	820				404	
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	100	100	99	100				99	
cM capacity (veh/h)	182	173	591	262	172	805	805				1151	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	0	6	204	204	413	413						
Volume Left	0	1	3	0	6	0						
Volume Right	0	5	0	3	0	6						
cSH	1700	598	805	1700	1151	1700						
Volume to Capacity	0.03	0.01	0.00	0.12	0.01	0.24						
Queue Length 95th (ft)	0	1	0	0	0	0						
Control Delay (s)	0.0	11.1	0.2	0.0	0.2	0.0						
Lane LOS	A	B	A		A							
Approach Delay (s)	0.0	11.1	0.1		0.1							
Approach LOS	A	B										
Intersection Summary												
Average Delay				0.1								
Intersection Capacity Utilization				31.4%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

7: Chapman Ave & Rollins Ave Extension/Rollins Ave

Total Future AM Phase 1
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	22	3	32	6	33	1	336	49	36	571	0
Future Volume (Veh/h)	0	22	3	32	6	33	1	336	49	36	571	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	23	3	33	6	34	1	346	51	37	589	0
Pedestrians					11						3	
Lane Width (ft)					12.0						10.0	
Walking Speed (ft/s)					3.5						3.5	
Percent Blockage					1						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								287			440	
pX, platoon unblocked	0.97	0.97		0.97	0.97	0.97				0.97		
vC, conflicting volume	1076	1073	294	768	1048	386	589			408		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1064	1061	294	747	1035	354	589			377		
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	89	100	87	97	94	100			97		
cM capacity (veh/h)	154	207	702	256	214	617	982			1134		
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1	SB 2						
Volume Total	26	33	40	398	332	294						
Volume Left	0	33	0	1	37	0						
Volume Right	3	0	34	51	0	0						
cSH	225	256	481	982	1134	1700						
Volume to Capacity	0.12	0.13	0.08	0.00	0.03	0.17						
Queue Length 95th (ft)	10	11	7	0	3	0						
Control Delay (s)	23.1	21.2	13.2	0.0	1.2	0.0						
Lane LOS	C	C	B	A	A							
Approach Delay (s)	23.1	16.8		0.0	0.6							
Approach LOS	C	C										
Intersection Summary												
Average Delay			2.0									
Intersection Capacity Utilization			56.4%		ICU Level of Service		B					
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

9: Chapman Ave & Bou Ave

Total Future AM Phase 1

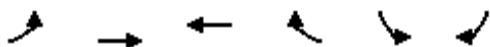
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	120	37	6	95	166	4	41	4	139	79	390
Future Volume (vph)	147	120	37	6	95	166	4	41	4	139	79	390
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		0.99	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1645	1663		1630	1739	1433	1648	1713		1633	1739	1478
Flt Permitted	0.57	1.00		0.65	1.00	1.00	0.70	1.00		0.73	1.00	1.00
Satd. Flow (perm)	979	1663		1120	1739	1433	1220	1713		1248	1739	1478
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	155	126	39	6	100	175	4	43	4	146	83	411
RTOR Reduction (vph)	0	14	0	0	0	120	0	3	0	0	0	186
Lane Group Flow (vph)	155	151	0	6	100	55	4	44	0	146	83	225
Confl. Peds. (#/hr)	5		8	8		5	2		11	11		2
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	pt+ov
Protected Phases	1	6			2			4			8	8 1
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	42.9	42.9		24.5	24.5	24.5	24.0	24.0		24.0	24.0	42.9
Effective Green, g (s)	42.9	42.9		24.5	24.5	24.5	24.0	24.0		24.0	24.0	42.9
Actuated g/C Ratio	0.55	0.55		0.31	0.31	0.31	0.31	0.31		0.31	0.31	0.55
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	6.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	645	909		350	543	447	373	524		382	532	808
v/s Ratio Prot	0.04	0.09			0.06			0.03			0.05	c0.15
v/s Ratio Perm	c0.09			0.01		0.04	0.00			c0.12		
v/c Ratio	0.24	0.17		0.02	0.18	0.12	0.01	0.08		0.38	0.16	0.28
Uniform Delay, d1	9.1	8.8		18.6	19.7	19.3	18.9	19.4		21.4	19.8	9.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.0		0.1	0.7	0.6	0.0	0.1		2.9	0.6	0.5
Delay (s)	9.6	8.9		18.7	20.4	19.8	18.9	19.4		24.3	20.4	10.0
Level of Service	A	A		B	C	B	B	B		C	C	B
Approach Delay (s)		9.2			20.0			19.4			14.6	
Approach LOS		A			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.6									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.32									
Actuated Cycle Length (s)			78.4									Sum of lost time (s) 17.0
Intersection Capacity Utilization			59.0%									ICU Level of Service B
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

10: Bou Ave & Pike Center

Total Future AM Phase 1
12/04/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	111	278	506	18	20	87
Future Volume (Veh/h)	111	278	506	18	20	87
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	118	296	538	19	21	93
Pedestrians		4			7	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		278	280			
pX, platoon unblocked						
vC, conflicting volume	564				938	290
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	564				938	290
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	88				91	87
cM capacity (veh/h)	997				230	700
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	217	197	359	198	114	
Volume Left	118	0	0	0	21	
Volume Right	0	0	0	19	93	
cSH	997	1700	1700	1700	508	
Volume to Capacity	0.12	0.12	0.21	0.12	0.22	
Queue Length 95th (ft)	10	0	0	0	21	
Control Delay (s)	5.5	0.0	0.0	0.0	14.1	
Lane LOS	A				B	
Approach Delay (s)	2.9		0.0		14.1	
Approach LOS					B	
Intersection Summary						
Average Delay			2.6			
Intersection Capacity Utilization			43.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

11: East Jefferson Street & Rollins Avenue /Rollins Ave

Total Future AM Phase 1

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	44	27	282	32	38	9	243	358	20	218	18
Future Volume (vph)	17	44	27	282	32	38	9	243	358	20	218	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.94		1.00	0.92			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1711	1682		1711	1624			1797	1510		3362	
Flt Permitted	0.95	1.00		0.95	1.00			0.99	1.00		0.92	
Satd. Flow (perm)	1711	1682		1711	1624			1778	1510		3112	
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)	18	48	29	307	35	41	10	264	389	22	237	20
RTOR Reduction (vph)	0	27	0	0	32	0	0	0	93	0	5	0
Lane Group Flow (vph)	18	50	0	307	44	0	0	274	296	0	274	0
Confl. Peds. (#/hr)	7		10	10		7	7		6	6		7
Confl. Bikes (#/hr)			1			1			1			1
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		3	3			2	3		6	
Permitted Phases							2		2	6		
Actuated Green, G (s)	6.3	6.3		18.2	18.2			46.5	64.7		46.5	
Effective Green, g (s)	6.3	6.3		18.2	18.2			46.5	64.7		46.5	
Actuated g/C Ratio	0.07	0.07		0.21	0.21			0.55	0.76		0.55	
Clearance Time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Vehicle Extension (s)	2.0	2.0		1.0	1.0			5.0	1.0		5.0	
Lane Grp Cap (vph)	126	124		366	347			972	1149		1702	
v/s Ratio Prot	0.01	c0.03		c0.18	0.03				0.06			
v/s Ratio Perm								c0.15	0.14		0.09	
v/c Ratio	0.14	0.40		0.84	0.13			0.28	0.26		0.16	
Uniform Delay, d1	36.8	37.6		32.0	27.0			10.3	3.0		9.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.8		14.8	0.1			0.7	0.0		0.2	
Delay (s)	37.0	38.3		46.8	27.0			11.0	3.1		9.8	
Level of Service	D	D		D	C			B	A		A	
Approach Delay (s)		38.1			42.8			6.4			9.8	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			19.0			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			64.7%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Rockville Pike- 355 & Halpine Road

Total Future AM Phase 1
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 						 			 	
Traffic Volume (vph)	42	52	56	176	28	67	79	1296	311	63	1865	20
Future Volume (vph)	42	52	56	176	28	67	79	1296	311	63	1865	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		0.96	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1765	3174		1706	1863	1583	1711	4751		1711	4907	
Flt Permitted	0.74	1.00		0.68	1.00	1.00	0.06	1.00		0.10	1.00	
Satd. Flow (perm)	1371	3174		1223	1863	1583	112	4751		188	4907	
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)	44	54	58	183	29	70	82	1350	324	66	1943	21
RTOR Reduction (vph)	0	46	0	0	0	56	0	21	0	0	0	0
Lane Group Flow (vph)	44	66	0	183	29	14	82	1653	0	66	1964	0
Confl. Peds. (#/hr)	2		28	28		2	1		7	7		1
Confl. Bikes (#/hr)						1						
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	8	1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	30.0	30.0		30.0	30.0	30.0	104.8	94.7		100.2	92.4	
Effective Green, g (s)	30.0	30.0		30.0	30.0	30.0	104.8	94.7		100.2	92.4	
Actuated g/C Ratio	0.20	0.20		0.20	0.20	0.20	0.70	0.63		0.67	0.62	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	274	634		244	372	316	185	2999		204	3022	
v/s Ratio Prot		0.02			0.02	0.01	c0.03	0.35		0.02	c0.40	
v/s Ratio Perm	0.03			c0.15			0.28			0.20		
v/c Ratio	0.16	0.10		0.75	0.08	0.04	0.44	0.55		0.32	0.65	
Uniform Delay, d1	49.6	49.0		56.5	48.8	48.4	14.8	15.6		10.6	18.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	2.25	0.83		1.00	1.00	
Incremental Delay, d2	0.6	0.2		14.3	0.2	0.1	3.0	0.6		1.9	1.1	
Delay (s)	50.2	49.2		70.8	48.9	48.6	36.3	13.7		12.5	19.5	
Level of Service	D	D		E	D	D	D	B		B	B	
Approach Delay (s)		49.4			63.0			14.7			19.3	
Approach LOS		D			E			B			B	
Intersection Summary												
HCM 2000 Control Delay		21.4										
HCM 2000 Volume to Capacity ratio		0.66										
Actuated Cycle Length (s)		150.0										
Intersection Capacity Utilization		74.1%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Twinbrook Parkway & Parklawn Drive

Total Future AM Phase 1

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	24	51	163	19	124	50	490	277	179	807	63
Future Volume (vph)	36	24	51	163	19	124	50	490	277	179	807	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	10	10	10	10	10
Total Lost time (s)	6.5	6.5		7.0	7.0	7.0	8.0	6.0		8.0	6.0	6.0
Lane Util. Factor	0.95	0.95		0.95	0.95	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1573		1625	1645	1531	1651	4466		3203	3303	1437
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.29	1.00		0.30	1.00	1.00
Satd. Flow (perm)	1681	1573		1625	1645	1531	504	4466		1017	3303	1437
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	38	26	54	173	20	132	53	521	295	190	859	67
RTOR Reduction (vph)	0	46	0	0	0	106	0	37	0	0	0	26
Lane Group Flow (vph)	34	38	0	97	96	26	53	779	0	190	859	41
Confl. Peds. (#/hr)	10		2	2		10	2		1	1		2
Confl. Bikes (#/hr)												1
Turn Type	Split	NA		Split	NA	pt+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	9.4	9.4		14.5	14.5	30.0	96.1	90.1		101.1	92.6	92.6
Effective Green, g (s)	9.4	9.4		14.5	14.5	30.0	96.1	90.1		101.1	92.6	92.6
Actuated g/C Ratio	0.06	0.06		0.10	0.10	0.20	0.64	0.60		0.67	0.62	0.62
Clearance Time (s)	6.5	6.5		7.0	7.0		8.0	6.0		8.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	105	98		157	159	306	368	2682		809	2039	887
v/s Ratio Prot	0.02	c0.02		c0.06	0.06	0.02	0.01	0.17		c0.01	c0.26	
v/s Ratio Perm							0.09			0.14		0.03
v/c Ratio	0.32	0.39		0.62	0.60	0.09	0.14	0.29		0.23	0.42	0.05
Uniform Delay, d1	67.3	67.5		65.1	65.0	48.8	10.4	14.5		8.8	14.8	11.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.87	0.59		1.00	1.00	1.00
Incremental Delay, d2	1.8	2.5		7.1	6.3	0.1	0.2	0.3		0.2	0.6	0.1
Delay (s)	69.1	70.1		72.1	71.3	49.0	9.3	8.8		8.9	15.5	11.4
Level of Service	E	E		E	E	D	A	A		A	B	B
Approach Delay (s)		69.8			62.5			8.8			14.1	
Approach LOS		E			E			A			B	
Intersection Summary												
HCM 2000 Control Delay			21.4			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			27.5			
Intersection Capacity Utilization			58.8%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Total Future AM Phase 1

12/04/2024

14: Nebel Street & Randolph Road

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	669	63	261	1038	134	80	66	97	144	74	14
Future Volume (vph)	16	669	63	261	1038	134	80	66	97	144	74	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	12	12	12
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1652	3252		1769	3473		1711	1801	1531	1767	1863	1583
Flt Permitted	0.18	1.00		0.26	1.00		0.71	1.00	1.00	0.53	1.00	1.00
Satd. Flow (perm)	316	3252		490	3473		1272	1801	1531	989	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	17	704	66	275	1093	141	84	69	102	152	78	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	17	770	0	275	1234	0	84	69	102	152	78	15
Confl. Peds. (#/hr)	1		4	4		1			2	2		
Confl. Bikes (#/hr)									1			
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Prot	pm+pt	NA	Prot
Protected Phases	1	6		5	2		3	8	8	7	4	4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	76.9	74.2		96.7	88.0		28.3	16.2	16.2	39.3	21.7	21.7
Effective Green, g (s)	76.9	74.2		96.7	88.0		28.3	16.2	16.2	39.3	21.7	21.7
Actuated g/C Ratio	0.51	0.49		0.64	0.59		0.19	0.11	0.11	0.26	0.14	0.14
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	186	1608		456	2037		275	194	165	350	269	229
v/s Ratio Prot	0.00	0.24		c0.07	c0.36		0.02	0.04	c0.07	c0.05	0.04	0.01
v/s Ratio Perm	0.05			0.32			0.03			0.06		
v/c Ratio	0.09	0.48		0.60	0.61		0.31	0.36	0.62	0.43	0.29	0.07
Uniform Delay, d1	18.7	25.1		13.8	19.9		51.9	62.1	63.9	44.8	57.3	55.4
Progression Factor	0.77	0.76		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	1.0		2.3	1.3		0.9	1.5	7.7	1.2	0.8	0.2
Delay (s)	14.6	20.0		16.1	21.2		52.8	63.6	71.6	46.0	58.1	55.6
Level of Service	B	C		B	C		D	E	E	D	E	E
Approach Delay (s)		19.9			20.3			63.2			50.4	
Approach LOS		B			C			E			D	
Intersection Summary												
HCM 2000 Control Delay			26.7			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			25.5			
Intersection Capacity Utilization			66.8%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Total Future AM Phase 1

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	7	13	77	16	50	25	1815	116	48	2576	48
Future Volume (vph)	20	7	13	77	16	50	25	1815	116	48	2576	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.96		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.97	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	0.89		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	1604		1770	1581		1711	6115		1711	4893	
Flt Permitted	0.71	1.00		0.74	1.00		0.04	1.00		0.07	1.00	
Satd. Flow (perm)	1241	1604		1386	1581		66	6115		133	4893	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	20	7	13	79	16	51	26	1852	118	49	2629	49
RTOR Reduction (vph)	0	12	0	0	46	0	0	3	0	0	1	0
Lane Group Flow (vph)	20	8	0	79	21	0	26	1967	0	49	2677	0
Confl. Peds. (#/hr)	25					25	29		16	16		29
Confl. Bikes (#/hr)			4			3						
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8		113.5	108.5		117.9	110.7	
Effective Green, g (s)	15.8	15.8		15.8	15.8		113.5	108.5		117.9	110.7	
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.76	0.72		0.79	0.74	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	130	168		145	166		104	4423		180	3611	
v/s Ratio Prot		0.01			0.01		0.01	0.32		c0.01	c0.55	
v/s Ratio Perm	0.02			c0.06			0.18			0.20		
v/c Ratio	0.15	0.05		0.54	0.13		0.25	0.44		0.27	0.74	
Uniform Delay, d1	61.0	60.3		63.7	60.9		11.4	8.5		4.8	11.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.41	0.35	
Incremental Delay, d2	1.2	0.3		7.2	0.7		2.6	0.3		1.1	0.9	
Delay (s)	62.2	60.6		70.9	61.6		14.0	8.8		3.0	4.9	
Level of Service	E	E		E	E		B	A		A	A	
Approach Delay (s)		61.4			66.6			8.9			4.8	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay		8.8										
HCM 2000 Volume to Capacity ratio		0.70										
Actuated Cycle Length (s)		150.0								18.5		
Intersection Capacity Utilization		80.2%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Total Future AM Phase 1

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	705	80	9	1119	66	11	6	4	27	7	24
Future Volume (vph)	77	705	80	9	1119	66	11	6	4	27	7	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.94		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	3234		1647	3303	1428	1711	1675		1681	1549	
Flt Permitted	0.16	1.00		0.31	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	279	3234		544	3303	1428	1711	1675		1681	1549	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	89	810	92	10	1286	76	13	7	5	31	8	28
RTOR Reduction (vph)	0	3	0	0	0	24	0	5	0	0	0	0
Lane Group Flow (vph)	89	899	0	10	1286	52	13	7	0	28	39	0
Confl. Peds. (#/hr)	4		11	11		4	4		3	3		4
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	118.1	110.3		105.5	102.7	102.7	5.1	5.1		8.8	8.8	
Effective Green, g (s)	118.1	110.3		105.5	102.7	102.7	5.1	5.1		8.8	8.8	
Actuated g/C Ratio	0.79	0.74		0.70	0.68	0.68	0.03	0.03		0.06	0.06	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	314	2378		403	2261	977	58	56		98	90	
v/s Ratio Prot	c0.02	c0.28		0.00	c0.39		c0.01	0.00		0.02	c0.03	
v/s Ratio Perm	0.20			0.02		0.04						
v/c Ratio	0.28	0.38		0.02	0.57	0.05	0.22	0.13		0.29	0.43	
Uniform Delay, d1	6.9	7.3		6.6	12.2	7.7	70.5	70.3		67.6	68.2	
Progression Factor	1.00	1.00		0.46	0.32	0.02	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.5		0.0	0.9	0.1	2.7	1.4		2.2	4.5	
Delay (s)	7.6	7.7		3.1	4.9	0.2	73.2	71.7		69.8	72.7	
Level of Service	A	A		A	A	A	E	E		E	E	
Approach Delay (s)		7.7			4.6			72.5			71.5	
Approach LOS		A			A			E			E	
Intersection Summary												
HCM 2000 Control Delay	8.4			HCM 2000 Level of Service			A					
HCM 2000 Volume to Capacity ratio	0.53											
Actuated Cycle Length (s)	150.0			Sum of lost time (s)			23.0					
Intersection Capacity Utilization	58.9%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

17: Chapman Ave/Chapman Road & Thompson Ave

Total Future AM Phase 1
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	3	37	30	15	2	37	142	7	7	144	9
Future Volume (Veh/h)	2	3	37	30	15	2	37	142	7	7	144	9
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	3	43	34	17	2	43	163	8	8	166	10
Pedestrians	71			19			50			2		
Lane Width (ft)	12.0			12.0			12.0			12.0		
Walking Speed (ft/s)	3.5			3.5			3.5			3.5		
Percent Blockage	7			2			5			0		
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)	638											
pX, platoon unblocked												
vC, conflicting volume	524	534	292	554	535	188	247				190	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	524	534	292	554	535	188	247				190	
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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	99	94	90	96	100	97				99	
cM capacity (veh/h)	378	397	664	350	397	837	1230				1359	
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	48	53	214	184								
Volume Left	2	34	43	8								
Volume Right	43	2	8	10								
cSH	618	372	1230	1359								
Volume to Capacity	0.08	0.14	0.03	0.01								
Queue Length 95th (ft)	6	12	3	0								
Control Delay (s)	11.3	16.3	1.9	0.4								
Lane LOS	B	C	A	A								
Approach Delay (s)	11.3	16.3	1.9	0.4								
Approach LOS	B	C										
Intersection Summary												
Average Delay				3.8								
Intersection Capacity Utilization				41.9%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

18: Rockville Pike - 355 & Rollins Ave Extension

Total Future AM Phase 1
12/04/2024

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (veh/h)	0	46	1614	61	0	2138	
Future Volume (Veh/h)	0	46	1614	61	0	2138	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	50	1754	66	0	2324	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			249			340	
pX, platoon unblocked	0.87	0.75			0.75		
vC, conflicting volume	2562	618			1820		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	434	0			940		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	94			100		
cM capacity (veh/h)	479	816			546		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	50	702	702	417	775	775	775
Volume Left	0	0	0	0	0	0	0
Volume Right	50	0	0	66	0	0	0
cSH	816	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.06	0.41	0.41	0.25	0.46	0.46	0.46
Queue Length 95th (ft)	5	0	0	0	0	0	0
Control Delay (s)	9.7	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A						
Approach Delay (s)	9.7	0.0			0.0		
Approach LOS	A						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			44.6%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis

Total Future PM Phase 1

1: Rockville Pike - 355 & Bou Ave

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰↱	↰		↱	↰↱↰	↱	↱	↰↱↰	
Traffic Volume (vph)	17	31	36	452	21	208	57	2417	526	279	1721	18
Future Volume (vph)	17	31	36	452	21	208	57	2417	526	279	1721	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	0.86		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1708	1478	3204	1422		1711	4916	1531	1770	5071	
Flt Permitted		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.05	1.00	
Satd. Flow (perm)		1708	1478	3204	1422		1711	4916	1531	100	5071	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	18	32	37	466	22	214	59	2492	542	288	1774	19
RTOR Reduction (vph)	0	0	35	0	179	0	0	0	109	0	0	0
Lane Group Flow (vph)	0	50	2	466	57	0	59	2492	433	288	1793	0
Confl. Peds. (#/hr)	25					25	25		25	25		25
Confl. Bikes (#/hr)			1			1			1			
Turn Type	Split	NA	Prot	Split	NA		Prot	NA	Prot	pm+pt	NA	
Protected Phases	3	3	3	4	4		1	5	5	6	2	
Permitted Phases										2		
Actuated Green, G (s)		7.3	7.3	24.4	24.4		9.2	83.3	83.3	85.1	85.1	
Effective Green, g (s)		7.3	7.3	24.4	24.4		9.2	83.3	83.3	85.1	85.1	
Actuated g/C Ratio		0.05	0.05	0.16	0.16		0.06	0.56	0.56	0.57	0.57	
Clearance Time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	6.0	6.0		3.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)		83	71	521	231		104	2730	850	173	2876	
v/s Ratio Prot		c0.03	0.00	c0.15	0.04		0.03	c0.51	0.28	c0.12	0.35	
v/s Ratio Perm										c0.83		
v/c Ratio		0.60	0.03	0.89	0.25		0.57	0.91	0.51	1.66	0.62	
Uniform Delay, d1		69.9	68.0	61.5	54.8		68.5	30.1	20.7	56.4	21.7	
Progression Factor		1.00	1.00	1.00	1.00		1.34	0.53	0.60	0.55	0.14	
Incremental Delay, d2		11.7	0.1	19.3	1.6		3.7	3.3	1.1	316.2	0.7	
Delay (s)		81.6	68.1	80.9	56.3		95.5	19.2	13.5	347.0	3.8	
Level of Service		F	E	F	E		F	B	B	F	A	
Approach Delay (s)		75.9			72.6			19.7			51.3	
Approach LOS		E			E			B			D	
Intersection Summary												
HCM 2000 Control Delay			37.7			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			1.46									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			31.0			
Intersection Capacity Utilization			97.1%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Rockville Pike - 355 & Federal Plaza/Pike Center

Total Future PM Phase 1

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Traffic Volume (vph)	147	8	133	42	9	39	197	2418	0	36	1803	13
Future Volume (vph)	147	8	133	42	9	39	197	2418	0	36	1803	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	16	16	16	11	11	11	10	10	10
Total Lost time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00	1.00		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.94		1.00	1.00		1.00	1.00	
Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1660	1478		1925		1711	4916		1652	4738	
Flt Permitted		0.95	1.00		0.98		0.05	1.00		0.05	1.00	
Satd. Flow (perm)		1660	1478		1925		88	4916		91	4738	
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)	153	8	139	44	9	41	205	2519	0	38	1878	14
RTOR Reduction (vph)	0	0	121	0	21	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	161	18	0	73	0	205	2519	0	38	1892	0
Confl. Peds. (#/hr)	3		5	5		3	23		16	16		23
Confl. Bikes (#/hr)						1						
Turn Type	Split	NA	Prot	Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	8	8	8	4	4		5	2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		19.8	19.8		11.0		100.7	90.0		82.1	76.4	
Effective Green, g (s)		19.8	19.8		11.0		100.7	90.0		82.1	76.4	
Actuated g/C Ratio		0.13	0.13		0.07		0.67	0.60		0.55	0.51	
Clearance Time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		219	195		141		267	2949		109	2413	
v/s Ratio Prot		c0.10	0.01		c0.04		c0.10	c0.51		0.01	0.40	
v/s Ratio Perm							0.41			0.18		
v/c Ratio		0.74	0.09		0.52		0.77	0.85		0.35	0.78	
Uniform Delay, d1		62.6	57.2		66.9		45.3	24.6		23.6	30.1	
Progression Factor		1.00	1.00		1.00		1.57	0.34		1.56	0.48	
Incremental Delay, d2		12.1	0.2		3.2		8.1	2.2		1.5	2.1	
Delay (s)		74.6	57.4		70.1		79.0	10.6		38.3	16.7	
Level of Service		E	E		E		E	B		D	B	
Approach Delay (s)		66.7			70.1			15.8			17.1	
Approach LOS		E			E			B			B	
Intersection Summary												
HCM 2000 Control Delay			20.3				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			23.5		
Intersection Capacity Utilization			81.4%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Rockville Pike - 355 & Gas Station

Total Future PM Phase 1
12/04/2024

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			  			  	
Traffic Volume (veh/h)	0	58	2606	44	0	1885	
Future Volume (Veh/h)	0	58	2606	44	0	1885	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	
Hourly flow rate (vph)	0	66	2961	50	0	2142	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			225			340	
pX, platoon unblocked	0.71	0.57			0.57		
vC, conflicting volume	3700	1012			3011		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	739	0			1903		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	89			100		
cM capacity (veh/h)	251	622			177		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	66	1184	1184	642	714	714	714
Volume Left	0	0	0	0	0	0	0
Volume Right	66	0	0	50	0	0	0
cSH	622	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.11	0.70	0.70	0.38	0.42	0.42	0.42
Queue Length 95th (ft)	9	0	0	0	0	0	0
Control Delay (s)	11.5	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	11.5	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			61.6%		ICU Level of Service		B
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis

Total Future PM Phase 1

4: Rockville Pike - 355/Rockville Pike- 355 & Rollins Ave/Twinbrook Parkway

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑	↑	↑	↑↑↑	↑	↑	↑↑↑	
Traffic Volume (vph)	0	426	57	0	314	167	145	2263	121	204	1828	57
Future Volume (vph)	0	426	57	0	314	167	145	2263	121	204	1828	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	10	10	10	11	11	11
Total Lost time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.98			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3231			3539	1583	1652	4746	1478	1711	4884	
Flt Permitted		1.00			1.00	1.00	0.06	1.00	1.00	0.05	1.00	
Satd. Flow (perm)		3231			3539	1583	109	4746	1478	85	4884	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	430	58	0	317	169	146	2286	122	206	1846	58
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	56	0	2	0
Lane Group Flow (vph)	0	488	0	0	317	169	146	2286	66	206	1902	0
Confl. Peds. (#/hr)	24		18	18		24	26		36	36		26
Confl. Bikes (#/hr)			1			1			2			
Turn Type		NA			NA	Prot	pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		4			8	8	1	6	6	5	2	
Permitted Phases							6			2		
Actuated Green, G (s)		29.9			29.9	29.9	97.2	81.5	81.5	103.0	84.4	
Effective Green, g (s)		29.9			29.9	29.9	97.2	81.5	81.5	103.0	84.4	
Actuated g/C Ratio		0.20			0.20	0.20	0.65	0.54	0.54	0.69	0.56	
Clearance Time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Vehicle Extension (s)		4.0			4.0	4.0	4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)		644			705	315	232	2578	803	259	2748	
v/s Ratio Prot		c0.15			0.09	0.11	0.07	c0.48	0.04	c0.10	0.39	
v/s Ratio Perm							0.34			c0.44		
v/c Ratio		0.76			0.45	0.54	0.63	0.89	0.08	0.80	0.69	
Uniform Delay, d1		56.6			52.8	53.8	30.8	30.2	16.4	47.6	23.5	
Progression Factor		1.00			0.61	0.62	1.42	0.45	0.12	0.66	1.78	
Incremental Delay, d2		5.4			0.6	2.0	4.1	3.5	0.1	11.1	1.0	
Delay (s)		62.0			32.8	35.4	47.9	17.0	2.1	42.4	42.9	
Level of Service		E			C	D	D	B	A	D	D	
Approach Delay (s)		62.0			33.7			18.1			42.8	
Approach LOS		E			C			B			D	
Intersection Summary												
HCM 2000 Control Delay			32.5		HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			150.0		Sum of lost time (s)					20.0		
Intersection Capacity Utilization			92.8%		ICU Level of Service					F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Chapman Ave & Twinbrook Parkway

Total Future PM Phase 1

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	739	134	469	586	141	69	109	592	215	119	37
Future Volume (vph)	68	739	134	469	586	141	69	109	592	215	119	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	10	10	10	10	10	10
Total Lost time (s)	5.5	6.0		5.5	6.0			6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		0.97	0.95			1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1650	3213		3319	3305			1705	1478	3204	1739	1421
Flt Permitted	0.36	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (perm)	632	3213		3319	3305			1705	1478	3204	1739	1421
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	70	762	138	484	604	145	71	112	610	222	123	38
RTOR Reduction (vph)	0	10	0	0	12	0	0	0	54	0	0	34
Lane Group Flow (vph)	70	890	0	484	737	0	0	183	556	222	123	4
Confl. Peds. (#/hr)	2		9	9		2	15		14	14		15
Confl. Bikes (#/hr)									1			1
Turn Type	pm+pt	NA		Prot	NA		Split	NA	pt+ov	Split	NA	Perm
Protected Phases	5	2		1	6		4	4	4 1	3	3	
Permitted Phases	2											3
Actuated Green, G (s)	52.7	45.2		25.4	63.1			38.4	70.3	16.5	16.5	16.5
Effective Green, g (s)	52.7	45.2		25.4	63.1			38.4	70.3	16.5	16.5	16.5
Actuated g/C Ratio	0.35	0.30		0.17	0.42			0.26	0.47	0.11	0.11	0.11
Clearance Time (s)	5.5	6.0		5.5	6.0			6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	272	968		562	1390			436	692	352	191	156
v/s Ratio Prot	0.01	c0.28		c0.15	0.22			0.11	c0.38	0.07	c0.07	
v/s Ratio Perm	0.08											0.00
v/c Ratio	0.26	0.92		0.86	0.53			0.42	0.80	0.63	0.64	0.03
Uniform Delay, d1	33.0	50.6		60.6	32.4			46.5	34.0	63.8	63.9	59.6
Progression Factor	0.98	0.78		1.07	0.79			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	14.4		11.9	1.3			0.7	6.7	3.7	7.2	0.1
Delay (s)	32.9	53.9		76.4	26.8			47.2	40.7	67.5	71.2	59.7
Level of Service	C	D		E	C			D	D	E	E	E
Approach Delay (s)		52.4			46.3			42.2			67.9	
Approach LOS		D			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			49.5			HCM 2000 Level of Service				D		
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			91.4%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Chapman Ave & Pike Center North/Driveway

Total Future PM Phase 1
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	1	4	4	1	7	3	743	8	5	634	4
Future Volume (Veh/h)	2	1	4	4	1	7	3	743	8	5	634	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	2	1	4	4	1	8	3	826	9	6	704	4
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								471			256	
pX, platoon unblocked												
vC, conflicting volume	1146	1559	354	1205	1556	418	708			835		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1146	1559	354	1205	1556	418	708			835		
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	99	99	97	99	99	100			99		
cM capacity (veh/h)	150	110	642	137	110	584	887			794		
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	7	13	416	422	358	356						
Volume Left	2	4	3	0	6	0						
Volume Right	4	8	0	9	0	4						
cSH	244	250	887	1700	794	1700						
Volume to Capacity	0.03	0.05	0.00	0.25	0.01	0.21						
Queue Length 95th (ft)	2	4	0	0	1	0						
Control Delay (s)	20.2	20.2	0.1	0.0	0.2	0.0						
Lane LOS	C	C	A		A							
Approach Delay (s)	20.2	20.2	0.1		0.1							
Approach LOS	C	C										
Intersection Summary												
Average Delay			0.3									
Intersection Capacity Utilization			32.9%		ICU Level of Service		A					
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 7: Chapman Ave & Rollins Ave Extension/Rollins Ave

Total Future PM Phase 1
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	19	0	59	20	89	0	665	49	45	597	0
Future Volume (Veh/h)	0	19	0	59	20	89	0	665	49	45	597	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	20	0	61	21	92	0	686	51	46	615	0
Pedestrians					18							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					3.5							
Percent Blockage					2							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								287			440	
pX, platoon unblocked	0.90	0.90		0.90	0.90	0.90				0.90		
vC, conflicting volume	1521	1462	308	1139	1436	730	615			755		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1523	1458	308	1097	1429	639	615			668		
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	81	100	49	81	75	100			94		
cM capacity (veh/h)	44	107	688	119	111	368	961			808		
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1	SB 2						
Volume Total	20	61	113	737	354	308						
Volume Left	0	61	0	0	46	0						
Volume Right	0	0	92	51	0	0						
cSH	107	119	257	961	808	1700						
Volume to Capacity	0.19	0.51	0.44	0.00	0.06	0.18						
Queue Length 95th (ft)	16	59	53	0	5	0						
Control Delay (s)	46.4	63.1	29.5	0.0	1.9	0.0						
Lane LOS	E	F	D		A							
Approach Delay (s)	46.4	41.3		0.0	1.0							
Approach LOS	E	E										
Intersection Summary												
Average Delay			5.5									
Intersection Capacity Utilization			67.3%		ICU Level of Service					C		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

9: Chapman Ave & Bou Ave

Total Future PM Phase 1

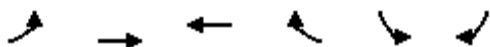
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	324	252	56	15	175	258	17	127	42	245	127	322
Future Volume (vph)	324	252	56	15	175	258	17	127	42	245	127	322
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00		0.99	1.00	1.00	0.99	1.00		0.98	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1643	1682		1641	1739	1422	1636	1660		1627	1739	1478
Flt Permitted	0.51	1.00		0.57	1.00	1.00	0.67	1.00		0.65	1.00	1.00
Satd. Flow (perm)	881	1682		978	1739	1422	1158	1660		1105	1739	1478
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)	338	262	58	16	182	269	18	132	44	255	132	335
RTOR Reduction (vph)	0	10	0	0	0	186	0	15	0	0	0	149
Lane Group Flow (vph)	338	311	0	16	182	83	18	161	0	255	132	186
Confl. Peds. (#/hr)	8		5	5		8	10		17	17		10
Confl. Bikes (#/hr)			2			1						
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	pt+ov
Protected Phases	1	6			2			4			8	8 1
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	44.2	44.2		24.5	24.5	24.5	24.0	24.0		24.0	24.0	44.2
Effective Green, g (s)	44.2	44.2		24.5	24.5	24.5	24.0	24.0		24.0	24.0	44.2
Actuated g/C Ratio	0.55	0.55		0.31	0.31	0.31	0.30	0.30		0.30	0.30	0.55
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	6.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	624	932		300	534	437	348	499		332	523	819
v/s Ratio Prot	c0.10	0.19			0.10			0.10			0.08	0.13
v/s Ratio Perm	c0.20			0.02		0.06	0.02			c0.23		
v/c Ratio	0.54	0.33		0.05	0.34	0.19	0.05	0.32		0.77	0.25	0.23
Uniform Delay, d1	10.3	9.7		19.4	21.4	20.3	19.8	21.6		25.3	21.1	9.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.2	0.1		0.3	1.7	1.0	0.1	0.4		15.6	1.2	0.4
Delay (s)	12.5	9.8		19.8	23.1	21.3	19.8	21.9		40.9	22.2	9.4
Level of Service	B	A		B	C	C	B	C		D	C	A
Approach Delay (s)		11.2			21.9			21.7			22.9	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			18.8									
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			79.7									
Intersection Capacity Utilization			79.6%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

10: Bou Ave & Pike Center

Total Future PM Phase 1
12/04/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↕	↕↕		↕↕	
Traffic Volume (veh/h)	190	523	462	45	59	202
Future Volume (Veh/h)	190	523	462	45	59	202
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	196	539	476	46	61	208
Pedestrians		1			7	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		278	280			
pX, platoon unblocked						
vC, conflicting volume	529				1168	269
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	529				1168	269
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	81				59	71
cM capacity (veh/h)	1027				150	723
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	376	359	317	205	269	
Volume Left	196	0	0	0	61	
Volume Right	0	0	0	46	208	
cSH	1027	1700	1700	1700	388	
Volume to Capacity	0.19	0.21	0.19	0.12	0.69	
Queue Length 95th (ft)	18	0	0	0	127	
Control Delay (s)	5.8	0.0	0.0	0.0	32.9	
Lane LOS	A				D	
Approach Delay (s)	3.0		0.0		32.9	
Approach LOS					D	
Intersection Summary						
Average Delay			7.2			
Intersection Capacity Utilization			60.0%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

11: East Jefferson Street & Rollins Avenue /Rollins Ave

Total Future PM Phase 1

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	44	26	390	65	78	7	477	402	18	263	18
Future Volume (vph)	10	44	26	390	65	78	7	477	402	18	263	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.97			1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.94		1.00	0.92			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1711	1678		1711	1600			1799	1500		3368	
Flt Permitted	0.95	1.00		0.95	1.00			1.00	1.00		0.92	
Satd. Flow (perm)	1711	1678		1711	1600			1792	1500		3097	
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)	10	46	27	406	68	81	7	497	419	19	274	19
RTOR Reduction (vph)	0	25	0	0	51	0	0	0	100	0	4	0
Lane Group Flow (vph)	10	48	0	406	98	0	0	504	319	0	308	0
Confl. Peds. (#/hr)	19		20	20		19	18		15	15		18
Confl. Bikes (#/hr)			1			3			2			3
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		3	3			2	3		6	
Permitted Phases							2		2	6		
Actuated Green, G (s)	6.2	6.2		21.3	21.3			43.5	64.8		43.5	
Effective Green, g (s)	6.2	6.2		21.3	21.3			43.5	64.8		43.5	
Actuated g/C Ratio	0.07	0.07		0.25	0.25			0.51	0.76		0.51	
Clearance Time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Vehicle Extension (s)	2.0	2.0		1.0	1.0			5.0	1.0		5.0	
Lane Grp Cap (vph)	124	122		428	400			917	1143		1584	
v/s Ratio Prot	0.01	c0.03		c0.24	0.06				0.07			
v/s Ratio Perm								c0.28	0.14		0.10	
v/c Ratio	0.08	0.39		0.95	0.25			0.55	0.28		0.19	
Uniform Delay, d1	36.7	37.6		31.3	25.4			14.1	3.1		11.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.1	0.8		30.1	0.1			2.4	0.0		0.3	
Delay (s)	36.8	38.4		61.4	25.5			16.5	3.1		11.5	
Level of Service	D	D		E	C			B	A		B	
Approach Delay (s)		38.2			51.8			10.4			11.5	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			24.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			71.4%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Rockville Pike- 355 & Halpine Road

Total Future PM Phase 1

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	66	87	210	70	127	197	2261	105	99	1845	30
Future Volume (vph)	98	66	87	210	70	127	197	2261	105	99	1845	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.96	1.00		0.97	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1698	3148		1719	1863	1583	1711	4874		1711	4899	
Flt Permitted	0.71	1.00		0.65	1.00	1.00	0.05	1.00		0.05	1.00	
Satd. Flow (perm)	1267	3148		1176	1863	1583	87	4874		93	4899	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	103	69	92	221	74	134	207	2380	111	104	1942	32
RTOR Reduction (vph)	0	70	0	0	0	97	0	3	0	0	1	0
Lane Group Flow (vph)	103	91	0	221	74	37	207	2488	0	104	1973	0
Confl. Peds. (#/hr)	30		24	24		30	12		16	16		12
Confl. Bikes (#/hr)												1
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	8	1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	35.1	35.1		35.1	35.1	35.1	102.9	87.3		87.8	77.7	
Effective Green, g (s)	35.1	35.1		35.1	35.1	35.1	102.9	87.3		87.8	77.7	
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.69	0.58		0.59	0.52	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	296	736		275	435	370	272	2836		163	2537	
v/s Ratio Prot		0.03			0.04	0.02	c0.10	c0.51		0.04	0.40	
v/s Ratio Perm	0.08			c0.19			0.42			0.33		
v/c Ratio	0.35	0.12		0.80	0.17	0.10	0.76	0.88		0.64	0.78	
Uniform Delay, d1	47.9	45.3		54.2	45.8	45.1	45.8	26.8		31.1	29.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.39	0.46		1.00	1.00	
Incremental Delay, d2	1.5	0.2		17.4	0.4	0.3	8.8	2.6		10.9	2.4	
Delay (s)	49.4	45.5		71.6	46.2	45.3	72.6	14.9		41.9	31.6	
Level of Service	D	D		E	D	D	E	B		D	C	
Approach Delay (s)		47.0			59.0			19.4			32.1	
Approach LOS		D			E			B			C	
Intersection Summary												
HCM 2000 Control Delay			28.7									
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			150.0									
Intersection Capacity Utilization			99.6%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Twinbrook Parkway & Parklawn Drive

Total Future PM Phase 1

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	32	68	304	39	272	31	1199	271	133	743	32
Future Volume (vph)	44	32	68	304	39	272	31	1199	271	133	743	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	10	10	10	10	10
Total Lost time (s)	6.5	6.5		7.0	7.0	7.0	8.0	6.0		8.0	6.0	6.0
Lane Util. Factor	0.95	0.95		0.95	0.95	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1573		1625	1647	1531	1650	4576		3204	3303	1428
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.30	1.00		0.10	1.00	1.00
Satd. Flow (perm)	1681	1573		1625	1647	1531	522	4576		327	3303	1428
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	47	34	72	323	41	289	33	1276	288	141	790	34
RTOR Reduction (vph)	0	47	0	0	0	160	0	16	0	0	0	15
Lane Group Flow (vph)	42	64	0	181	183	129	33	1548	0	141	790	19
Confl. Peds. (#/hr)	12		2	2		12	4		17	17		4
Turn Type	Split	NA		Split	NA	pt+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	11.3	11.3		23.5	23.5	38.8	85.1	79.4		90.3	82.0	82.0
Effective Green, g (s)	11.3	11.3		23.5	23.5	38.8	85.1	79.4		90.3	82.0	82.0
Actuated g/C Ratio	0.08	0.08		0.16	0.16	0.26	0.57	0.53		0.60	0.55	0.55
Clearance Time (s)	6.5	6.5		7.0	7.0		8.0	6.0		8.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	126	118		254	258	396	339	2422		356	1805	780
v/s Ratio Prot	0.02	c0.04		c0.11	0.11	c0.08	0.00	c0.34		0.02	c0.24	
v/s Ratio Perm							0.05			0.22		0.01
v/c Ratio	0.33	0.54		0.71	0.71	0.33	0.10	0.64		0.40	0.44	0.02
Uniform Delay, d1	65.8	66.9		60.0	60.0	45.0	14.8	25.1		16.5	20.3	15.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.24	1.10		1.00	1.00	1.00
Incremental Delay, d2	1.6	5.0		9.1	8.6	0.5	0.1	0.7		0.7	0.8	0.1
Delay (s)	67.3	71.8		69.1	68.6	45.5	18.4	28.3		17.2	21.0	15.7
Level of Service	E	E		E	E	D	B	C		B	C	B
Approach Delay (s)		70.6			58.5			28.1			20.3	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			33.7									C
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			150.0							27.5		
Intersection Capacity Utilization			70.6%									C
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Total Future PM Phase 1

14: Nebel Street & Randolph Road

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1076	93	183	827	185	137	145	311	294	171	24
Future Volume (vph)	21	1076	93	183	827	185	137	145	311	294	171	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	12	12	12
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1651	3243		1770	3420		1684	1801	1531	1763	1863	1583
Flt Permitted	0.19	1.00		0.06	1.00		0.64	1.00	1.00	0.43	1.00	1.00
Satd. Flow (perm)	327	3243		116	3420		1141	1801	1531	799	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	22	1133	98	193	871	195	144	153	327	309	180	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	22	1231	0	193	1066	0	144	153	327	309	180	25
Confl. Peds. (#/hr)	12		18	18		12	17		8	8		17
Confl. Bikes (#/hr)			4			3			3			3
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Prot	pm+pt	NA	Prot
Protected Phases	1	6		5	2		3	8	8	7	4	4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	62.2	58.0		80.5	70.3		41.7	26.5	26.5	56.5	34.8	34.8
Effective Green, g (s)	62.2	58.0		80.5	70.3		41.7	26.5	26.5	56.5	34.8	34.8
Actuated g/C Ratio	0.41	0.39		0.54	0.47		0.28	0.18	0.18	0.38	0.23	0.23
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	172	1253		244	1602		372	318	270	451	432	367
v/s Ratio Prot	0.00	c0.38		c0.09	0.31		0.04	0.08	c0.21	c0.11	0.10	0.02
v/s Ratio Perm	0.05			0.34			0.07			0.15		
v/c Ratio	0.13	0.98		0.79	0.67		0.39	0.48	1.21	0.69	0.42	0.07
Uniform Delay, d1	27.1	45.5		43.6	30.8		42.8	55.6	61.8	35.9	49.0	44.9
Progression Factor	0.86	0.79		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	19.9		15.9	2.2		0.9	1.6	124.2	4.6	0.9	0.1
Delay (s)	23.5	55.8		59.5	33.0		43.7	57.1	186.0	40.6	49.9	45.1
Level of Service	C	E		E	C		D	E	F	D	D	D
Approach Delay (s)		55.2			37.0			121.6			44.0	
Approach LOS		E			D			F			D	
Intersection Summary												
HCM 2000 Control Delay		58.7										
HCM 2000 Volume to Capacity ratio		0.96										
Actuated Cycle Length (s)		150.0							25.5			
Intersection Capacity Utilization		91.0%							F			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Total Future PM Phase 1

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	12	32	186	13	138	18	2732	250	161	2184	26
Future Volume (vph)	40	12	32	186	13	138	18	2732	250	161	2184	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.93		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.95	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	0.86		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1627	1589		1770	1496		1711	6077		1711	4902	
Flt Permitted	0.54	1.00		0.73	1.00		0.05	1.00		0.04	1.00	
Satd. Flow (perm)	931	1589		1354	1496		84	6077		78	4902	
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)	42	12	33	194	14	144	19	2846	260	168	2275	27
RTOR Reduction (vph)	0	27	0	0	117	0	0	8	0	0	1	0
Lane Group Flow (vph)	42	19	0	194	41	0	19	3098	0	168	2301	0
Confl. Peds. (#/hr)	44					44	25		20	20		25
Confl. Bikes (#/hr)			3						1			3
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	27.7	27.7		27.7	27.7		91.4	86.4		109.8	98.8	
Effective Green, g (s)	27.7	27.7		27.7	27.7		91.4	86.4		109.8	98.8	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.61	0.58		0.73	0.66	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	171	293		250	276		105	3500		246	3228	
v/s Ratio Prot		0.01			0.03		0.01	c0.51		c0.08	c0.47	
v/s Ratio Perm	0.05			c0.14			0.10			0.42		
v/c Ratio	0.25	0.07		0.78	0.15		0.18	0.89		0.68	0.71	
Uniform Delay, d1	52.2	50.5		58.2	51.2		14.5	27.5		46.1	16.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.23	0.57	
Incremental Delay, d2	1.6	0.2		16.1	0.5		1.7	3.7		7.8	1.1	
Delay (s)	53.8	50.7		74.3	51.8		16.2	31.2		64.4	10.5	
Level of Service	D	D		E	D		B	C		E	B	
Approach Delay (s)		52.2			64.2			31.1			14.2	
Approach LOS		D			E			C			B	
Intersection Summary												
HCM 2000 Control Delay		26.4					HCM 2000 Level of Service		C			
HCM 2000 Volume to Capacity ratio		0.84										
Actuated Cycle Length (s)		150.0					Sum of lost time (s)		18.5			
Intersection Capacity Utilization		100.4%					ICU Level of Service		G			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Total Future PM Phase 1

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	1013	72	14	803	127	50	24	20	152	51	96
Future Volume (vph)	144	1013	72	14	803	127	50	24	20	152	51	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1651	3259		1650	3303	1432	1711	1665		1681	1573	
Flt Permitted	0.26	1.00		0.21	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	449	3259		364	3303	1432	1711	1665		1681	1573	
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)	150	1055	75	15	836	132	52	25	21	158	53	100
RTOR Reduction (vph)	0	2	0	0	0	48	0	20	0	0	0	0
Lane Group Flow (vph)	150	1128	0	15	836	84	52	26	0	142	169	0
Confl. Peds. (#/hr)	3		10	10		3	9		2	2		9
Confl. Bikes (#/hr)						1						1
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	100.0	91.9		86.3	83.2	83.2	9.5	9.5		22.5	22.5	
Effective Green, g (s)	100.0	91.9		86.3	83.2	83.2	9.5	9.5		22.5	22.5	
Actuated g/C Ratio	0.67	0.61		0.58	0.55	0.55	0.06	0.06		0.15	0.15	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	393	1996		235	1832	794	108	105		252	235	
v/s Ratio Prot	c0.03	c0.35		0.00	0.25		c0.03	0.02		0.08	c0.11	
v/s Ratio Perm	0.22			0.04		0.06						
v/c Ratio	0.38	0.56		0.06	0.46	0.11	0.48	0.25		0.56	0.72	
Uniform Delay, d1	11.1	17.2		14.3	19.9	15.8	67.9	66.9		59.2	60.7	
Progression Factor	1.00	1.00		0.59	0.47	0.13	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	1.2		0.1	0.7	0.2	4.6	1.7		3.5	10.7	
Delay (s)	11.9	18.4		8.6	10.1	2.2	72.4	68.6		62.7	71.5	
Level of Service	B	B		A	B	A	E	E		E	E	
Approach Delay (s)		17.6			9.0			70.6			67.5	
Approach LOS		B			A			E			E	
Intersection Summary												
HCM 2000 Control Delay		22.2										
HCM 2000 Volume to Capacity ratio		0.59										
Actuated Cycle Length (s)		150.0								23.0		
Intersection Capacity Utilization		69.6%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

17: Chapman Ave/Chapman Road & Thompson Ave

Total Future PM Phase 1
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	17	122	9	12	5	28	279	23	7	281	27
Future Volume (Veh/h)	26	17	122	9	12	5	28	279	23	7	281	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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)	28	18	130	10	13	5	30	297	24	7	299	29
Pedestrians		66			56			51			6	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		6			5			5			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								638				
pX, platoon unblocked	1.00	1.00		1.00	1.00	1.00				1.00		
vC, conflicting volume	780	830	430	942	833	371	394			377		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	777	828	430	940	831	367	394			373		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	89	93	77	93	95	99	97			99		
cM capacity (veh/h)	248	262	557	142	261	636	1091			1118		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	176	28	351	335								
Volume Left	28	10	30	7								
Volume Right	130	5	24	29								
cSH	424	218	1091	1118								
Volume to Capacity	0.42	0.13	0.03	0.01								
Queue Length 95th (ft)	50	11	2	0								
Control Delay (s)	19.4	23.9	1.0	0.2								
Lane LOS	C	C	A	A								
Approach Delay (s)	19.4	23.9	1.0	0.2								
Approach LOS	C	C										
Intersection Summary												
Average Delay			5.1									
Intersection Capacity Utilization			51.4%		ICU Level of Service					A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

18: Rockville Pike - 355 & Rollins Ave Extension

Total Future PM Phase 1
12/04/2024

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations			  			  	
Traffic Volume (veh/h)	0	143	2588	87	0	1996	
Future Volume (Veh/h)	0	143	2588	87	0	1996	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	155	2813	95	0	2170	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			249			340	
pX, platoon unblocked	0.70	0.53			0.53		
vC, conflicting volume	3584	985			2908		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	43	0			1524		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	73			100		
cM capacity (veh/h)	671	580			232		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	155	1125	1125	658	723	723	723
Volume Left	0	0	0	0	0	0	0
Volume Right	155	0	0	95	0	0	0
cSH	580	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.27	0.66	0.66	0.39	0.43	0.43	0.43
Queue Length 95th (ft)	27	0	0	0	0	0	0
Control Delay (s)	13.5	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	B						
Approach Delay (s)	13.5	0.0			0.0		
Approach LOS	B						
Intersection Summary							
Average Delay			0.4				
Intersection Capacity Utilization			67.5%		ICU Level of Service		C
Analysis Period (min)			15				

APPENDIX D
PHASE 2 2039 CONDITIONS
CAPACITY ANALYSES

HCM Signalized Intersection Capacity Analysis

Total Future AM Phase 2

1: Rockville Pike - 355 & Bou Ave

12/04/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↶	↷	↶↷	↶		↶	↶↶↶	↷	↶	↶↶↶	
Traffic Volume (vph)	14	21	25	571	11	49	36	1750	137	141	2039	6
Future Volume (vph)	14	21	25	571	11	49	36	1750	137	141	2039	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	0.98		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	0.88		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1704	1478	3204	1501		1711	4916	1531	1770	5083	
Flt Permitted		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.08	1.00	
Satd. Flow (perm)		1704	1478	3204	1501		1711	4916	1531	149	5083	
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)	15	22	26	595	11	51	38	1823	143	147	2124	6
RTOR Reduction (vph)	0	0	25	0	42	0	0	0	65	0	0	0
Lane Group Flow (vph)	0	37	1	595	20	0	38	1823	78	147	2130	0
Confl. Peds. (#/hr)	4					4	5		9	9		5
Confl. Bikes (#/hr)			1									
Turn Type	Split	NA	Prot	Split	NA		Prot	NA	Prot	pm+pt	NA	
Protected Phases	3	3	3	4	4		1	5	5	6	2	
Permitted Phases										2		
Actuated Green, G (s)		7.0	7.0	26.7	26.7		7.6	81.3	81.3	84.7	84.7	
Effective Green, g (s)		7.0	7.0	26.7	26.7		7.6	81.3	81.3	84.7	84.7	
Actuated g/C Ratio		0.05	0.05	0.18	0.18		0.05	0.54	0.54	0.56	0.56	
Clearance Time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	6.0	6.0		3.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)		79	68	570	267		86	2664	829	197	2870	
v/s Ratio Prot		c0.02	0.00	c0.19	0.01		0.02	c0.37	0.05	0.05	c0.42	
v/s Ratio Perm										c0.37		
v/c Ratio		0.47	0.02	1.04	0.08		0.44	0.68	0.09	0.75	0.74	
Uniform Delay, d1		69.7	68.2	61.6	51.4		69.1	25.0	16.6	42.2	24.5	
Progression Factor		1.00	1.00	1.00	1.00		1.46	0.66	0.32	0.55	0.30	
Incremental Delay, d2		4.3	0.1	49.6	0.3		3.3	1.3	0.2	11.8	1.5	
Delay (s)		74.0	68.3	111.3	51.7		104.4	18.0	5.5	35.1	8.7	
Level of Service		E	E	F	D		F	B	A	D	A	
Approach Delay (s)		71.7			105.7			18.7			10.4	
Approach LOS		E			F			B			B	
Intersection Summary												
HCM 2000 Control Delay			27.0			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			31.5			
Intersection Capacity Utilization			81.7%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Rockville Pike - 355 & Federal Plaza/New Street

Total Future AM Phase 2

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Traffic Volume (vph)	16	2	56	21	2	24	84	1582	11	18	2070	2
Future Volume (vph)	16	2	56	21	2	24	84	1582	11	18	2070	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	16	16	16	11	11	11	10	10	10
Total Lost time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00	1.00		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.93		1.00	1.00		1.00	1.00	
Flt Protected		0.96	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1664	1478		1904		1711	4910		1651	4745	
Flt Permitted		0.96	1.00		0.98		0.06	1.00		0.12	1.00	
Satd. Flow (perm)		1664	1478		1904		101	4910		213	4745	
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)	17	2	58	22	2	25	88	1648	11	19	2156	2
RTOR Reduction (vph)	0	0	56	0	24	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	19	2	0	25	0	88	1659	0	19	2158	0
Confl. Peds. (#/hr)	1						1	3		7	7	3
Confl. Bikes (#/hr)			1			1						
Turn Type	Split	NA	Prot	Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	8	8	8	4	4		5	2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		6.2	6.2		6.5		117.6	110.1		110.0	106.3	
Effective Green, g (s)		6.2	6.2		6.5		117.6	110.1		110.0	106.3	
Actuated g/C Ratio		0.04	0.04		0.04		0.78	0.73		0.73	0.71	
Clearance Time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		68	61		82		159	3603		191	3362	
v/s Ratio Prot		c0.01	0.00		c0.01		c0.03	0.34		0.00	c0.45	
v/s Ratio Perm							0.40			0.07		
v/c Ratio		0.28	0.04		0.31		0.55	0.46		0.10	0.64	
Uniform Delay, d1		69.7	69.0		69.6		12.8	8.0		5.8	11.7	
Progression Factor		1.00	1.00		1.05		2.97	0.05		0.53	0.31	
Incremental Delay, d2		2.2	0.3		2.1		3.2	0.3		0.2	0.7	
Delay (s)		72.0	69.3		74.9		41.2	0.7		3.2	4.3	
Level of Service		E	E		E		D	A		A	A	
Approach Delay (s)		70.0			74.9			2.8			4.3	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay			5.7				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			23.5		
Intersection Capacity Utilization			68.8%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Rockville Pike - 355 & Rollins Ave/Twinbrook Parkway

Total Future AM Phase 2

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑			↑↑	↑	↑	↑↑↑	↑	↑	↑↑↑	
Traffic Volume (vph)	0	256	136	0	310	221	105	1464	123	238	1973	45
Future Volume (vph)	0	256	136	0	310	221	105	1464	123	238	1973	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	10	10	10	11	11	11
Total Lost time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		0.99			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.95			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3106			3539	1583	1652	4746	1478	1711	4899	
Flt Permitted		1.00			1.00	1.00	0.06	1.00	1.00	0.10	1.00	
Satd. Flow (perm)		3106			3539	1583	99	4746	1478	184	4899	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	261	139	0	316	226	107	1494	126	243	2013	46
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	59	0	1	0
Lane Group Flow (vph)	0	400	0	0	316	226	107	1494	67	243	2058	0
Confl. Peds. (#/hr)	13		9	9		13			4	4		
Confl. Bikes (#/hr)									1			
Turn Type		NA			NA	Prot	pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		4			8	8	1	6	6	5	2	
Permitted Phases							6			2		
Actuated Green, G (s)		29.3			29.3	29.3	90.8	79.3	79.3	107.7	89.2	
Effective Green, g (s)		29.3			29.3	29.3	90.8	79.3	79.3	107.7	89.2	
Actuated g/C Ratio		0.20			0.20	0.20	0.61	0.53	0.53	0.72	0.59	
Clearance Time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Vehicle Extension (s)		4.0			4.0	4.0	4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)		606			691	309	178	2509	781	349	2913	
v/s Ratio Prot		0.13			0.09	c0.14	0.05	0.31	0.05	c0.10	c0.42	
v/s Ratio Perm							0.32			0.40		
v/c Ratio		0.66			0.46	0.73	0.60	0.60	0.09	0.70	0.71	
Uniform Delay, d1		55.7			53.3	56.7	23.5	24.3	17.4	27.2	21.2	
Progression Factor		1.00			0.87	0.86	1.67	0.36	0.12	2.24	0.42	
Incremental Delay, d2		3.0			0.6	8.9	6.0	1.0	0.2	5.2	1.2	
Delay (s)		58.7			47.3	57.8	45.1	9.7	2.3	66.3	10.1	
Level of Service		E			D	E	D	A	A	E	B	
Approach Delay (s)		58.7			51.7			11.3			16.0	
Approach LOS		E			D			B			B	
Intersection Summary												
HCM 2000 Control Delay		21.7			HCM 2000 Level of Service					C		
HCM 2000 Volume to Capacity ratio		0.73										
Actuated Cycle Length (s)		150.0			Sum of lost time (s)					20.0		
Intersection Capacity Utilization		78.1%			ICU Level of Service					D		
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Chapman Ave & Twinbrook Parkway

Total Future AM Phase 2

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	509	128	534	440	123	100	48	197	84	50	24
Future Volume (vph)	40	509	128	534	440	123	100	48	197	84	50	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	10	10	10	10	10	10
Total Lost time (s)	5.5	6.0		5.5	6.0			6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		0.97	0.95			1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.97	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1648	3194		3319	3286			1682	1478	3204	1739	1443
Flt Permitted	0.43	1.00		0.95	1.00			0.97	1.00	0.95	1.00	1.00
Satd. Flow (perm)	751	3194		3319	3286			1682	1478	3204	1739	1443
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	41	525	132	551	454	127	103	49	203	87	52	25
RTOR Reduction (vph)	0	12	0	0	10	0	0	0	125	0	0	23
Lane Group Flow (vph)	41	645	0	551	571	0	0	152	78	87	52	2
Confl. Peds. (#/hr)	4		1	1		4	5		14	14		5
Confl. Bikes (#/hr)			4			1						1
Turn Type	pm+pt	NA		Prot	NA		Split	NA	pt+ov	Split	NA	Perm
Protected Phases	5	2		1	6		4	4	4 1	3	3	
Permitted Phases	2											3
Actuated Green, G (s)	70.4	64.7		31.8	90.8			19.0	57.3	10.0	10.0	10.0
Effective Green, g (s)	70.4	64.7		31.8	90.8			19.0	57.3	10.0	10.0	10.0
Actuated g/C Ratio	0.47	0.43		0.21	0.61			0.13	0.38	0.07	0.07	0.07
Clearance Time (s)	5.5	6.0		5.5	6.0			6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	386	1377		703	1989			213	564	213	115	96
v/s Ratio Prot	0.00	c0.20		c0.17	0.17			c0.09	0.05	0.03	c0.03	
v/s Ratio Perm	0.05											0.00
v/c Ratio	0.11	0.47		0.78	0.29			0.71	0.14	0.41	0.45	0.02
Uniform Delay, d1	21.7	30.4		55.9	14.1			62.9	30.2	67.2	67.4	65.4
Progression Factor	0.74	0.74		1.13	1.12			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	1.1		5.4	0.3			10.8	0.1	1.3	2.8	0.1
Delay (s)	16.2	23.5		68.6	16.2			73.7	30.3	68.4	70.2	65.5
Level of Service	B	C		E	B			E	C	E	E	E
Approach Delay (s)		23.1			41.7			48.9			68.5	
Approach LOS		C			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			39.1			HCM 2000 Level of Service			D			
HCM 2000 Volume to Capacity ratio			0.58									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			69.0%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

6: Chapman Ave & Pike Center North/Driveway

Total Future AM Phase 2

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	24	0	35	1	0	4	8	317	2	5	655	52
Future Volume (Veh/h)	24	0	35	1	0	4	8	317	2	5	655	52
Sign Control	Stop		Stop		Free		Free					
Grade	0%		0%		0%		0%					
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	30	0	44	1	0	5	10	401	3	6	829	66
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)							467			256		
pX, platoon unblocked												
vC, conflicting volume	1100	1298	448	893	1330	202	895				404	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1100	1298	448	893	1330	202	895				404	
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 %	82	100	92	100	100	99	99				99	
cM capacity (veh/h)	164	158	559	215	151	805	754				1151	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	74	6	210	204	420	480						
Volume Left	30	1	10	0	6	0						
Volume Right	44	5	0	3	0	66						
cSH	282	552	754	1700	1151	1700						
Volume to Capacity	0.26	0.01	0.01	0.12	0.01	0.28						
Queue Length 95th (ft)	26	1	1	0	0	0						
Control Delay (s)	22.2	11.6	0.6	0.0	0.2	0.0						
Lane LOS	C	B	A		A							
Approach Delay (s)	22.2	11.6	0.3		0.1							
Approach LOS	C	B										
Intersection Summary												
Average Delay				1.4								
Intersection Capacity Utilization				36.5%	ICU Level of Service				A			
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis

7: Chapman Ave & Rollins Ave Extension/Rollins Ave

Total Future AM Phase 2

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	22	31	32	6	33	1	342	49	36	610	8
Future Volume (Veh/h)	0	22	31	32	6	33	1	342	49	36	610	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	0	23	32	33	6	34	1	353	51	37	629	8
Pedestrians					11						3	
Lane Width (ft)					12.0						10.0	
Walking Speed (ft/s)					3.5						3.5	
Percent Blockage					1						0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								283			440	
pX, platoon unblocked	0.97	0.97		0.97	0.97	0.97				0.97		
vC, conflicting volume	1128	1124	318	824	1102	392	637			415		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1115	1112	318	802	1090	357	637			380		
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	88	95	85	97	94	100			97		
cM capacity (veh/h)	140	192	677	221	198	612	943			1126		
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1	SB 2						
Volume Total	55	33	40	405	352	322						
Volume Left	0	33	0	1	37	0						
Volume Right	32	0	34	51	0	8						
cSH	329	221	466	943	1126	1700						
Volume to Capacity	0.17	0.15	0.09	0.00	0.03	0.19						
Queue Length 95th (ft)	15	13	7	0	3	0						
Control Delay (s)	18.1	24.1	13.5	0.0	1.2	0.0						
Lane LOS	C	C	B	A	A							
Approach Delay (s)	18.1	18.3		0.0	0.6							
Approach LOS	C	C										
Intersection Summary												
Average Delay			2.3									
Intersection Capacity Utilization			57.6%		ICU Level of Service					B		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

9: Chapman Ave & Bou Ave

Total Future AM Phase 2

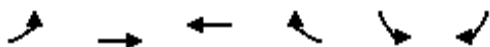
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	119	37	6	92	172	4	41	4	149	79	447
Future Volume (vph)	147	119	37	6	92	172	4	41	4	149	79	447
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		0.99	1.00	1.00	1.00	1.00		0.99	1.00	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1645	1662		1630	1739	1433	1648	1713		1633	1739	1478
Flt Permitted	0.57	1.00		0.65	1.00	1.00	0.70	1.00		0.73	1.00	1.00
Satd. Flow (perm)	982	1662		1121	1739	1433	1220	1713		1248	1739	1478
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	155	125	39	6	97	181	4	43	4	157	83	471
RTOR Reduction (vph)	0	14	0	0	0	125	0	3	0	0	0	213
Lane Group Flow (vph)	155	150	0	6	97	56	4	44	0	157	83	258
Confl. Peds. (#/hr)	5		8	8		5	2		11	11		2
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	pt+ov
Protected Phases	1	6			2			4			8	8 1
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	43.0	43.0		24.5	24.5	24.5	24.0	24.0		24.0	24.0	43.0
Effective Green, g (s)	43.0	43.0		24.5	24.5	24.5	24.0	24.0		24.0	24.0	43.0
Actuated g/C Ratio	0.55	0.55		0.31	0.31	0.31	0.31	0.31		0.31	0.31	0.55
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	6.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	647	910		349	542	447	372	523		381	531	809
v/s Ratio Prot	0.04	0.09			0.06			0.03			0.05	c0.17
v/s Ratio Perm	c0.09			0.01		0.04	0.00			c0.13		
v/c Ratio	0.24	0.16		0.02	0.18	0.13	0.01	0.08		0.41	0.16	0.32
Uniform Delay, d1	9.1	8.8		18.7	19.7	19.3	19.0	19.4		21.6	19.9	9.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.0		0.1	0.7	0.6	0.0	0.1		3.3	0.6	0.6
Delay (s)	9.6	8.9		18.8	20.4	19.9	19.0	19.5		24.9	20.5	10.4
Level of Service	A	A		B	C	B	B	B		C	C	B
Approach Delay (s)		9.2			20.1			19.5			14.8	
Approach LOS		A			C			B			B	
Intersection Summary												
HCM 2000 Control Delay			14.7									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.35									
Actuated Cycle Length (s)			78.5									Sum of lost time (s) 17.0
Intersection Capacity Utilization			62.5%									ICU Level of Service B
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

10: Bou Ave & Pike Center

Total Future AM Phase 2
12/04/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Volume (veh/h)	9	278	563	15	19	42
Future Volume (Veh/h)	9	278	563	15	19	42
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	10	296	599	16	20	45
Pedestrians		4			7	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		278	283			
pX, platoon unblocked						
vC, conflicting volume	622				782	318
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	622				782	318
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				94	93
cM capacity (veh/h)	948				325	670
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	109	197	399	216	65	
Volume Left	10	0	0	0	20	
Volume Right	0	0	0	16	45	
cSH	948	1700	1700	1700	505	
Volume to Capacity	0.01	0.12	0.23	0.13	0.13	
Queue Length 95th (ft)	1	0	0	0	11	
Control Delay (s)	0.9	0.0	0.0	0.0	13.2	
Lane LOS	A				B	
Approach Delay (s)	0.3		0.0		13.2	
Approach LOS					B	
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			27.8%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

11: East Jefferson Street & Rollins Avenue /Rollins Ave

Total Future AM Phase 2

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	17	44	27	282	32	38	9	243	362	20	218	18
Future Volume (vph)	17	44	27	282	32	38	9	243	362	20	218	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.98			1.00	0.99		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.94		1.00	0.92			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1711	1682		1711	1624			1797	1510		3362	
Flt Permitted	0.95	1.00		0.95	1.00			0.99	1.00		0.92	
Satd. Flow (perm)	1711	1682		1711	1624			1778	1510		3112	
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)	18	48	29	307	35	41	10	264	393	22	237	20
RTOR Reduction (vph)	0	27	0	0	32	0	0	0	94	0	5	0
Lane Group Flow (vph)	18	50	0	307	44	0	0	274	299	0	274	0
Confl. Peds. (#/hr)	7		10	10		7	7		6	6		7
Confl. Bikes (#/hr)			1			1			1			1
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		3	3			2	3		6	
Permitted Phases							2		2	6		
Actuated Green, G (s)	6.3	6.3		18.2	18.2			46.5	64.7		46.5	
Effective Green, g (s)	6.3	6.3		18.2	18.2			46.5	64.7		46.5	
Actuated g/C Ratio	0.07	0.07		0.21	0.21			0.55	0.76		0.55	
Clearance Time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Vehicle Extension (s)	2.0	2.0		1.0	1.0			5.0	1.0		5.0	
Lane Grp Cap (vph)	126	124		366	347			972	1149		1702	
v/s Ratio Prot	0.01	c0.03		c0.18	0.03				0.06			
v/s Ratio Perm								c0.15	0.14		0.09	
v/c Ratio	0.14	0.40		0.84	0.13			0.28	0.26		0.16	
Uniform Delay, d1	36.8	37.6		32.0	27.0			10.3	3.0		9.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.8		14.8	0.1			0.7	0.0		0.2	
Delay (s)	37.0	38.3		46.8	27.0			11.0	3.1		9.8	
Level of Service	D	D		D	C			B	A		A	
Approach Delay (s)		38.1			42.8			6.3			9.8	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM 2000 Control Delay			18.9			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			64.9%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Total Future AM Phase 2

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	52	56	176	28	67	79	1322	311	63	1876	20
Future Volume (vph)	42	52	56	176	28	67	79	1322	311	63	1876	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		0.96	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	0.97		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1765	3174		1706	1863	1583	1711	4753		1711	4907	
Flt Permitted	0.74	1.00		0.68	1.00	1.00	0.06	1.00		0.10	1.00	
Satd. Flow (perm)	1371	3174		1223	1863	1583	110	4753		181	4907	
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)	44	54	58	183	29	70	82	1377	324	66	1954	21
RTOR Reduction (vph)	0	46	0	0	0	56	0	20	0	0	0	0
Lane Group Flow (vph)	44	66	0	183	29	14	82	1681	0	66	1975	0
Confl. Peds. (#/hr)	2		28	28		2	1		7	7		1
Confl. Bikes (#/hr)						1						
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	8	1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	30.0	30.0		30.0	30.0	30.0	104.8	94.7		100.2	92.4	
Effective Green, g (s)	30.0	30.0		30.0	30.0	30.0	104.8	94.7		100.2	92.4	
Actuated g/C Ratio	0.20	0.20		0.20	0.20	0.20	0.70	0.63		0.67	0.62	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	274	634		244	372	316	184	3000		200	3022	
v/s Ratio Prot		0.02			0.02	0.01	c0.03	0.35		0.02	c0.40	
v/s Ratio Perm	0.03			c0.15			0.28			0.20		
v/c Ratio	0.16	0.10		0.75	0.08	0.04	0.45	0.56		0.33	0.65	
Uniform Delay, d1	49.6	49.0		56.5	48.8	48.4	15.0	15.8		10.7	18.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	2.18	1.00		1.00	1.00	
Incremental Delay, d2	0.6	0.2		14.3	0.2	0.1	3.0	0.6		2.0	1.1	
Delay (s)	50.2	49.2		70.8	48.9	48.6	35.8	16.5		12.8	19.6	
Level of Service	D	D		E	D	D	D	B		B	B	
Approach Delay (s)		49.4			63.0			17.3			19.4	
Approach LOS		D			E			B			B	
Intersection Summary												
HCM 2000 Control Delay		22.5										
HCM 2000 Volume to Capacity ratio		0.66										
Actuated Cycle Length (s)		150.0										
Intersection Capacity Utilization		74.4%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Twinbrook Parkway & Parklawn Drive

Total Future AM Phase 2

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	24	51	163	19	124	50	490	277	179	807	63
Future Volume (vph)	36	24	51	163	19	124	50	490	277	179	807	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	10	10	10	10	10
Total Lost time (s)	6.5	6.5		7.0	7.0	7.0	8.0	6.0		8.0	6.0	6.0
Lane Util. Factor	0.95	0.95		0.95	0.95	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1573		1625	1645	1531	1651	4466		3203	3303	1437
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.29	1.00		0.30	1.00	1.00
Satd. Flow (perm)	1681	1573		1625	1645	1531	504	4466		1017	3303	1437
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	38	26	54	173	20	132	53	521	295	190	859	67
RTOR Reduction (vph)	0	46	0	0	0	106	0	37	0	0	0	26
Lane Group Flow (vph)	34	38	0	97	96	26	53	779	0	190	859	41
Confl. Peds. (#/hr)	10		2	2		10	2		1	1		2
Confl. Bikes (#/hr)												1
Turn Type	Split	NA		Split	NA	pt+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	9.4	9.4		14.5	14.5	30.0	96.1	90.1		101.1	92.6	92.6
Effective Green, g (s)	9.4	9.4		14.5	14.5	30.0	96.1	90.1		101.1	92.6	92.6
Actuated g/C Ratio	0.06	0.06		0.10	0.10	0.20	0.64	0.60		0.67	0.62	0.62
Clearance Time (s)	6.5	6.5		7.0	7.0		8.0	6.0		8.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	105	98		157	159	306	368	2682		809	2039	887
v/s Ratio Prot	0.02	c0.02		c0.06	0.06	0.02	0.01	0.17		c0.01	c0.26	
v/s Ratio Perm							0.09			0.14		0.03
v/c Ratio	0.32	0.39		0.62	0.60	0.09	0.14	0.29		0.23	0.42	0.05
Uniform Delay, d1	67.3	67.5		65.1	65.0	48.8	10.4	14.5		8.8	14.8	11.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.87	0.60		1.00	1.00	1.00
Incremental Delay, d2	1.8	2.5		7.1	6.3	0.1	0.2	0.3		0.2	0.6	0.1
Delay (s)	69.1	70.1		72.1	71.3	49.0	9.3	8.9		8.9	15.5	11.4
Level of Service	E	E		E	E	D	A	A		A	B	B
Approach Delay (s)		69.8			62.5			9.0			14.1	
Approach LOS		E			E			A			B	
Intersection Summary												
HCM 2000 Control Delay			21.5			HCM 2000 Level of Service				C		
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)				27.5		
Intersection Capacity Utilization			58.8%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

Total Future AM Phase 2

12/04/2024

14: Nebel Street & Randolph Road

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	16	698	56	177	1122	137	102	66	68	153	74	14
Future Volume (vph)	16	698	56	177	1122	137	102	66	68	153	74	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	12	12	12
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1652	3259		1769	3476		1711	1801	1531	1767	1863	1583
Flt Permitted	0.15	1.00		0.27	1.00		0.71	1.00	1.00	0.54	1.00	1.00
Satd. Flow (perm)	262	3259		503	3476		1272	1801	1531	1012	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	17	735	59	186	1181	144	107	69	72	161	78	15
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	17	794	0	186	1325	0	107	69	72	161	78	15
Confl. Peds. (#/hr)	1		4	4		1			2	2		
Confl. Bikes (#/hr)									1			
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Prot	pm+pt	NA	Prot
Protected Phases	1	6		5	2		3	8	8	7	4	4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	84.1	81.4		99.1	90.4		27.3	13.3	13.3	35.5	17.4	17.4
Effective Green, g (s)	84.1	81.4		99.1	90.4		27.3	13.3	13.3	35.5	17.4	17.4
Actuated g/C Ratio	0.56	0.54		0.66	0.60		0.18	0.09	0.09	0.24	0.12	0.12
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	171	1768		431	2094		272	159	135	330	216	183
v/s Ratio Prot	0.00	0.24		c0.03	c0.38		0.04	0.04	0.05	c0.06	c0.04	0.01
v/s Ratio Perm	0.05			0.25			0.03			c0.06		
v/c Ratio	0.10	0.45		0.43	0.63		0.39	0.43	0.53	0.49	0.36	0.08
Uniform Delay, d1	16.3	20.7		11.6	19.1		53.5	64.8	65.4	48.1	61.2	59.2
Progression Factor	0.75	0.70		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.8		0.7	1.5		1.3	2.6	5.1	1.5	1.4	0.3
Delay (s)	12.5	15.2		12.3	20.6		54.8	67.4	70.5	49.7	62.6	59.4
Level of Service	B	B		B	C		D	E	E	D	E	E
Approach Delay (s)		15.2			19.6			62.8			54.2	
Approach LOS		B			B			E			D	
Intersection Summary												
HCM 2000 Control Delay			25.2			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.62									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			25.5			
Intersection Capacity Utilization			69.7%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Total Future AM Phase 2

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	20	7	13	77	16	50	25	1835	116	48	2623	48
Future Volume (vph)	20	7	13	77	16	50	25	1835	116	48	2623	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.96		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.97	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.90		1.00	0.89		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	1604		1770	1581		1711	6115		1711	4894	
Flt Permitted	0.71	1.00		0.74	1.00		0.04	1.00		0.07	1.00	
Satd. Flow (perm)	1241	1604		1386	1581		66	6115		130	4894	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	20	7	13	79	16	51	26	1872	118	49	2677	49
RTOR Reduction (vph)	0	12	0	0	46	0	0	3	0	0	1	0
Lane Group Flow (vph)	20	8	0	79	21	0	26	1987	0	49	2725	0
Confl. Peds. (#/hr)	25					25	29		16	16		29
Confl. Bikes (#/hr)			4			3						
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8		113.5	108.5		117.9	110.7	
Effective Green, g (s)	15.8	15.8		15.8	15.8		113.5	108.5		117.9	110.7	
Actuated g/C Ratio	0.11	0.11		0.11	0.11		0.76	0.72		0.79	0.74	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	130	168		145	166		104	4423		178	3611	
v/s Ratio Prot		0.01			0.01		0.01	0.32		c0.01	c0.56	
v/s Ratio Perm	0.02			c0.06			0.18			0.20		
v/c Ratio	0.15	0.05		0.54	0.13		0.25	0.45		0.28	0.75	
Uniform Delay, d1	61.0	60.3		63.7	60.9		12.0	8.5		4.9	11.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		0.39	0.34	
Incremental Delay, d2	1.2	0.3		7.2	0.7		2.6	0.3		1.1	0.9	
Delay (s)	62.2	60.6		70.9	61.6		14.6	8.8		3.0	4.9	
Level of Service	E	E		E	E		B	A		A	A	
Approach Delay (s)		61.4			66.6			8.9			4.9	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM 2000 Control Delay		8.8										
HCM 2000 Volume to Capacity ratio		0.72										
Actuated Cycle Length (s)		150.0										
Intersection Capacity Utilization		81.1%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Total Future AM Phase 2

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	77	727	80	9	1225	66	11	6	4	27	7	24
Future Volume (vph)	77	727	80	9	1225	66	11	6	4	27	7	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.97	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.94		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1652	3236		1647	3303	1428	1711	1675		1681	1549	
Flt Permitted	0.13	1.00		0.30	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	232	3236		528	3303	1428	1711	1675		1681	1549	
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	89	836	92	10	1408	76	13	7	5	31	8	28
RTOR Reduction (vph)	0	2	0	0	0	24	0	5	0	0	0	0
Lane Group Flow (vph)	89	926	0	10	1408	52	13	7	0	28	39	0
Confl. Peds. (#/hr)	4		11	11		4	4		3	3		4
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	118.1	110.3		105.5	102.7	102.7	5.1	5.1		8.8	8.8	
Effective Green, g (s)	118.1	110.3		105.5	102.7	102.7	5.1	5.1		8.8	8.8	
Actuated g/C Ratio	0.79	0.74		0.70	0.68	0.68	0.03	0.03		0.06	0.06	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	281	2379		392	2261	977	58	56		98	90	
v/s Ratio Prot	c0.02	c0.29		0.00	c0.43		c0.01	0.00		0.02	c0.03	
v/s Ratio Perm	0.23			0.02		0.04						
v/c Ratio	0.32	0.39		0.03	0.62	0.05	0.22	0.13		0.29	0.43	
Uniform Delay, d1	8.3	7.4		6.6	13.0	7.7	70.5	70.3		67.6	68.2	
Progression Factor	1.00	1.00		0.50	0.34	0.02	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.5		0.0	1.1	0.1	2.7	1.4		2.2	4.5	
Delay (s)	9.2	7.8		3.4	5.6	0.3	73.2	71.7		69.8	72.7	
Level of Service	A	A		A	A	A	E	E		E	E	
Approach Delay (s)		8.0			5.3			72.5			71.5	
Approach LOS		A			A			E			E	
Intersection Summary												
HCM 2000 Control Delay		8.7										
HCM 2000 Volume to Capacity ratio		0.57										
Actuated Cycle Length (s)		150.0										
Intersection Capacity Utilization		61.8%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

17: Chapman Ave/Chapman Road & Thompson Ave

Total Future AM Phase 2

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	3	37	30	15	2	37	142	7	7	144	9
Future Volume (Veh/h)	2	3	37	30	15	2	37	142	7	7	144	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Hourly flow rate (vph)	2	3	43	34	17	2	43	163	8	8	166	10
Pedestrians		71			19			50			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		7			2			5			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								638				
pX, platoon unblocked												
vC, conflicting volume	524	534	292	554	535	188	247			190		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	524	534	292	554	535	188	247			190		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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	99	94	90	96	100	97			99		
cM capacity (veh/h)	378	397	664	350	397	837	1230			1359		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	48	53	214	184								
Volume Left	2	34	43	8								
Volume Right	43	2	8	10								
cSH	618	372	1230	1359								
Volume to Capacity	0.08	0.14	0.03	0.01								
Queue Length 95th (ft)	6	12	3	0								
Control Delay (s)	11.3	16.3	1.9	0.4								
Lane LOS	B	C	A	A								
Approach Delay (s)	11.3	16.3	1.9	0.4								
Approach LOS	B	C										
Intersection Summary												
Average Delay			3.8									
Intersection Capacity Utilization			41.9%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 18: Rockville Pike - 355 & Rollins Ave Extension

Total Future AM Phase 2
12/04/2024

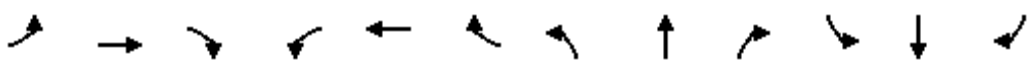
							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (veh/h)	0	45	1652	109	0	2138	
Future Volume (Veh/h)	0	45	1652	109	0	2138	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	49	1796	118	0	2324	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			249			340	
pX, platoon unblocked	0.85	0.73			0.73		
vC, conflicting volume	2630	658			1914		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	366	0			956		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	94			100		
cM capacity (veh/h)	517	791			522		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	49	718	718	477	775	775	775
Volume Left	0	0	0	0	0	0	0
Volume Right	49	0	0	118	0	0	0
cSH	791	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.06	0.42	0.42	0.28	0.46	0.46	0.46
Queue Length 95th (ft)	5	0	0	0	0	0	0
Control Delay (s)	9.8	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	A						
Approach Delay (s)	9.8	0.0			0.0		
Approach LOS	A						
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Utilization			44.6%		ICU Level of Service		A
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis

Total Future PM Phase 2

1: Rockville Pike - 355 & Bou Ave

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰	↱	↰↱	↰		↱	↰↱↰	↱	↱	↰↱↰	
Traffic Volume (vph)	17	31	36	510	21	214	57	2550	444	225	1696	18
Future Volume (vph)	17	31	36	510	21	214	57	2550	444	225	1696	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Lane Util. Factor		1.00	1.00	0.97	1.00		1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt		1.00	0.85	1.00	0.86		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1708	1478	3204	1428		1711	4916	1531	1770	5070	
Flt Permitted		0.98	1.00	0.95	1.00		0.95	1.00	1.00	0.06	1.00	
Satd. Flow (perm)		1708	1478	3204	1428		1711	4916	1531	103	5070	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	18	32	37	526	22	221	59	2629	458	232	1748	19
RTOR Reduction (vph)	0	0	35	0	182	0	0	0	90	0	0	0
Lane Group Flow (vph)	0	50	2	526	61	0	59	2629	368	232	1767	0
Confl. Peds. (#/hr)	25					25	25		25	25		25
Turn Type	Split	NA	Prot	Split	NA		Prot	NA	Prot	pm+pt	NA	
Protected Phases	3	3	3	4	4		1	5	5	6	2	
Permitted Phases										2		
Actuated Green, G (s)		7.3	7.3	26.4	26.4		9.2	81.3	81.3	83.1	83.1	
Effective Green, g (s)		7.3	7.3	26.4	26.4		9.2	81.3	81.3	83.1	83.1	
Actuated g/C Ratio		0.05	0.05	0.18	0.18		0.06	0.54	0.54	0.55	0.55	
Clearance Time (s)		6.0	6.0	7.0	7.0		5.0	5.5	5.5	6.0	6.0	
Vehicle Extension (s)		3.0	3.0	6.0	6.0		3.0	0.2	0.2	3.0	0.2	
Lane Grp Cap (vph)		83	71	563	251		104	2664	829	173	2808	
v/s Ratio Prot		c0.03	0.00	c0.16	0.04		0.03	c0.53	0.24	c0.09	0.35	
v/s Ratio Perm										c0.65		
v/c Ratio		0.60	0.03	0.93	0.24		0.57	0.99	0.44	1.34	0.63	
Uniform Delay, d1		69.9	68.0	60.9	53.2		68.5	33.8	20.7	62.1	22.9	
Progression Factor		1.00	1.00	1.00	1.00		1.34	0.54	0.63	0.57	0.13	
Incremental Delay, d2		11.7	0.1	24.0	1.4		3.5	9.6	0.9	179.9	0.8	
Delay (s)		81.6	68.1	85.0	54.6		95.1	27.9	14.0	215.2	3.8	
Level of Service		F	E	F	D		F	C	B	F	A	
Approach Delay (s)		75.9			75.4			27.1			28.3	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			34.4			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			1.25									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			31.5			
Intersection Capacity Utilization			98.4%			ICU Level of Service			F			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Rockville Pike - 355 & Federal Plaza/New Street

Total Future PM Phase 2

12/04/2024

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↑↑↑		↖	↑↑↑	
Traffic Volume (vph)	147	8	133	18	9	14	197	2422	0	6	1747	32
Future Volume (vph)	147	8	133	18	9	14	197	2422	0	6	1747	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	16	16	16	11	11	11	10	10	10
Total Lost time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00	1.00		0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.95		1.00	1.00		1.00	1.00	
Flt Protected		0.95	1.00		0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1660	1478		1953		1711	4916		1652	4726	
Flt Permitted		0.95	1.00		0.98		0.06	1.00		0.05	1.00	
Satd. Flow (perm)		1660	1478		1953		105	4916		86	4726	
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)	153	8	139	19	9	15	205	2523	0	6	1820	33
RTOR Reduction (vph)	0	0	121	0	14	0	0	0	0	0	1	0
Lane Group Flow (vph)	0	161	18	0	29	0	205	2523	0	6	1852	0
Confl. Peds. (#/hr)	3		5	5		3	23		16	16		23
Confl. Bikes (#/hr)						1						
Turn Type	Split	NA	Prot	Split	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	8	8	8	4	4		5	2		1	6	
Permitted Phases							2			6		
Actuated Green, G (s)		19.8	19.8		6.7		105.0	98.8		82.4	81.2	
Effective Green, g (s)		19.8	19.8		6.7		105.0	98.8		82.4	81.2	
Actuated g/C Ratio		0.13	0.13		0.04		0.70	0.66		0.55	0.54	
Clearance Time (s)		6.5	6.5		6.5		5.0	5.5		5.0	5.5	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	0.2		3.0	0.2	
Lane Grp Cap (vph)		219	195		87		274	3238		59	2558	
v/s Ratio Prot		c0.10	0.01		c0.01		c0.09	c0.51		0.00	0.39	
v/s Ratio Perm							0.43			0.05		
v/c Ratio		0.74	0.09		0.33		0.75	0.78		0.10	0.72	
Uniform Delay, d1		62.6	57.2		69.5		41.0	18.0		18.6	25.9	
Progression Factor		1.00	1.00		1.00		1.66	0.35		0.26	0.35	
Incremental Delay, d2		12.1	0.2		2.2		6.0	1.1		0.6	1.4	
Delay (s)		74.6	57.4		71.7		74.0	7.3		5.3	10.5	
Level of Service		E	E		E		E	A		A	B	
Approach Delay (s)		66.7			71.7			12.3			10.5	
Approach LOS		E			E			B			B	
Intersection Summary												
HCM 2000 Control Delay			15.4			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)				23.5		
Intersection Capacity Utilization			81.5%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Rockville Pike - 355 & Rollins Ave/Twinbrook Parkway

Total Future PM Phase 2

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↱			↑↑	↱	↱	↑↑↑	↱	↱	↑↑↱	
Traffic Volume (vph)	0	426	57	0	309	204	145	2244	121	299	1763	57
Future Volume (vph)	0	426	57	0	309	204	145	2244	121	299	1763	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	10	10	10	11	11	11
Total Lost time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Lane Util. Factor		0.95			0.95	1.00	1.00	0.91	1.00	1.00	0.91	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt		0.98			1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		1.00			1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		3231			3539	1583	1652	4746	1478	1711	4883	
Flt Permitted		1.00			1.00	1.00	0.08	1.00	1.00	0.05	1.00	
Satd. Flow (perm)		3231			3539	1583	137	4746	1478	90	4883	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	0	430	58	0	312	206	146	2267	122	302	1781	58
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	62	0	2	0
Lane Group Flow (vph)	0	488	0	0	312	206	146	2267	60	302	1837	0
Confl. Peds. (#/hr)	24		18	18		24	26		36	36		26
Confl. Bikes (#/hr)			1			1			2			
Turn Type		NA			NA	Prot	pm+pt	NA	Prot	pm+pt	NA	
Protected Phases		4			8	8	1	6	6	5	2	
Permitted Phases							6			2		
Actuated Green, G (s)		29.9			29.9	29.9	88.6	73.3	73.3	107.1	84.8	
Effective Green, g (s)		29.9			29.9	29.9	88.6	73.3	73.3	107.1	84.8	
Actuated g/C Ratio		0.20			0.20	0.20	0.59	0.49	0.49	0.71	0.57	
Clearance Time (s)		7.5			7.5	7.5	7.0	5.5	5.5	7.0	5.5	
Vehicle Extension (s)		4.0			4.0	4.0	4.0	0.2	0.2	4.0	0.2	
Lane Grp Cap (vph)		644			705	315	235	2319	722	353	2760	
v/s Ratio Prot		c0.15			0.09	0.13	0.06	c0.48	0.04	c0.15	0.38	
v/s Ratio Perm							0.30			0.46		
v/c Ratio		0.76			0.44	0.65	0.62	0.98	0.08	0.86	0.67	
Uniform Delay, d1		56.6			52.7	55.3	21.9	37.5	20.4	49.8	22.7	
Progression Factor		1.00			0.64	0.65	1.43	0.49	0.32	0.71	1.81	
Incremental Delay, d2		5.4			0.5	4.7	3.9	10.9	0.2	12.8	0.8	
Delay (s)		62.0			34.3	40.9	35.2	29.2	6.7	48.1	42.0	
Level of Service		E			C	D	D	C	A	D	D	
Approach Delay (s)		62.0			36.9			28.5			42.9	
Approach LOS		E			D			C			D	
Intersection Summary												
HCM 2000 Control Delay			37.6		HCM 2000 Level of Service					D		
HCM 2000 Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			150.0		Sum of lost time (s)					20.0		
Intersection Capacity Utilization			97.7%		ICU Level of Service					F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Chapman Ave & Twinbrook Parkway

Total Future PM Phase 2

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	68	739	229	469	586	141	109	109	592	215	119	37
Future Volume (vph)	68	739	229	469	586	141	109	109	592	215	119	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	11	11	11	10	10	10	10	10	10
Total Lost time (s)	5.5	6.0		5.5	6.0			6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		0.97	0.95			1.00	1.00	0.97	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00	1.00	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.97			1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1650	3165		3319	3305			1696	1478	3204	1739	1421
Flt Permitted	0.36	1.00		0.95	1.00			0.98	1.00	0.95	1.00	1.00
Satd. Flow (perm)	632	3165		3319	3305			1696	1478	3204	1739	1421
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	70	762	236	484	604	145	112	112	610	222	123	38
RTOR Reduction (vph)	0	20	0	0	12	0	0	0	54	0	0	34
Lane Group Flow (vph)	70	978	0	484	737	0	0	224	556	222	123	4
Confl. Peds. (#/hr)	2		9	9		2	15		14	14		15
Confl. Bikes (#/hr)									1			1
Turn Type	pm+pt	NA		Prot	NA		Split	NA	pt+ov	Split	NA	Perm
Protected Phases	5	2		1	6		4	4	4 1	3	3	
Permitted Phases	2											3
Actuated Green, G (s)	52.7	45.2		25.4	63.1			38.4	70.3	16.5	16.5	16.5
Effective Green, g (s)	52.7	45.2		25.4	63.1			38.4	70.3	16.5	16.5	16.5
Actuated g/C Ratio	0.35	0.30		0.17	0.42			0.26	0.47	0.11	0.11	0.11
Clearance Time (s)	5.5	6.0		5.5	6.0			6.5		6.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	272	953		562	1390			434	692	352	191	156
v/s Ratio Prot	0.01	c0.31		c0.15	0.22			0.13	c0.38	0.07	c0.07	
v/s Ratio Perm	0.08											0.00
v/c Ratio	0.26	1.03		0.86	0.53			0.52	0.80	0.63	0.64	0.03
Uniform Delay, d1	33.0	52.4		60.6	32.4			47.8	34.0	63.8	63.9	59.6
Progression Factor	1.04	0.85		1.07	0.79			1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	34.9		11.9	1.3			1.0	6.7	3.7	7.2	0.1
Delay (s)	34.9	79.2		76.4	26.8			48.9	40.7	67.5	71.2	59.7
Level of Service	C	E		E	C			D	D	E	E	E
Approach Delay (s)		76.3			46.3			42.9			67.9	
Approach LOS		E			D			D			E	
Intersection Summary												
HCM 2000 Control Delay			57.0			HCM 2000 Level of Service			E			
HCM 2000 Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			24.5			
Intersection Capacity Utilization			94.5%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 6: Chapman Ave & Pike Center North/Driveway

Total Future PM Phase 2
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	42	1	51	4	1	7	55	743	8	5	657	76
Future Volume (Veh/h)	42	1	51	4	1	7	55	743	8	5	657	76
Sign Control	Stop			Stop			Free			Free		
Grade	0%			0%			0%			0%		
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	47	1	57	4	1	8	61	826	9	6	730	84
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)							467			256		
pX, platoon unblocked												
vC, conflicting volume	1328	1741	407	1387	1778	418	814				835	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1328	1741	407	1387	1778	418	814				835	
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 %	55	99	90	95	99	99	92				99	
cM capacity (veh/h)	104	79	593	86	75	584	809				794	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2						
Volume Total	105	13	474	422	371	449						
Volume Left	47	4	61	0	6	0						
Volume Right	57	8	0	9	0	84						
cSH	187	176	809	1700	794	1700						
Volume to Capacity	0.56	0.07	0.08	0.25	0.01	0.26						
Queue Length 95th (ft)	75	6	6	0	1	0						
Control Delay (s)	46.5	27.0	2.1	0.0	0.2	0.0						
Lane LOS	E	D	A		A							
Approach Delay (s)	46.5	27.0	1.1		0.1							
Approach LOS	E	D										
Intersection Summary												
Average Delay			3.5									
Intersection Capacity Utilization			61.3%		ICU Level of Service				B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

7: Chapman Ave & Rollins Ave Extension/Rollins Ave

Total Future PM Phase 2

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	45	19	6	59	20	89	39	672	49	45	649	18
Future Volume (Veh/h)	45	19	6	59	20	89	39	672	49	45	649	18
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	46	20	6	61	21	92	40	693	51	46	669	19
Pedestrians					18							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					3.5							
Percent Blockage					2							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								283			440	
pX, platoon unblocked	0.83	0.83		0.83	0.83	0.83				0.83		
vC, conflicting volume	1672	1612	344	1259	1596	736	688			762		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1706	1635	344	1211	1616	584	688			614		
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 %	0	73	99	25	72	75	96			94		
cM capacity (veh/h)	27	74	652	81	76	373	902			787		
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1	SB 2						
Volume Total	72	61	113	784	380	354						
Volume Left	46	61	0	40	46	0						
Volume Right	6	0	92	51	0	19						
cSH	36	81	216	902	787	1700						
Volume to Capacity	2.01	0.75	0.52	0.04	0.06	0.21						
Queue Length 95th (ft)	198	92	68	3	5	0						
Control Delay (s)	708.2	128.2	38.7	1.2	1.8	0.0						
Lane LOS	F	F	E	A	A							
Approach Delay (s)	708.2	70.1		1.2	0.9							
Approach LOS	F	F										
Intersection Summary												
Average Delay			36.7									
Intersection Capacity Utilization			80.9%		ICU Level of Service					D		
Analysis Period (min)			15									

HCM Signalized Intersection Capacity Analysis

Total Future PM Phase 2

9: Chapman Ave & Bou Ave

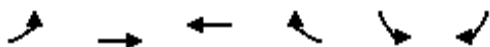
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	355	243	56	15	166	273	17	127	42	258	127	368
Future Volume (vph)	355	243	56	15	166	273	17	127	42	258	127	368
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	10	10	10	10	10	10
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	6.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.96	1.00	0.99		1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00		0.99	1.00	1.00	0.99	1.00		0.98	1.00	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1642	1680		1640	1739	1422	1636	1660		1627	1739	1478
Flt Permitted	0.52	1.00		0.57	1.00	1.00	0.67	1.00		0.64	1.00	1.00
Satd. Flow (perm)	900	1680		986	1739	1422	1158	1660		1103	1739	1478
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)	370	253	58	16	173	284	18	132	44	269	132	383
RTOR Reduction (vph)	0	10	0	0	0	197	0	15	0	0	0	170
Lane Group Flow (vph)	370	301	0	16	173	87	18	161	0	269	132	213
Confl. Peds. (#/hr)	8		5	5		8	10		17	17		10
Confl. Bikes (#/hr)			2			1						
Turn Type	pm+pt	NA		Perm	NA	Perm	Perm	NA		Perm	NA	pt+ov
Protected Phases	1	6			2			4			8	8 1
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)	44.5	44.5		24.5	24.5	24.5	24.0	24.0		24.0	24.0	44.5
Effective Green, g (s)	44.5	44.5		24.5	24.5	24.5	24.0	24.0		24.0	24.0	44.5
Actuated g/C Ratio	0.56	0.56		0.31	0.31	0.31	0.30	0.30		0.30	0.30	0.56
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	6.0	0.2		0.2	0.2	0.2	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	635	934		301	532	435	347	498		330	521	822
v/s Ratio Prot	c0.11	0.18			0.10			0.10			0.08	0.14
v/s Ratio Perm	c0.22			0.02		0.06	0.02			c0.24		
v/c Ratio	0.58	0.32		0.05	0.33	0.20	0.05	0.32		0.82	0.25	0.26
Uniform Delay, d1	10.5	9.6		19.6	21.4	20.5	19.9	21.7		25.9	21.2	9.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.6	0.1		0.3	1.6	1.0	0.1	0.4		19.5	1.2	0.5
Delay (s)	13.1	9.7		19.9	23.0	21.5	20.0	22.1		45.4	22.4	9.7
Level of Service	B	A		B	C	C	B	C		D	C	A
Approach Delay (s)		11.5			22.0			21.9			24.1	
Approach LOS		B			C			C			C	
Intersection Summary												
HCM 2000 Control Delay			19.4									HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			80.0							17.0		
Intersection Capacity Utilization			82.0%									ICU Level of Service E
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

10: Bou Ave & Pike Center

Total Future PM Phase 2
12/04/2024



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑↑	
Traffic Volume (veh/h)	21	554	497	47	50	232
Future Volume (Veh/h)	21	554	497	47	50	232
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	22	571	512	48	52	239
Pedestrians		1			7	
Lane Width (ft)		12.0			12.0	
Walking Speed (ft/s)		3.5			3.5	
Percent Blockage		0			1	
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)		278	283			
pX, platoon unblocked						
vC, conflicting volume	567				872	288
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	567				872	288
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				82	66
cM capacity (veh/h)	994				281	703
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	SB 1	
Volume Total	212	381	341	219	291	
Volume Left	22	0	0	0	52	
Volume Right	0	0	0	48	239	
cSH	994	1700	1700	1700	555	
Volume to Capacity	0.02	0.22	0.20	0.13	0.52	
Queue Length 95th (ft)	2	0	0	0	76	
Control Delay (s)	1.1	0.0	0.0	0.0	18.4	
Lane LOS	A				C	
Approach Delay (s)	0.4		0.0		18.4	
Approach LOS					C	
Intersection Summary						
Average Delay			3.9			
Intersection Capacity Utilization			54.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Signalized Intersection Capacity Analysis

11: East Jefferson Street & Rollins Avenue /Rollins Ave

Total Future PM Phase 2

12/04/2024

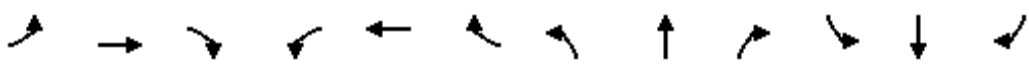
												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	44	26	390	65	78	7	477	396	18	263	18
Future Volume (vph)	10	44	26	390	65	78	7	477	396	18	263	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00	1.00		0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.97			1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Frt	1.00	0.94		1.00	0.92			1.00	0.85		0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00	1.00		1.00	
Satd. Flow (prot)	1711	1678		1711	1600			1799	1500		3368	
Flt Permitted	0.95	1.00		0.95	1.00			1.00	1.00		0.92	
Satd. Flow (perm)	1711	1678		1711	1600			1792	1500		3097	
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)	10	46	27	406	68	81	7	497	412	19	274	19
RTOR Reduction (vph)	0	25	0	0	51	0	0	0	98	0	4	0
Lane Group Flow (vph)	10	48	0	406	98	0	0	504	315	0	308	0
Confl. Peds. (#/hr)	19		20	20		19	18		15	15		18
Confl. Bikes (#/hr)			1			3			2			3
Turn Type	Split	NA		Split	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	4	4		3	3			2	3		6	
Permitted Phases							2		2	6		
Actuated Green, G (s)	6.2	6.2		21.3	21.3			43.5	64.8		43.5	
Effective Green, g (s)	6.2	6.2		21.3	21.3			43.5	64.8		43.5	
Actuated g/C Ratio	0.07	0.07		0.25	0.25			0.51	0.76		0.51	
Clearance Time (s)	4.5	4.5		4.5	4.5			5.0	4.5		5.0	
Vehicle Extension (s)	2.0	2.0		1.0	1.0			5.0	1.0		5.0	
Lane Grp Cap (vph)	124	122		428	400			917	1143		1584	
v/s Ratio Prot	0.01	c0.03		c0.24	0.06				0.07			
v/s Ratio Perm								c0.28	0.14		0.10	
v/c Ratio	0.08	0.39		0.95	0.25			0.55	0.28		0.19	
Uniform Delay, d1	36.7	37.6		31.3	25.4			14.1	3.0		11.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.1	0.8		30.1	0.1			2.4	0.0		0.3	
Delay (s)	36.8	38.4		61.4	25.5			16.5	3.1		11.5	
Level of Service	D	D		E	C			B	A		B	
Approach Delay (s)		38.2			51.8			10.4			11.5	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM 2000 Control Delay			24.1			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			85.0			Sum of lost time (s)			14.0			
Intersection Capacity Utilization			71.0%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Rockville Pike - 355/Rockville Pike- 355 & Halpine Road

Total Future PM Phase 2

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	98	66	87	210	70	127	197	2276	105	99	1875	30
Future Volume (vph)	98	66	87	210	70	127	197	2276	105	99	1875	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	11	11	11	11	11	11
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.96	1.00		0.97	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1698	3148		1719	1863	1583	1711	4874		1711	4900	
Flt Permitted	0.71	1.00		0.65	1.00	1.00	0.05	1.00		0.05	1.00	
Satd. Flow (perm)	1267	3148		1176	1863	1583	87	4874		93	4900	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	103	69	92	221	74	134	207	2396	111	104	1974	32
RTOR Reduction (vph)	0	70	0	0	0	97	0	3	0	0	1	0
Lane Group Flow (vph)	103	91	0	221	74	37	207	2504	0	104	2005	0
Confl. Peds. (#/hr)	30		24	24		30	12		16	16		12
Confl. Bikes (#/hr)												1
Turn Type	Perm	NA		Perm	NA	Prot	pm+pt	NA		pm+pt	NA	
Protected Phases		4			8	8	1	6		5	2	
Permitted Phases	4			8			6			2		
Actuated Green, G (s)	35.1	35.1		35.1	35.1	35.1	102.9	87.3		87.8	77.7	
Effective Green, g (s)	35.1	35.1		35.1	35.1	35.1	102.9	87.3		87.8	77.7	
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.69	0.58		0.59	0.52	
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0	5.0	5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	296	736		275	435	370	272	2836		163	2538	
v/s Ratio Prot		0.03			0.04	0.02	c0.10	c0.51		0.04	0.41	
v/s Ratio Perm	0.08			c0.19			0.42			0.33		
v/c Ratio	0.35	0.12		0.80	0.17	0.10	0.76	0.88		0.64	0.79	
Uniform Delay, d1	47.9	45.3		54.2	45.8	45.1	46.0	27.0		31.3	29.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.63	0.34		1.00	1.00	
Incremental Delay, d2	1.5	0.2		17.4	0.4	0.3	7.2	2.3		10.9	2.6	
Delay (s)	49.4	45.5		71.6	46.2	45.3	82.3	11.4		42.1	32.1	
Level of Service	D	D		E	D	D	F	B		D	C	
Approach Delay (s)		47.0			59.0			16.8			32.6	
Approach LOS		D			E			B			C	
Intersection Summary												
HCM 2000 Control Delay			27.6									
HCM 2000 Volume to Capacity ratio			0.87									
Actuated Cycle Length (s)			150.0									
Intersection Capacity Utilization			99.9%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Twinbrook Parkway & Parklawn Drive

Total Future PM Phase 2

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	44	32	68	304	39	272	31	1199	271	133	743	32
Future Volume (vph)	44	32	68	304	39	272	31	1199	271	133	743	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	10	10	10	10	10	10
Total Lost time (s)	6.5	6.5		7.0	7.0	7.0	8.0	6.0		8.0	6.0	6.0
Lane Util. Factor	0.95	0.95		0.95	0.95	1.00	1.00	0.91		0.97	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	1.00	1.00	0.99		1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.90		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1681	1573		1625	1647	1531	1650	4576		3204	3303	1428
Flt Permitted	0.95	1.00		0.95	0.96	1.00	0.30	1.00		0.10	1.00	1.00
Satd. Flow (perm)	1681	1573		1625	1647	1531	522	4576		327	3303	1428
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	47	34	72	323	41	289	33	1276	288	141	790	34
RTOR Reduction (vph)	0	47	0	0	0	160	0	16	0	0	0	15
Lane Group Flow (vph)	42	64	0	181	183	129	33	1548	0	141	790	19
Confl. Peds. (#/hr)	12		2	2		12	4		17	17		4
Turn Type	Split	NA		Split	NA	pt+ov	pm+pt	NA		pm+pt	NA	Perm
Protected Phases	3	3		4	4	4 1	5	2		1	6	
Permitted Phases							2			6		6
Actuated Green, G (s)	11.3	11.3		23.5	23.5	38.8	85.1	79.4		90.3	82.0	82.0
Effective Green, g (s)	11.3	11.3		23.5	23.5	38.8	85.1	79.4		90.3	82.0	82.0
Actuated g/C Ratio	0.08	0.08		0.16	0.16	0.26	0.57	0.53		0.60	0.55	0.55
Clearance Time (s)	6.5	6.5		7.0	7.0		8.0	6.0		8.0	6.0	6.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	0.2		3.0	0.2	0.2
Lane Grp Cap (vph)	126	118		254	258	396	339	2422		356	1805	780
v/s Ratio Prot	0.02	c0.04		c0.11	0.11	c0.08	0.00	c0.34		0.02	c0.24	
v/s Ratio Perm							0.05			0.22		0.01
v/c Ratio	0.33	0.54		0.71	0.71	0.33	0.10	0.64		0.40	0.44	0.02
Uniform Delay, d1	65.8	66.9		60.0	60.0	45.0	14.8	25.1		16.5	20.3	15.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.23	1.09		1.00	1.00	1.00
Incremental Delay, d2	1.6	5.0		9.1	8.6	0.5	0.1	0.6		0.7	0.8	0.1
Delay (s)	67.3	71.8		69.1	68.6	45.5	18.4	28.0		17.2	21.0	15.7
Level of Service	E	E		E	E	D	B	C		B	C	B
Approach Delay (s)		70.6			58.5			27.8			20.3	
Approach LOS		E			E			C			C	
Intersection Summary												
HCM 2000 Control Delay			33.6									HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			150.0							27.5		
Intersection Capacity Utilization			70.6%									ICU Level of Service C
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

Total Future PM Phase 2

14: Nebel Street & Randolph Road

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	21	1075	93	183	827	191	125	145	311	298	171	24
Future Volume (vph)	21	1075	93	183	827	191	125	145	311	298	171	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	12	12	12	11	11	11	12	12	12
Total Lost time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.98	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1651	3243		1770	3417		1684	1801	1531	1763	1863	1583
Flt Permitted	0.19	1.00		0.06	1.00		0.64	1.00	1.00	0.43	1.00	1.00
Satd. Flow (perm)	323	3243		116	3417		1141	1801	1531	797	1863	1583
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	22	1132	98	193	871	201	132	153	327	314	180	25
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	22	1230	0	193	1072	0	132	153	327	314	180	25
Confl. Peds. (#/hr)	12		18	18		12	17		8	8		17
Confl. Bikes (#/hr)			4			3			3			3
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA	Prot	pm+pt	NA	Prot
Protected Phases	1	6		5	2		3	8	8	7	4	4
Permitted Phases	6			2			8			4		
Actuated Green, G (s)	62.2	58.0		80.5	70.3		40.8	26.4	26.4	56.5	35.6	35.6
Effective Green, g (s)	62.2	58.0		80.5	70.3		40.8	26.4	26.4	56.5	35.6	35.6
Actuated g/C Ratio	0.41	0.39		0.54	0.47		0.27	0.18	0.18	0.38	0.24	0.24
Clearance Time (s)	6.0	6.5		6.0	6.5		6.5	6.5	6.5	6.5	6.5	6.5
Vehicle Extension (s)	3.0	5.0		3.0	5.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	171	1253		244	1601		362	316	269	452	442	375
v/s Ratio Prot	0.00	c0.38		c0.09	0.31		0.03	0.08	c0.21	c0.11	0.10	0.02
v/s Ratio Perm	0.05			0.34			0.06			0.15		
v/c Ratio	0.13	0.98		0.79	0.67		0.36	0.48	1.22	0.69	0.41	0.07
Uniform Delay, d1	27.1	45.5		43.5	30.9		43.1	55.7	61.8	36.0	48.3	44.3
Progression Factor	0.85	0.79		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	19.7		15.9	2.2		0.9	1.6	126.1	5.0	0.8	0.1
Delay (s)	23.5	55.6		59.4	33.1		44.0	57.3	187.9	41.0	49.1	44.4
Level of Service	C	E		E	C		D	E	F	D	D	D
Approach Delay (s)		55.0			37.1			124.2			44.0	
Approach LOS		E			D			F			D	
Intersection Summary												
HCM 2000 Control Delay		58.8										
HCM 2000 Volume to Capacity ratio		0.96										
Actuated Cycle Length (s)		150.0										
Intersection Capacity Utilization		91.2%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Rockville Pike - 355 & Hubbard Drive/Plaza Driveway

Total Future PM Phase 2

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	12	32	186	13	138	18	2786	250	161	2221	26
Future Volume (vph)	40	12	32	186	13	138	18	2786	250	161	2221	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	12	12	12	11	11	11	11	11	11
Total Lost time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.93		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	0.95	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.89		1.00	0.86		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1627	1589		1770	1496		1711	6079		1711	4902	
Flt Permitted	0.54	1.00		0.73	1.00		0.05	1.00		0.04	1.00	
Satd. Flow (perm)	931	1589		1354	1496		83	6079		78	4902	
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)	42	12	33	194	14	144	19	2902	260	168	2314	27
RTOR Reduction (vph)	0	27	0	0	117	0	0	8	0	0	1	0
Lane Group Flow (vph)	42	19	0	194	41	0	19	3154	0	168	2340	0
Confl. Peds. (#/hr)	44					44	25		20	20		25
Confl. Bikes (#/hr)			3						1			3
Turn Type	Perm	NA		Perm	NA		pm+pt	NA		pm+pt	NA	
Protected Phases		8			4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	27.7	27.7		27.7	27.7		91.4	86.4		109.8	98.8	
Effective Green, g (s)	27.7	27.7		27.7	27.7		91.4	86.4		109.8	98.8	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.61	0.58		0.73	0.66	
Clearance Time (s)	7.0	7.0		7.0	7.0		6.0	5.5		6.0	5.5	
Vehicle Extension (s)	5.0	5.0		5.0	5.0		5.0	0.2		5.0	0.2	
Lane Grp Cap (vph)	171	293		250	276		104	3501		246	3228	
v/s Ratio Prot		0.01			0.03		0.01	c0.52		c0.08	c0.48	
v/s Ratio Perm	0.05			c0.14			0.10			0.42		
v/c Ratio	0.25	0.07		0.78	0.15		0.18	0.90		0.68	0.73	
Uniform Delay, d1	52.2	50.5		58.2	51.2		14.8	28.0		46.4	16.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.24	0.53	
Incremental Delay, d2	1.6	0.2		16.1	0.5		1.8	4.3		7.7	1.1	
Delay (s)	53.8	50.7		74.3	51.8		16.6	32.3		65.0	10.1	
Level of Service	D	D		E	D		B	C		E	B	
Approach Delay (s)		52.2			64.2			32.2			13.7	
Approach LOS		D			E			C			B	
Intersection Summary												
HCM 2000 Control Delay			26.8			HCM 2000 Level of Service			C			
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			18.5			
Intersection Capacity Utilization			101.2%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: Chapman Ave & Josiah Henson Parkway/Randolph Road

Total Future PM Phase 2

12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	1012	72	14	791	127	50	24	20	152	51	96
Future Volume (vph)	144	1012	72	14	791	127	50	24	20	152	51	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	10	10	10	10	11	11	11	12	12	12
Total Lost time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		0.95	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.97	1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.93		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1651	3259		1650	3303	1432	1711	1665		1681	1573	
Flt Permitted	0.26	1.00		0.21	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	457	3259		364	3303	1432	1711	1665		1681	1573	
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)	150	1054	75	15	824	132	52	25	21	158	53	100
RTOR Reduction (vph)	0	2	0	0	0	49	0	20	0	0	0	0
Lane Group Flow (vph)	150	1127	0	15	824	83	52	26	0	142	169	0
Confl. Peds. (#/hr)	3		10	10		3	9		2	2		9
Confl. Bikes (#/hr)						1						1
Turn Type	pm+pt	NA		pm+pt	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	6		5	2		3	3		4	4	
Permitted Phases	6			2		2						
Actuated Green, G (s)	100.0	91.9		86.3	83.2	83.2	9.5	9.5		22.5	22.5	
Effective Green, g (s)	100.0	91.9		86.3	83.2	83.2	9.5	9.5		22.5	22.5	
Actuated g/C Ratio	0.67	0.61		0.58	0.55	0.55	0.06	0.06		0.15	0.15	
Clearance Time (s)	5.0	6.0		5.0	6.0	6.0	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.0	0.2		4.0	0.2	0.2	4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	398	1996		235	1832	794	108	105		252	235	
v/s Ratio Prot	c0.03	c0.35		0.00	0.25		c0.03	0.02		0.08	c0.11	
v/s Ratio Perm	0.22			0.04		0.06						
v/c Ratio	0.38	0.56		0.06	0.45	0.11	0.48	0.25		0.56	0.72	
Uniform Delay, d1	11.0	17.2		14.3	19.8	15.8	67.9	66.9		59.2	60.7	
Progression Factor	1.00	1.00		0.54	0.44	0.11	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.8	1.2		0.1	0.7	0.2	4.6	1.7		3.5	10.7	
Delay (s)	11.8	18.4		7.9	9.4	1.9	72.4	68.6		62.7	71.5	
Level of Service	B	B		A	A	A	E	E		E	E	
Approach Delay (s)		17.6			8.4			70.6			67.5	
Approach LOS		B			A			E			E	
Intersection Summary												
HCM 2000 Control Delay		22.0										
HCM 2000 Volume to Capacity ratio		0.59										
Actuated Cycle Length (s)		150.0								23.0		
Intersection Capacity Utilization		69.6%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis 17: Chapman Ave/Chapman Road & Thompson Ave

Total Future PM Phase 2
12/04/2024

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	26	17	122	9	12	5	28	279	23	7	281	27
Future Volume (Veh/h)	26	17	122	9	12	5	28	279	23	7	281	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
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)	28	18	130	10	13	5	30	297	24	7	299	29
Pedestrians		66			56			51			6	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		6			5			5			1	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								638				
pX, platoon unblocked	1.00	1.00		1.00	1.00	1.00				1.00		
vC, conflicting volume	780	830	430	942	833	371	394			377		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	777	828	430	940	831	367	394			373		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	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 %	89	93	77	93	95	99	97			99		
cM capacity (veh/h)	248	262	557	142	261	636	1091			1118		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	176	28	351	335								
Volume Left	28	10	30	7								
Volume Right	130	5	24	29								
cSH	424	218	1091	1118								
Volume to Capacity	0.42	0.13	0.03	0.01								
Queue Length 95th (ft)	50	11	2	0								
Control Delay (s)	19.4	23.9	1.0	0.2								
Lane LOS	C	C	A	A								
Approach Delay (s)	19.4	23.9	1.0	0.2								
Approach LOS	C	C										
Intersection Summary												
Average Delay			5.1									
Intersection Capacity Utilization			51.4%		ICU Level of Service				A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis

18: Rockville Pike - 355 & Rollins Ave Extension

Total Future PM Phase 2
12/04/2024

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Traffic Volume (veh/h)	0	143	2605	209	0	1917	
Future Volume (Veh/h)	0	143	2605	209	0	1917	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	0	155	2832	227	0	2084	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type			None			None	
Median storage veh							
Upstream signal (ft)			249			340	
pX, platoon unblocked	0.62	0.47			0.47		
vC, conflicting volume	3640	1058			3059		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	0	0			1427		
tC, single (s)	6.8	6.9			4.1		
tC, 2 stage (s)							
tF (s)	3.5	3.3			2.2		
p0 queue free %	100	70			100		
cM capacity (veh/h)	629	508			222		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	155	1133	1133	793	695	695	695
Volume Left	0	0	0	0	0	0	0
Volume Right	155	0	0	227	0	0	0
cSH	508	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.30	0.67	0.67	0.47	0.41	0.41	0.41
Queue Length 95th (ft)	32	0	0	0	0	0	0
Control Delay (s)	15.2	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C						
Approach Delay (s)	15.2	0.0			0.0		
Approach LOS	C						
Intersection Summary							
Average Delay			0.4				
Intersection Capacity Utilization			70.5%		ICU Level of Service		C
Analysis Period (min)			15				

APPENDIX E
CRITICAL LANE VOLUME
WORKSHEETS

1

Critical Lane Volume and Level of Service Calculations

Intersection: 01. Rockville Pike / Bou Ave

Jurisdiction: Montgomery County, MD

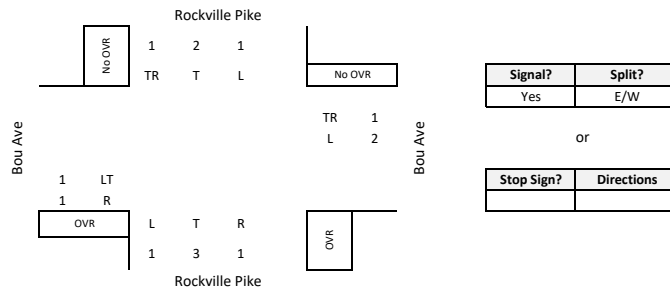
Scenario/Design Year: Existing Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LT	35		1.00	35				35	*
	R	25	0	1.00	25				25	
WB	2L	442		0.60	265				265	*
	TR	76	0	1.00	76				76	
NB	3T	957		0.37	354	124	1.10	136	490	
	R	194	194	1.00	0				136	
SB	2T+TR	1321	0	0.37	489	36	1.10	40	529	*
Note:									CLV	829
									v/c	0.535
									LOS	A
									Congestion Equiv.	
									1550	

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LT	48		1.00	48				48	*
	R	36	0	1.00	36				36	
WB	2L	324		0.60	194				194	*
	TR	196	0	1.00	196				196	
NB	3T	1847		0.37	683	206	1.10	227	910	*
	R	365	365	1.00	0				227	
SB	2T+TR	1188	0	0.37	440	57	1.10	63	503	
Note:									CLV	1154
									v/c	0.745
									LOS	C
									Congestion Equiv.	
									1550	

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	Yes	25	36		1.00	36	57		0.00	0	0
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Northbound	Yes	194	365		0.00	442	324		0.60	194	365
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors				LOS	
		Number of Lanes	Left Turn LUF	Through LUF		GRADE	VALUE
		1	1.1	1.00		A	1000.00
		2	0.6	0.53		B	1150.00
		3	0.4	0.37		C	1300.00
		4		0.30		D	1450.00
		5		0.25		E	1600.00
						F	1800.00

2

Critical Lane Volume and Level of Service Calculations

Intersection: 02. Rockville Pike / Pike Center / Federal Plaza

Jurisdiction: Montgomery County, MD

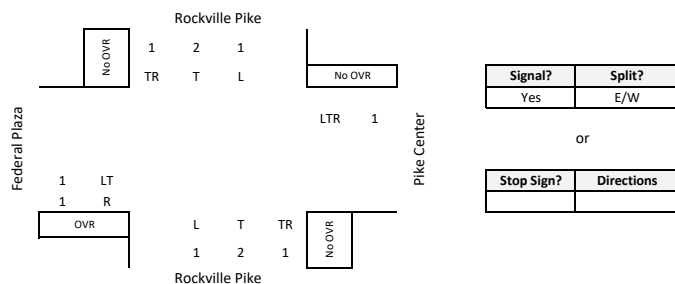
Scenario/Design Year: Existing Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LT R	18 54	54	1.00 1.00	18 0				18	*
WB	LTR	17		1.00	17				17	*
NB	2T+TR	866	0	0.37	320	30	1.10	33	353	
SB	2T+TR	1345	0	0.37	498	84	1.10	92	590	*
Note:									CLV	625
									v/c	0.403
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LT R	135 133	133	1.00 1.00	135 0				135	*
WB	LTR	65		1.00	65				65	*
NB	2T+TR	1723	0	0.37	638	26	1.10	29	667	
SB	2T+TR	1234	0	0.37	457	197	1.10	217	674	*
Note:									CLV	874
									v/c	0.564
									LOS	A

Right Turn Overlap

Approach	Excl. Right	Right Vol.			Adjacent Overlap Vol.				Overlap	
		AM	PM	LUF	AM	PM	LUF	AM	PM	
Eastbound	Yes	54	133	1.00	84	197	1.10	54	133	
Westbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	
Northbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	
Southbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

3

Critical Lane Volume and Level of Service Calculations

Intersection: **03. Rockville Pike / Gas Station**

Jurisdiction: **Montgomery County, MD**

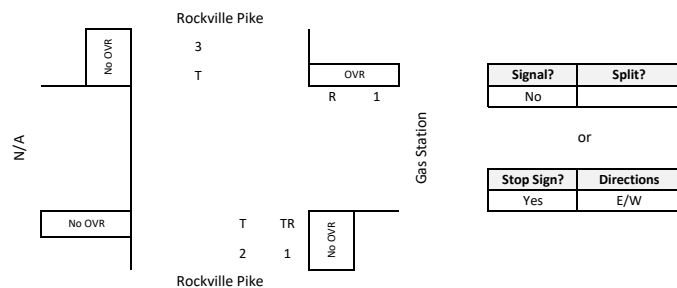
Scenario/Design Year: **Existing Conditions**

Computed by: **W+A**



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB										
WB	R	19	0	1.00	19				19	*
NB	2T+TR	879	0	0.37	325				325	
SB	3T	1394	0	0.37	516				516	*
Note:									CLV	535
									v/c	0.345
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB										
WB	R	58	0	1.00	58				58	*
NB	2T+TR	1865	0	0.37	690				690	*
SB	3T	1248	0	0.37	462				462	
Note:									CLV	748
									v/c	0.483
									LOS	A

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	Yes	19	58		1.00	0	0		0.00	0	0
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

4

Critical Lane Volume and Level of Service Calculations

Intersection: 04. Rockville Pike / Twinbrook Park / Rollins Ave

Jurisdiction: Montgomery County, MD

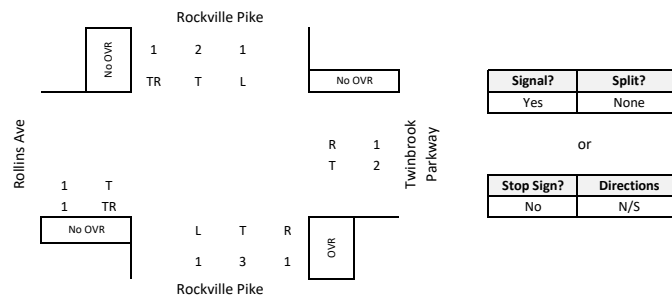
Scenario/Design Year: Existing Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	311	0	0.53	165				165	
WB	2T	311	0	0.53	165				165	*
	R	134	0	1.00	134				134	
NB	3T	748	0	0.37	277	184	1.10	202	479	
	R	106	0	1.00	106				308	
SB	2T+TR	1371	0	0.37	507	96	1.10	106	613	*
Note:									CLV	778
									v/c	0.502
									LOS	A
					Congestion Equiv.					
					1550					

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	460	0	0.53	244				244	*
WB	2T	308	0	0.53	163				163	
	R	148	0	1.00	148				148	
NB	3T	1523	0	0.37	564	154	1.10	169	733	*
	R	121	0	1.00	121				290	
SB	2T+TR	1255	0	0.37	464	100	1.10	110	574	
Note:									CLV	977
									v/c	0.630
									LOS	A
					Congestion Equiv.					
					1550					

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Northbound	Yes	106	121		1.00	0	0		0.00	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

5

Critical Lane Volume and Level of Service Calculations

Intersection: 05. Twinbrook Park / Chapman Ave

Jurisdiction: Montgomery County, MD

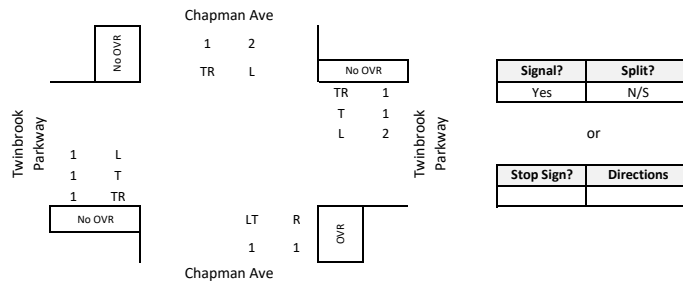
Scenario/Design Year: Existing Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	555		0.53	294	506	0.60	304	598	*
WB	T+TR	549		0.53	291	40	1.10	44	335	
NB	LT R	76		1.00	76				76	*
SB	TR	216	216	1.00	0					
	L	50		1.00	50				50	*
		84	0	0.60	50					
Note:									CLV	724
									v/c	0.467
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	820		0.53	435	463	0.60	278	713	*
WB	T+TR	724		0.53	384	68	1.10	75	459	
NB	LT R	164		1.00	164				164	*
SB	TR	564	278	1.00	286				286	*
	L	119		1.00	119				119	*
		215	0	0.60	129					
Note:									CLV	1128
									v/c	0.728
									LOS	B

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap			
		AM	PM		LUF	AM	PM		LUF	AM	PM		
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Northbound	Yes	216	564		1.00	506	463		0.60	216	278		
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

6

Critical Lane Volume and Level of Service Calculations

Intersection: 06. Chapman Ave / Site Drive North

Jurisdiction: Montgomery County, MD

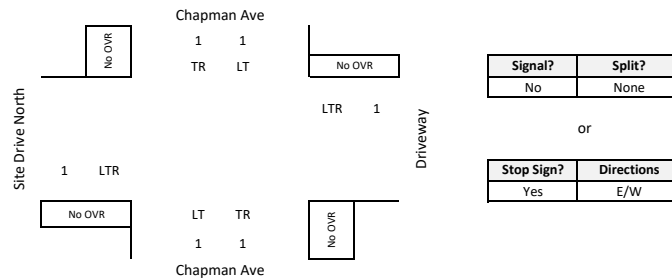
Scenario/Design Year: Existing Conditions

Computed by: W+A



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Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	0	0	1.00	0	1	1.10	1	1	
WB	LTR	5	0	1.00	5	0	1.10	0	5	*
NB	T+TR	338	0	0.53	179	5	1.10	6	185	
SB	T+TR	587	0	0.53	311	2	1.10	2	313	*
	L	2		1.10	6				8	
Note:									CLV	318
									v/c	0.205
									LOS	A
									1550	

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	5	0	1.00	5	4	1.10	4	9	
WB	LTR	12	0	1.00	12	6	1.10	7	19	*
NB	T+TR	705	0	0.53	374	5	1.10	6	380	*
SB	T+TR	593	0	0.53	314	3	1.10	3	317	
	L	3		1.10	6				9	
Note:									CLV	399
									v/c	0.257
									LOS	A
									1550	

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap			
		AM	PM		LUF	AM	PM		LUF	AM	PM		
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

Critical Lane Volume and Level of Service Calculations

Intersection: 07. Chapman Ave / Rollins Ave

Jurisdiction: Montgomery County, MD

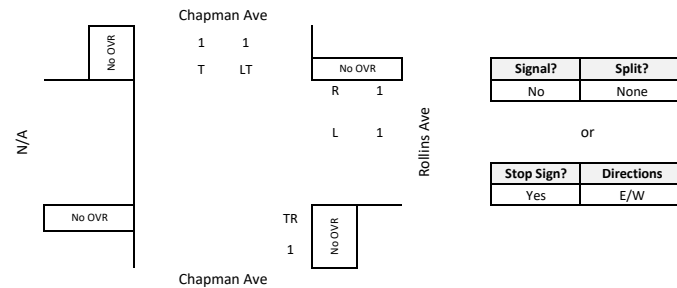
Scenario/Design Year: Existing Conditions

Computed by: W+A



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Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB										
WB	L R	35 36	0	1.10 1.00	39 36				39 36	*
NB	TR	375	0	1.00	375	36	1.10	40	415 40	*
SB	LT+T	546	0	0.53	289	0	1.10	0	289	
Note:									CLV	454
									v/c	0.293
									LOS	A
					Congestion Equiv.					
					1550					

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB									0 0	
WB	L R	71 97	0	1.10 1.00	78 97				78 97	*
NB	TR	679	0	1.00	679	45	1.10	50	729 50	*
SB	LT+T	597	0	0.53	316	0	1.10	0	316 0	
Note:									CLV	826
									v/c	0.533
									LOS	A
					Congestion Equiv.					
					1550					

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap			
		AM	PM		LUF	AM	PM		LUF	AM	PM		
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		

Montgomery County LATR

		Lane Use Factors				LOS	
		Number of Lanes	Left Turn LUF	Through LUF		GRADE	VALUE
		1	1.1	1.00		A	1000.00
		2	0.6	0.53		B	1150.00
		3	0.4	0.37		C	1300.00
		4		0.30		D	1450.00
		5		0.25		E	1600.00
						F	1800.00

8

Critical Lane Volume and Level of Service Calculations

Intersection: 08. Chapman Ave / Site Drive South

Jurisdiction: Montgomery County, MD

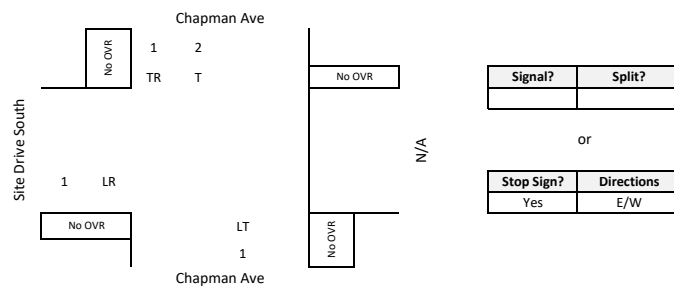
Scenario/Design Year: Existing Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LR	1	0	1.10	1				1	*
WB										
NB	LT	342	0	1.00	342				342	*
SB	T+TR	550	0	0.37	204	1	1.10	1	205	
Note:									CLV	343
									v/c	0.221
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LR	1	0	1.10	1				1	*
WB									0	
NB	LT	674	0	1.00	674				674	*
SB	T+TR	623	0	0.37	231	0		0	231	
Note:									CLV	675
									v/c	0.435
									LOS	A

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap		
		AM	PM		LUF	AM	PM		LUF	AM	PM	
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

9

Critical Lane Volume and Level of Service Calculations

Intersection: 09. Chapman Ave / Bou Ave

Jurisdiction: Montgomery County, MD

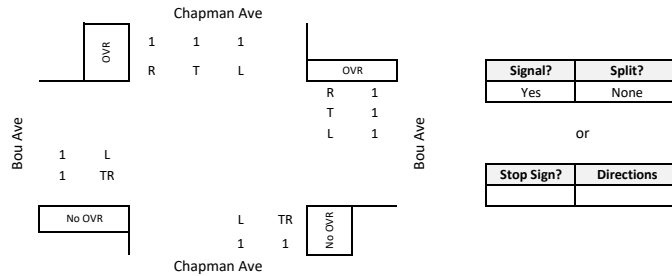
Scenario/Design Year: Existing Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	153	0	1.00	153	6	1.10	7	160	
WB	T	91		1.00	91	186	1.10	205	296	*
	R	116	110	1.00	6				211	
NB	TR	45	0	1.00	45	100	1.10	110	155	
SB	T	79		1.00	79	4	1.10	4	83	*
	R	368	205	1.10	179				183	
Note:									CLV	479
									v/c	0.309
									LOS	A
					Congestion Equiv.					
					1550					

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	295	0	1.00	295	15	1.10	17	312	
									17	
WB	T	167		1.00	167	317	1.10	349	516	*
	R	230	227	1.00	3				352	
NB	TR	169	0	1.00	169	206	1.10	227	396	*
									227	
SB	T	127		1.00	127	17	1.10	19	146	
	R	329	329	1.10	0				19	
Note:									CLV	912
									v/c	0.588
									LOS	A
					Congestion Equiv.					
					1550					

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap		
		AM	PM		LUF	AM	PM		LUF	AM	PM	
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Westbound	Yes	116	230	1.00	100	206		1.10	110	227		
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Southbound	Yes	368	329	1.00	186	317		1.10	205	329		

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

10

Critical Lane Volume and Level of Service Calculations

Intersection: 10. Bou Ave / Site Drive

Jurisdiction: Montgomery County, MD

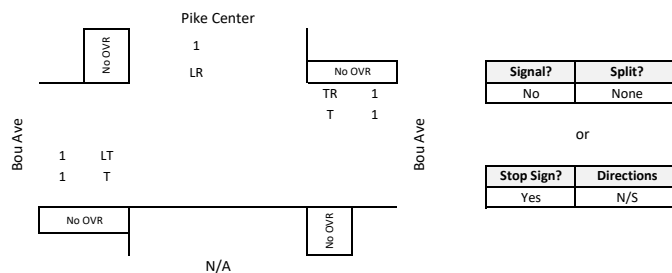
Scenario/Design Year: Existing Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	2T	317	0	1.00	317	0	1.10	0	317	*
WB	T+TR	498	0	0.53	264	10	1.10	11	275	
NB										
SB	LR	24	0	1.10	26				26	*
Note:									CLV	343
									v/c	0.221
									LOS	A
					1550					

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	2T	516	0	1.00	516	0	1.10	0	516	*
WB	T+TR	506	0	0.53	268	20	1.10	22	290	
NB										
SB	LR	74	0	1.10	81				81	*
Note:									CLV	597
									v/c	0.385
									LOS	A
					1550					

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

11

Critical Lane Volume and Level of Service Calculations

Intersection: 11. Rollins Ave / East Jefferson St

Jurisdiction: Montgomery County, MD

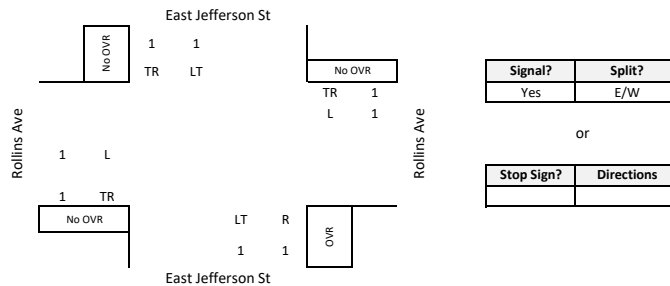
Scenario/Design Year: Existing Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	88	0	1.00	88				88	*
WB	LTR	342	0	1.00	342				342	*
NB	LT R	252 259	0	1.10 1.00	277 259	20	1.10	22	299 281	*
SB	LTR	256	0	0.53	136	9	1.10	10	146	
Note:									CLV	729
									v/c	0.470
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	80	0	1.00	80				80	*
WB	LTR	474	0	1.00	474				474	*
NB	LT R	484 373	0	1.10 1.00	532 373	18	1.10	20	552 393	*
SB	LTR	299	0	0.53	158	7	1.10	8	166	
Note:									CLV	1106
									v/c	0.714
									LOS	B

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap			
		AM	PM		LUF	AM	PM		LUF	AM	PM		
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Northbound	Yes	259	373		1.00	272	331		0.00	0	0		
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

12

Critical Lane Volume and Level of Service Calculations

Intersection: 12. Rockville Pike / Halpine Rd

Jurisdiction: Montgomery County, MD

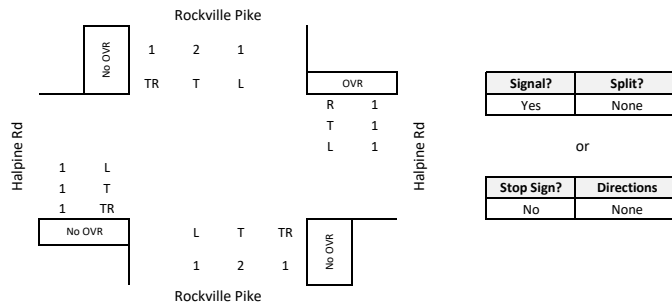
Scenario/Design Year: Existing Conditions

Computed by: W+A



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Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	108	0	0.53	57	7	1.10	8	65	*
WB	LTR	102	67	0.37	13	42	1.10	46	46	
NB	2T+TR	811	0	0.37	300	63	1.10	69	369	
SB	2T+TR	1364	0	0.37	505	79	1.10	87	592	*
Note:									CLV	657
									v/c	0.424
									LOS	A
					Congestion Equiv.					
					1550					

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	153	0	0.53	81	18	1.10	20	101	
WB	LTR	215	109	0.37	39	98	1.10	108	147	*
NB	2T+TR	1616	0	0.37	598	99	1.10	109	707	
SB	2T+TR	1387	0	0.37	513	197	1.10	217	730	*
Note:									CLV	877
									v/c	0.566
									LOS	A
					Congestion Equiv.					
					1550					

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	Yes	67	127		1.00	63	99		1.10	67	109
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

13

Critical Lane Volume and Level of Service Calculations

Intersection: 13. Twinbrook Park / Parklawn Dr

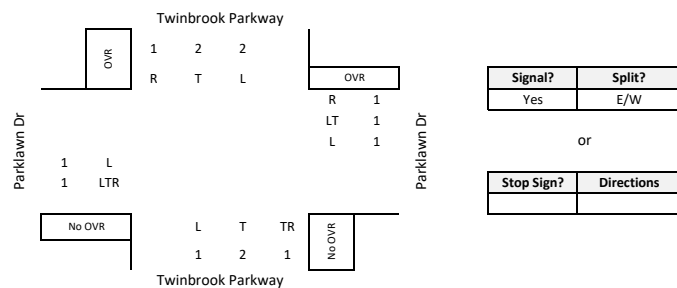
Jurisdiction: Montgomery County, MD

Scenario/Design Year: Existing Conditions

Computed by: W+A



Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	111	0	0.60	67				67	*
WB	LT R	182		0.60	109				109	*
NB	2T+TR	796	0	0.37	295	179	0.60	107	402	
SB	T R	765		0.53	405	50	1.10	55	460	*
		63	40	1.00	23				23	
Note:									CLV	636
									v/c	0.410
									LOS	A
					Congestion Equiv.					
					1550					

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	144	0	0.60	86				86	*
WB	LT R	343		0.60	206				206	*
NB	2T+TR	1428	0	0.37	528	133	0.60	80	608	*
SB	T R	734		0.53	389	31	1.10	34	423	
		32	32	1.00	0				34	
Note:									CLV	900
									v/c	0.581
									LOS	A
					Congestion Equiv.					
					1550					

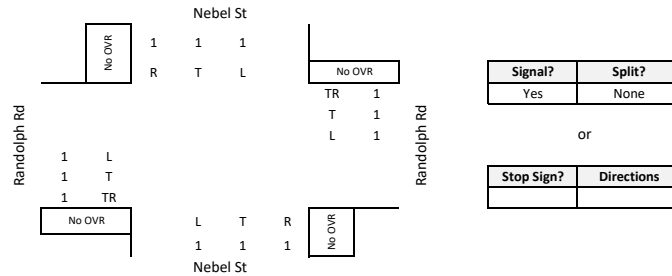
Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	Yes	124	272		1.00	179	133		0.60	107	80
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	Yes	63	32		1.00	36	44		1.10	40	32

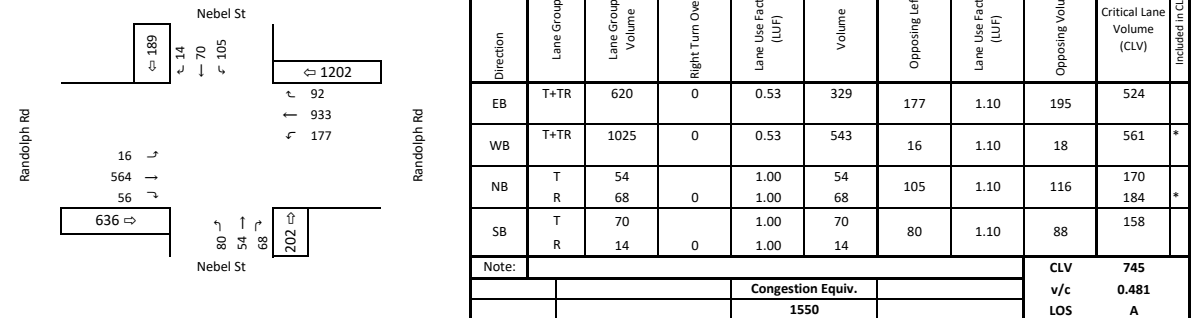
Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

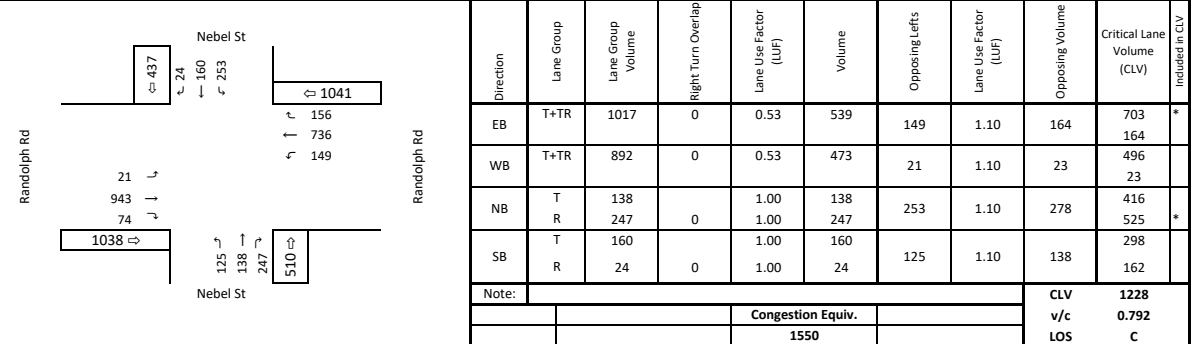
Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

[illegible]

PM Peak Hour Critical Lane Volume Analysis



Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap			
		AM	PM		LUF	AM	PM		LUF	AM	PM		
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

17

Critical Lane Volume and Level of Service Calculations

Intersection: 17. Chapman Ave / Thompson Ave

Jurisdiction: Montgomery County, MD

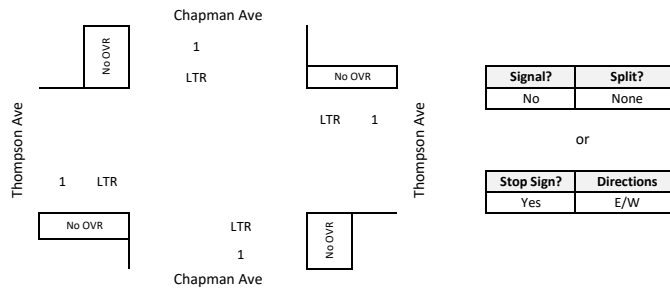
Scenario/Design Year: Existing Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	42	0	1.00	42				42	
WB	LTR	47	0	1.00	47				47	*
NB	LTR	186	0	1.00	186				186	*
SB	LTR	160	0	1.00	160				160	
Note:									CLV	233
									v/c	0.150
									LOS	A
									Congestion Equiv.	
									1550	

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	165	0	1.00	165				165	*
WB	LTR	26	0	1.00	26				26	
NB	LTR	330	0	1.00	330				330	*
SB	LTR	315	0	1.00	315				315	
Note:									CLV	495
									v/c	0.319
									LOS	A
									Congestion Equiv.	
									1550	

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

Diagram illustrating the intersection of Randolph Rd and Chapman Ave. The intersection is marked with a 'Signal?' and 'Split?' table. The 'Signal?' table has 'Yes' and 'N/S' (Not Signalized) options. The 'Split?' table has 'Stop Sign?' and 'Directions' options. The 'Signal?' table is a 2x2 grid. The 'Split?' table is a 2x2 grid. The 'Signal?' table is a 2x2 grid. The 'Split?' table is a 2x2 grid.

Signal?	Split?
Yes	N/S

Stop Sign?	Directions

		<table border="1"> <thead> <tr> <th>Direction</th> <th>Lane Group</th> <th>Lane Group Volume</th> <th>Right Turn Overlap</th> <th>Lane Use Factor (LUF)</th> <th>Volume</th> <th>Opposing Lefts</th> <th>Lane Use Factor (LUF)</th> <th>Opposing Volume</th> <th>Critical Lane Volume (CLV)</th> <th>Included in CLV</th> </tr> </thead> <tbody> <tr> <td>EB</td> <td>T+TR</td> <td>673</td> <td>0</td> <td>0.53</td> <td>357</td> <td>9</td> <td>1.10</td> <td>10</td> <td>367</td> <td></td> </tr> <tr> <td>WB</td> <td>T R</td> <td>1014 66</td> <td>30</td> <td>0.53 1.00</td> <td>537 36</td> <td>77</td> <td>1.10</td> <td>85</td> <td>622 121</td> <td>*</td> </tr> <tr> <td>NB</td> <td>LTR</td> <td>21</td> <td>0</td> <td>1.00</td> <td>21</td> <td></td> <td></td> <td></td> <td>21</td> <td>*</td> </tr> <tr> <td>SB</td> <td>LTR</td> <td>58</td> <td>0</td> <td>0.60</td> <td>35</td> <td></td> <td></td> <td></td> <td>35</td> <td>*</td> </tr> <tr> <td colspan="8">Note:</td> <td>CLV</td> <td>678</td> <td></td> </tr> <tr> <td colspan="4"></td> <td colspan="2">Congestion Equiv.</td> <td colspan="2"></td> <td>v/c</td> <td>0.437</td> <td></td> </tr> <tr> <td colspan="4"></td> <td colspan="2">1550</td> <td colspan="2"></td> <td>LOS</td> <td>A</td> <td></td> </tr> </tbody> </table>	Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV	EB	T+TR	673	0	0.53	357	9	1.10	10	367		WB	T R	1014 66	30	0.53 1.00	537 36	77	1.10	85	622 121	*	NB	LTR	21	0	1.00	21				21	*	SB	LTR	58	0	0.60	35				35	*	Note:								CLV	678						Congestion Equiv.				v/c	0.437						1550				LOS	A	
Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV																																																																																
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SB	LTR	58	0	0.60	35				35	*																																																																																
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				Congestion Equiv.				v/c	0.437																																																																																	
				1550				LOS	A																																																																																	

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		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

	<table border="1"> <thead> <tr> <th>Direction</th> <th>Lane Group</th> <th>Lane Group Volume</th> <th>Right Turn Overlap</th> <th>Lane Use Factor (LUF)</th> <th>Volume</th> <th>Opposing Lefts</th> <th>Lane Use Factor (LUF)</th> <th>Opposing Volume</th> <th>Critical Lane Volume (CLV)</th> <th>Included in CLV</th> </tr> </thead> <tbody> <tr> <td>EB</td> <td>T+TR</td> <td>933</td> <td>0</td> <td>0.53</td> <td>494</td> <td>14</td> <td>1.10</td> <td>15</td> <td>509</td> <td></td> </tr> <tr> <td>WB</td> <td>T R</td> <td>700 127</td> <td>127</td> <td>0.53 1.00</td> <td>371 0</td> <td>144</td> <td>1.10</td> <td>158</td> <td>529 158</td> <td>*</td> </tr> <tr> <td>NB</td> <td>LTR</td> <td>94</td> <td>0</td> <td>1.00</td> <td>94</td> <td></td> <td></td> <td></td> <td>94 0</td> <td>*</td> </tr> <tr> <td>SB</td> <td>LTR</td> <td>299</td> <td>0</td> <td>0.60</td> <td>179</td> <td></td> <td></td> <td></td> <td>179 0</td> <td>*</td> </tr> <tr> <td colspan="8">Note:</td> <td>CLV</td> <td>802</td> <td></td> </tr> <tr> <td colspan="8"></td> <td>v/c</td> <td>0.517</td> <td></td> </tr> <tr> <td colspan="8"></td> <td>LOS</td> <td>A</td> <td></td> </tr> </tbody> </table>											Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV	EB	T+TR	933	0	0.53	494	14	1.10	15	509		WB	T R	700 127	127	0.53 1.00	371 0	144	1.10	158	529 158	*	NB	LTR	94	0	1.00	94				94 0	*	SB	LTR	299	0	0.60	179				179 0	*	Note:								CLV	802										v/c	0.517										LOS	A	
	Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV																																																																																								
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WB	T R	700 127	127	0.53 1.00	371 0	144	1.10	158	529 158	*																																																																																									
NB	LTR	94	0	1.00	94				94 0	*																																																																																									
SB	LTR	299	0	0.60	179				179 0	*																																																																																									
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								v/c	0.517																																																																																										
								LOS	A																																																																																										

15

Critical Lane Volume and Level of Service Calculations

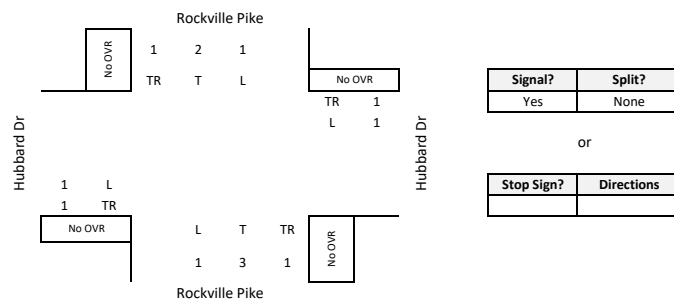
Intersection: 15. Rockville Pike / Hubbard Dr

Jurisdiction: Montgomery County, MD
 Scenario/Design Year: Existing Conditions
 Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	20	0	1.00	20	77	1.10	85	105	*
WB	TR	66	0	1.00	66	20	1.10	22	88	
NB	3T+TR	1215	0	0.30	365	48	1.10	53	418	
SB	2T+TR	1818	0	0.37	673	25	1.10	28	701	*
Note:									CLV	806
									v/c	0.520
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	44	0	1.00	44	186	1.10	205	249	
WB	TR	151	0	1.00	151	40	1.10	44	195	*
NB	3T+TR	2191	0	0.30	657	161	1.10	177	834	*
SB	2T+TR	1484	0	0.37	549	18	1.10	20	569	
Note:									CLV	1083
									v/c	0.699
									LOS	B

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

1

Critical Lane Volume and Level of Service Calculations

Intersection: 01. Rockville Pike / Bou Ave

Jurisdiction: Montgomery County, MD

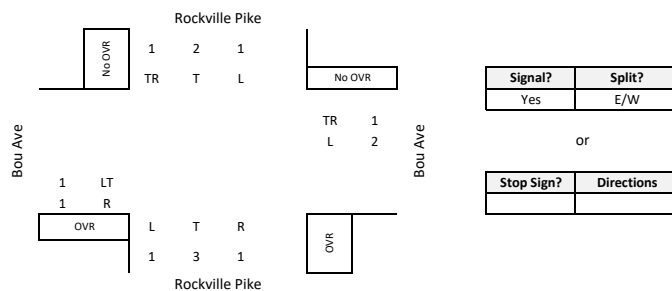
Scenario/Design Year: Background Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LT	35		1.00	35				35	*
	R	25	0	1.00	25				25	
WB	2L	467		0.60	280				280	*
	TR	76	0	1.00	76				76	
NB	3T	1646		0.37	609	124	1.10	136	745	
	R	177	177	1.00	0				136	
SB	2T+TR	2083	0	0.37	771	36	1.10	40	811	*
Note:									CLV	1126
									v/c	0.726
									LOS	B
									Congestion Equiv.	
									1550	

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LT	48		1.00	48				48	*
	R	36	0	1.00	36				36	
WB	2L	329		0.60	197				197	*
	TR	196	0	1.00	196				196	
NB	3T	2470		0.37	914	206	1.10	227	1141	*
	R	391	391	1.00	0				227	
SB	2T+TR	1733	0	0.37	641	57	1.10	63	704	
Note:									CLV	1386
									v/c	0.894
									LOS	D
									Congestion Equiv.	
									1550	

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	Yes	25	36		1.00	36	57		0.00	0	0
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Northbound	Yes	177	391		0.00	467	329		0.60	177	391
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors				LOS	
		Number of Lanes	Left Turn LUF	Through LUF		GRADE	VALUE
		1	1.1	1.00		A	1000.00
		2	0.6	0.53		B	1150.00
		3	0.4	0.37		C	1300.00
		4		0.30		D	1450.00
		5		0.25		E	1600.00
						F	1800.00

2

Critical Lane Volume and Level of Service Calculations

Intersection: 02. Rockville Pike / Pike Center / Federal Plaza

Jurisdiction: Montgomery County, MD

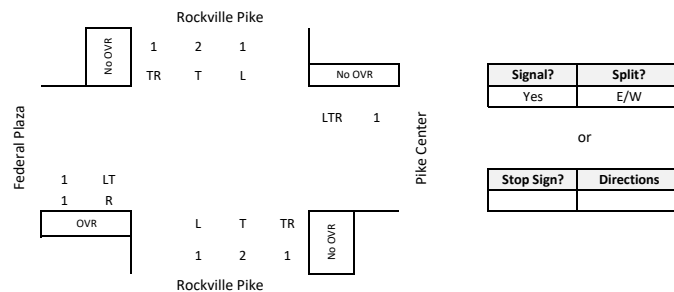
Scenario/Design Year: Background Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LT R	18 54	54	1.00 1.00	18 0				18	*
WB	LTR	17	0	1.00	17				17	*
NB	2T+TR	1555	0	0.37	575	30	1.10	33	608	
SB	2T+TR	2107	0	0.37	780	84	1.10	92	872	*
Note:									CLV	907
									v/c	0.585
									LOS	A
									Congestion Equiv.	
									1550	

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LT R	135 133	133	1.00 1.00	135 0				135	*
WB	LTR	65	0	1.00	65				65	*
NB	2T+TR	2346	0	0.37	868	26	1.10	29	897	*
SB	2T+TR	1779	0	0.37	658	197	1.10	217	875	
Note:									CLV	1097
									v/c	0.708
									LOS	B
									Congestion Equiv.	
									1550	

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap			
		AM	PM		LUF	AM	PM		LUF	AM	PM		
Eastbound	Yes	54	133		1.00	84	197		1.10	54	133		
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

3

Critical Lane Volume and Level of Service Calculations

Intersection: 03. Rockville Pike / Gas Station

Jurisdiction: Montgomery County, MD

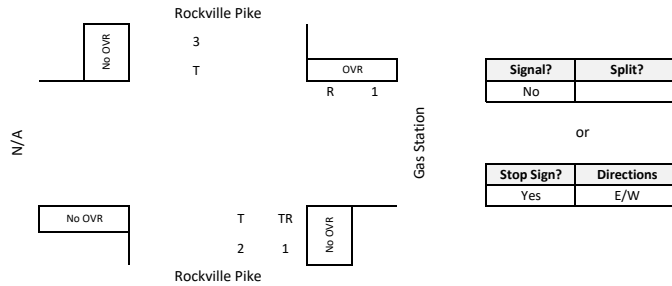
Scenario/Design Year: Background Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB										
WB	R	19	0	1.00	19				19	*
NB	2T+TR	1568	0	0.37	580				580	
SB	3T	2156	0	0.37	798				798	*
Note:									CLV	817
									v/c	0.527
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB										
WB	R	58	0	1.00	58				58	*
NB	2T+TR	2488	0	0.37	921				921	*
SB	3T	1793	0	0.37	663				663	
Note:									CLV	979
									v/c	0.632
									LOS	A

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	Yes	19	58		1.00	0	0		0.00	0	0
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

4

Critical Lane Volume and Level of Service Calculations

Intersection: 04. Rockville Pike / Twinbrook Park / Rollins Ave

Jurisdiction: Montgomery County, MD

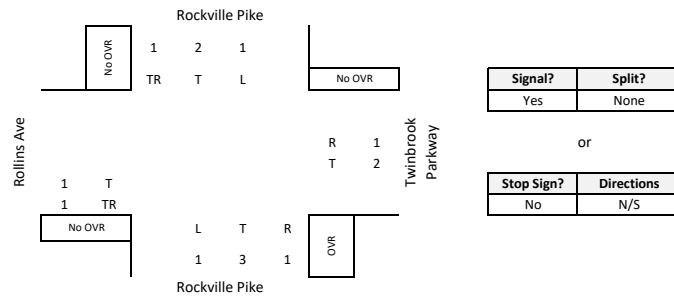
Scenario/Design Year: Background Conditions

Computed by: W+A



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Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	392	0	0.53	208				208	*
WB	2T R	312 186	0	0.53 1.00	165 186				165 186	
NB	3T R	1430 106	0	0.37 1.00	529 106	200	1.10	220	749 326	
SB	2T+TR	2020	0	0.37	747	103	1.10	113	860	*
Note:									CLV	1068
									v/c	0.689
									LOS	B

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	483	0	0.53	256				256	*
WB	2T R	314 171	0	0.53 1.00	166 171				166 171	
NB	3T R	2106 121	0	0.37 1.00	779 121	204	1.10	224	1003 345	*
SB	2T+TR	1793	0	0.37	663	140	1.10	154	817	
Note:									CLV	1259
									v/c	0.812
									LOS	C

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Northbound	Yes	106	121		1.00	0	0		0.00	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

5

Critical Lane Volume and Level of Service Calculations

Intersection: 05. Twinbrook Park / Chapman Ave

Jurisdiction: Montgomery County, MD

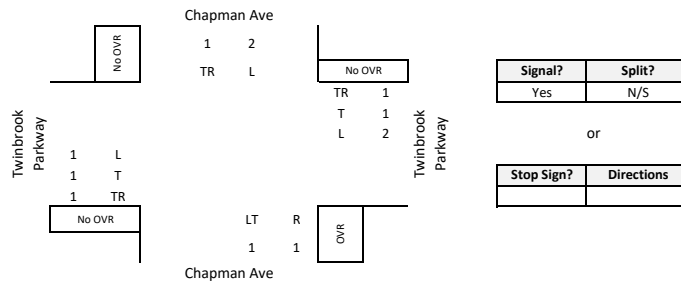
Scenario/Design Year: Background Conditions

Computed by: W+A



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Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	582		0.53	308	531	0.60	319	627	*
WB	T+TR	563		0.53	298	40	1.10	44	342	
NB	LT R	115 197	197	1.00 1.00	115 0				115	*
SB	TR L	50 84	0	1.00 0.60	50 50				50	*
Note:									CLV	792
									v/c	0.511
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	873		0.53	463	469	0.60	281	744	*
WB	T+TR	727		0.53	385	68	1.10	75	460	
NB	LT R	190 592	281	1.00 1.00	190 311				311	*
SB	TR L	119 215	0	1.00 0.60	119 129				129	*
Note:									CLV	1184
									v/c	0.764
									LOS	C

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap			
		AM	PM		LUF	AM	PM		LUF	AM	PM		
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Northbound	Yes	197	592		1.00	531	469		0.60	197	281		
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

6

Critical Lane Volume and Level of Service Calculations

Intersection: 06. Chapman Ave / Site Drive North

Jurisdiction: Montgomery County, MD

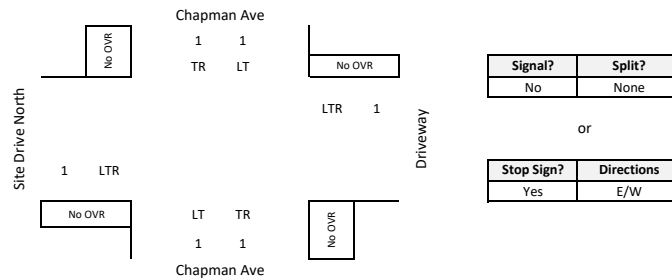
Scenario/Design Year: Background Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	0	0	1.00	0	1	1.10	1	1	
WB	LTR	5	0	1.00	5	0	1.10	0	5	*
NB	T+TR	358	0	0.53	190	5	1.10	6	196	
SB	T+TR	649	0	0.53	344	2	1.10	2	346	*
Note:									CLV	351
									v/c	0.226
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	5	0	1.00	5	4	1.10	4	9	
WB	LTR	12	0	1.00	12	6	1.10	7	19	*
NB	T+TR	759	0	0.53	402	5	1.10	6	408	*
SB	T+TR	638	0	0.53	338	3	1.10	3	341	
Note:									CLV	427
									v/c	0.275
									LOS	A

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

Critical Lane Volume and Level of Service Calculations

Intersection: 07. Chapman Ave / Rollins Ave

Jurisdiction: Montgomery County, MD

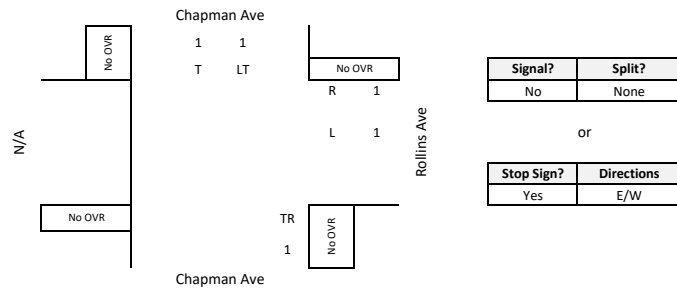
Scenario/Design Year: Background Conditions

Computed by: W+A



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Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB										
WB	L R	35 36	0	1.10 1.00	39 36				39 36	*
NB	TR	395	0	1.00	395	36	1.10	40	435 40	*
SB	LT+T	608	0	0.53	322	0	1.10	0	322	
Note:									CLV	474
									v/c	0.306
									LOS	A
					1550					

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB									0 0	
WB	L R	71 97	0	1.10 1.00	78 97				78 97	*
NB	TR	733	0	1.00	733	45	1.10	50	783 50	*
SB	LT+T	642	0	0.53	340	0	1.10	0	340 0	
Note:									CLV	880
									v/c	0.568
									LOS	A
					1550					

Right Turn Overlap

Approach	Excl. Right	Right Vol.			Adjacent Overlap Vol.			Overlap		
		AM	PM	LUF	AM	PM	LUF	AM	PM	LUF
Eastbound	No	n/a	n/a		n/a	n/a		0	0	
Westbound	No	n/a	n/a		n/a	n/a		0	0	
Northbound	No	n/a	n/a		n/a	n/a		0	0	
Southbound	No	n/a	n/a		n/a	n/a		0	0	

Montgomery County LATR

		Lane Use Factors				LOS	
		Number of Lanes	Left Turn LUF	Through LUF		GRADE	VALUE
		1	1.1	1.00		A	1000.00
		2	0.6	0.53		B	1150.00
		3	0.4	0.37		C	1300.00
		4		0.30		D	1450.00
		5		0.25		E	1600.00
						F	1800.00

**Critical Lane Volume
and
Level of Service Calculations**

Intersection: **08. Chapman Ave / Site Drive South**

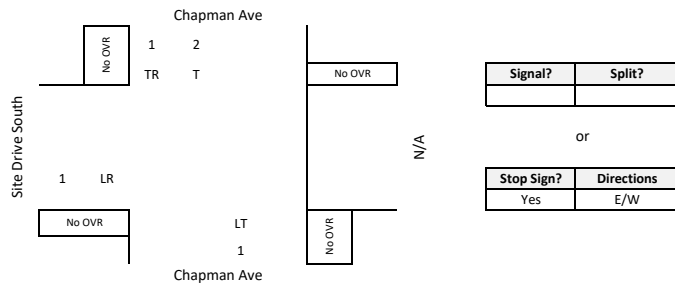
Jurisdiction: **Montgomery County, MD**

Scenario/Design Year: **Background Conditions**

Computed by: **W+A**



Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LR	1	0	1.10	1				1	*
WB										
NB	LT	362	0	1.00	362				362	*
SB	T+TR	612		0.37	226	1	1.10	1	227	
Note:									CLV	363
									v/c	0.234
									LOS	A

Approach	Excl. Right	Right Vol.	Adj. Overlap Vol.	Overlap
Eastbound	No	n/a	n/a	0
Westbound	No	n/a	n/a	0
Northbound	No	n/a	n/a	0
Southbound	No	n/a	n/a	0

Right Turn Overlap

Approach	Excl. Right	Right Vol.	Adj. Overlap Vol.	Overlap
Eastbound	No	n/a	n/a	0
Westbound	No	n/a	n/a	0
Northbound	No	n/a	n/a	0
Southbound	No	n/a	n/a	0

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LR	1	0	1.10	1				1	*
WB									0	
NB	LT	728	0	1.00	728				728	*
SB	T+TR	712		0.37	263	0		0	263	
Note:									CLV	729
									v/c	0.470
									LOS	A

Montgomery County LATR

Approach	Excl. Right	Right Vol.	Adj. Overlap Vol.	Overlap
Eastbound	No	n/a	n/a	0
Westbound	No	n/a	n/a	0
Northbound	No	n/a	n/a	0
Southbound	No	n/a	n/a	0

[illegible]

	Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)
	EB	TR	153	0	1.00	153	6	1.10	7	160
	WB	T	91	151	1.00	91	169	1.10	186	277
		R	153		1.00	2				188
	NB	TR	45	0	1.00	45	137	1.10	151	196
SB	T	79	186	1.00	79	4	1.10	4	83	
	R	393		1.10	228				232	
Note:									CLV	509
	Congestion Equiv.								v/c	0.328
	1550								LOS	A

[illegible]

Approach	Excl. Right	Right Vol.			Adjacent Overlap Vol.			Overlap		
		AM	PM	LUF	AM	PM	LUF	AM	PM	
Eastbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	
Westbound	Yes	153	258	1.00	137	246	1.10	151	258	
Northbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	
Southbound	Yes	393	334	1.00	169	343	1.10	186	334	

			<table border="1"> <thead> <tr> <th>Direction</th> <th>Lane Group</th> <th>Lane Group Volume</th> <th>Right Turn Overlap</th> <th>Lane Use Factor (LUF)</th> <th>Volume</th> <th>Opposing Lefts</th> <th>Lane Use Factor (LUF)</th> <th>Opposing Volume</th> <th>Critical Lane Volume (CLV)</th> </tr> </thead> <tbody> <tr> <td>EB</td> <td>TR</td> <td>295</td> <td>0</td> <td>1.00</td> <td>295</td> <td>15</td> <td>1.10</td> <td>17</td> <td>312 17</td> </tr> <tr> <td rowspan="2">WB</td> <td>T</td> <td>167</td> <td rowspan="2">258</td> <td>1.00</td> <td>167</td> <td rowspan="2">343</td> <td rowspan="2">1.10</td> <td rowspan="2">377</td> <td>544</td> </tr> <tr> <td>R</td> <td>258</td> <td>0</td> <td>377</td> </tr> <tr> <td>NB</td> <td>TR</td> <td>169</td> <td>0</td> <td>1.00</td> <td>169</td> <td>246</td> <td>1.10</td> <td>271</td> <td>440 271</td> </tr> <tr> <td rowspan="2">SB</td> <td>T</td> <td>127</td> <td rowspan="2">334</td> <td>1.00</td> <td>127</td> <td rowspan="2">17</td> <td rowspan="2">1.10</td> <td rowspan="2">19</td> <td>146</td> </tr> <tr> <td>R</td> <td>334</td> <td>0</td> <td>19</td> </tr> <tr> <td colspan="8">Note:</td> <td>CLV</td> <td>984</td> </tr> <tr> <td colspan="6">Congestion Equiv.</td> <td>v/c</td> <td>0.635</td> </tr> <tr> <td colspan="6">1550</td> <td>LOS</td> <td>A</td> </tr> </tbody> </table>										Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	EB	TR	295	0	1.00	295	15	1.10	17	312 17	WB	T	167	258	1.00	167	343	1.10	377	544	R	258	0	377	NB	TR	169	0	1.00	169	246	1.10	271	440 271	SB	T	127	334	1.00	127	17	1.10	19	146	R	334	0	19	Note:								CLV	984	Congestion Equiv.						v/c	0.635	1550						LOS	A
Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)																																																																																							
EB	TR	295	0	1.00	295	15	1.10	17	312 17																																																																																							
WB	T	167	258	1.00	167	343	1.10	377	544																																																																																							
	R	258		0	377																																																																																											
NB	TR	169	0	1.00	169	246	1.10	271	440 271																																																																																							
SB	T	127	334	1.00	127	17	1.10	19	146																																																																																							
	R	334		0	19																																																																																											
Note:								CLV	984																																																																																							
Congestion Equiv.						v/c	0.635																																																																																									
1550						LOS	A																																																																																									

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

10

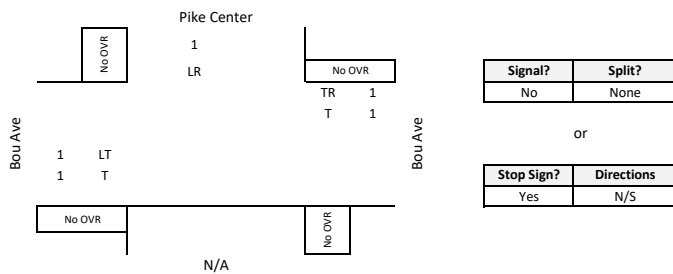
**Critical Lane Volume
and
Level of Service Calculations**

Intersection: 10. Bou Ave / Site Drive

Jurisdiction: Montgomery County, MD
 Scenario/Design Year: Background Conditions
 Computed by: W+A



Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	2T	300	0	1.00	300	0	1.10	0	300	*
WB	T+TR	523	0	0.53	277	10	1.10	11	288	
NB										
SB	LR	24	0	1.10	26				26	*
Note:									CLV	326
									v/c	0.210
									LOS	A
					1550					

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	2T	542	0	1.00	542	0	1.10	0	542	*
WB	T+TR	511	0	0.53	271	20	1.10	22	293	
NB										
SB	LR	74	0	1.10	81				81	*
Note:									CLV	623
									v/c	0.402
									LOS	A
					1550					

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

11

**Critical Lane Volume
and
Level of Service Calculations**

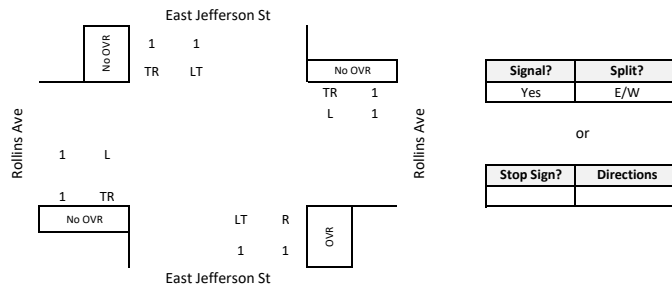
Intersection: **11. Rollins Ave / East Jefferson St**

Jurisdiction: **Montgomery County, MD**
 Scenario/Design Year: **Background Conditions**
 Computed by: **W+A**



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	88	0	1.00	88				88	*
WB	LTR	300	0	1.00	300				300	*
NB	LT R	252 340	0	1.10 1.00	277 340	20	1.10	22	299 362	*
SB	LTR	256	0	0.53	136	9	1.10	10	146	
Note:									CLV	750
									v/c	0.484
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	80	0	1.00	80				80	*
WB	LTR	533	0	1.00	533				533	*
NB	LT R	484 396	0	1.10 1.00	532 396	18	1.10	20	552 416	*
SB	LTR	299	0	0.53	158	7	1.10	8	166	
Note:									CLV	1165
									v/c	0.752
									LOS	C

Right Turn Overlap

Approach	Excl. Right	Right Vol.			Adjacent Overlap Vol.				Overlap		
		AM	PM	LUF	AM	PM	LUF	AM	PM	LUF	
Eastbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	0	
Westbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	0	
Northbound	Yes	340	396	1.00	230	390	0.00	0	0	0	
Southbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	0	

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

12

**Critical Lane Volume
and
Level of Service Calculations**

Intersection: **12. Rockville Pike / Halpine Rd**

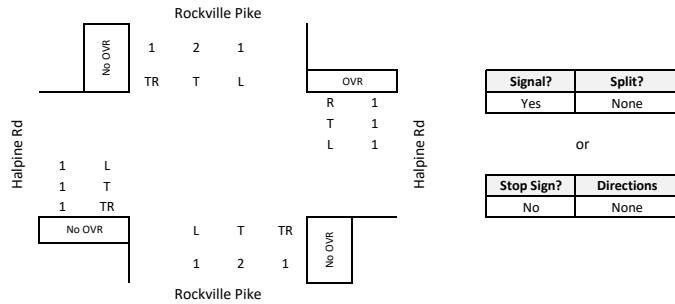
Jurisdiction: **Montgomery County, MD**

Scenario/Design Year: **Background Conditions**

Computed by: **W+A**



Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	108	0	0.53	57	176	1.10	194	251	*
WB	LTR	271	67	0.37	75	42	1.10	46	46	
NB	2T+TR	1545	0	0.37	572	63	1.10	69	641	
SB	2T+TR	1853	0	0.37	686	79	1.10	87	773	*
Note:									CLV	1024
Congestion Equiv.									v/c	0.661
1550									LOS	B

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	153	0	0.53	81	210	1.10	231	312	*
WB	LTR	407	109	0.37	110	98	1.10	108	218	
NB	2T+TR	2222	0	0.37	822	99	1.10	109	931	*
SB	2T+TR	1783	0	0.37	660	197	1.10	217	877	
Note:									CLV	1243
Congestion Equiv.									v/c	0.802
1550									LOS	C

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	Yes	67	127		1.00	63	99		1.10	67	109
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

13

**Critical Lane Volume
and
Level of Service Calculations**

Intersection: **13. Twinbrook Park / Parklawn Dr**

Jurisdiction: **Montgomery County, MD**

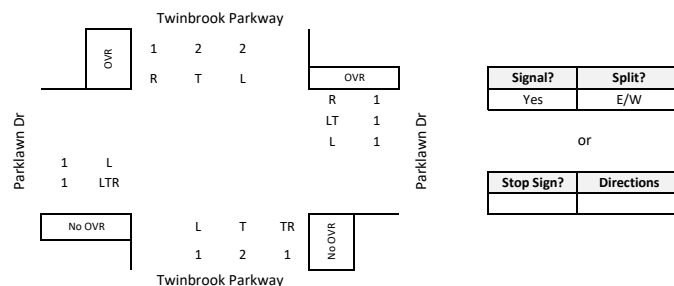
Scenario/Design Year: **Background Conditions**

Computed by: **W+A**



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	111	0	0.60	67				67	*
WB	LT R	182		0.60	109				109	*
NB	2T+TR	767	0	0.37	284	179	0.60	107	391	
SB	T R	804		0.53	426				481	*
		63	40	1.00	23	50	1.10	55	23	
Note:									CLV	657
									v/c	0.424
									LOS	A
					Congestion Equiv.					
					1550					

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	144	0	0.60	86				86	*
WB	LT R	343		0.60	206				206	*
NB	2T+TR	1470	0	0.37	544	133	0.60	80	624	*
SB	T R	743		0.53	394				428	
		32	32	1.00	0	31	1.10	34	34	
Note:									CLV	916
									v/c	0.591
									LOS	A
					Congestion Equiv.					
					1550					

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.			Overlap		
		AM	PM		LUF	AM	PM	LUF	AM	PM	
Eastbound	No	n/a	n/a		n/a	n/a	n/a	n/a	0	0	
Westbound	Yes	124	272		1.00	179	133	0.60	107	80	
Northbound	No	n/a	n/a		n/a	n/a	n/a	n/a	0	0	
Southbound	Yes	63	32		1.00	36	44	1.10	40	32	

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

14

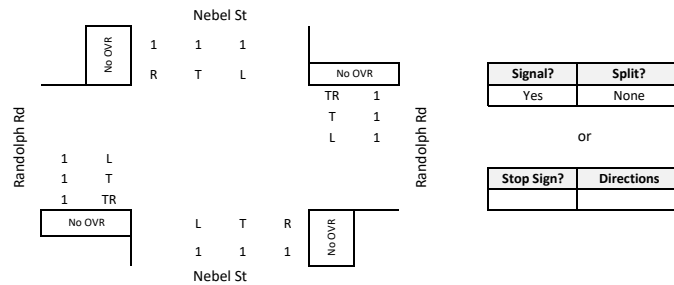
Critical Lane Volume and Level of Service Calculations

Intersection: 14. Nebel St / Randolph Rd

Jurisdiction: Montgomery County, MD
 Scenario/Design Year: Background Conditions
 Computed by: W+A



Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	678	0	0.53	359	258	1.10	284	643	*
WB	T+TR	1170	0	0.53	620	16	1.10	18	638	
NB	T	54	0	1.00	54	138	1.10	152	206	*
SB	T	74	0	1.00	74	80	1.10	88	162	
	R	14	0	1.00	14					
Note:									CLV	849
									v/c	0.548
									LOS	A
					Congestion Equiv.					
					1550					

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	1130	0	0.53	599	202	1.10	222	821	*
WB	T+TR	985	0	0.53	522	21	1.10	23	545	
NB	T	145	0	1.00	145	282	1.10	310	455	*
SB	T	171	0	1.00	171	125	1.10	138	309	
	R	24	0	1.00	24				162	
Note:									CLV	1442
									v/c	0.930
									LOS	D
					Congestion Equiv.					
					1550					

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap		
		AM	PM		LUF	AM	PM		LUF	AM	PM	
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

17

Critical Lane Volume and Level of Service Calculations

Intersection: 17. Chapman Ave / Thompson Ave

Jurisdiction: Montgomery County, MD

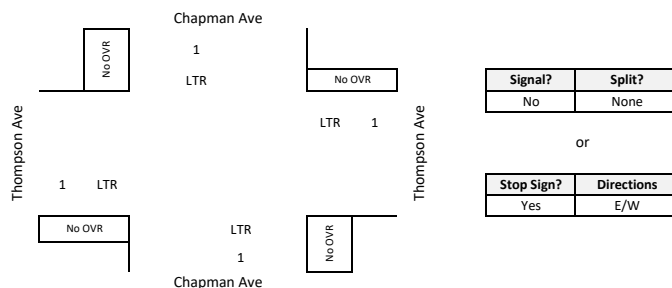
Scenario/Design Year: Background Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	42	0	1.00	42				42	
WB	LTR	47	0	1.00	47				47	*
NB	LTR	186	0	1.00	186				186	*
SB	LTR	160	0	1.00	160				160	
Note:									CLV	233
									v/c	0.150
									LOS	A
									Congestion Equiv.	
									1550	

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	165	0	1.00	165				165	*
WB	LTR	26	0	1.00	26				26	
NB	LTR	330	0	1.00	330				330	*
SB	LTR	315	0	1.00	315				315	
Note:									CLV	495
									v/c	0.319
									LOS	A
									Congestion Equiv.	
									1550	

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap		
		AM	PM		LUF	AM	PM		LUF	AM	PM	
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

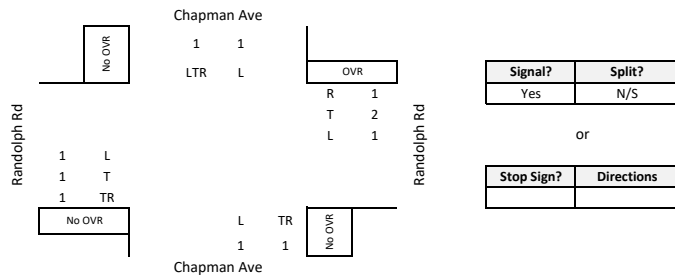
16

**Critical Lane Volume
and
Level of Service Calculations**

Intersection: **16. Chapman Ave / Randolph Rd**
 Jurisdiction: **Montgomery County, MD**
 Scenario/Design Year: **Background Conditions**
 Computed by: **W+A**



Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	731	0	0.53	387	9	1.10	10	397	
WB	T	1122	30	0.53	595	77	1.10	85	680	*
NB	LTR	21	0	1.00	21				21	*
SB	LTR	58	0	0.60	35				35	*
Note:									CLV	736
									v/c	0.475
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	1046	0	0.53	554	14	1.10	15	569	*
WB	T	772	127	0.53	409	144	1.10	158	567	
NB	LTR	94	0	1.00	94				94	*
SB	LTR	299	0	0.60	179				179	*
Note:									CLV	842
									v/c	0.543
									LOS	A

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM	LUF		AM	PM	LUF		AM	PM
Eastbound	No	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0	0	
Westbound	Yes	66	127	1.00	27	152	1.10	30	127		
Northbound	No	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0	0	
Southbound	No	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0	0	

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

15

Critical Lane Volume and Level of Service Calculations

Intersection: 15. Rockville Pike / Hubbard Dr

Jurisdiction: Montgomery County, MD

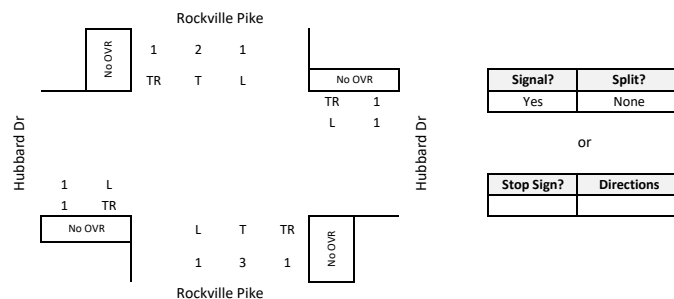
Scenario/Design Year: Background Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	20	0	1.00	20	77	1.10	85	105	*
WB	TR	66	0	1.00	66	20	1.10	22	88	
NB	3T+TR	1887	0	0.30	566	48	1.10	53	619	
SB	2T+TR	2605	0	0.37	964	25	1.10	28	992	*
Note:									CLV	1097
									v/c	0.708
									LOS	B

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	44	0	1.00	44	186	1.10	205	249	
WB	TR	151	0	1.00	151	40	1.10	44	195	*
NB	3T+TR	2840	0	0.30	852	161	1.10	177	1029	*
SB	2T+TR	2034	0	0.37	753	18	1.10	20	773	
Note:									CLV	1278
									v/c	0.825
									LOS	C

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

Critical Lane Volume and Level of Service Calculations

Jurisdiction: Montgomery County, MD

Scenario/Design Year: Total Future Phase 1 Conditions

Computed by: W+A



WELLS + ASSOCIATES

[illegible]

	Bou Ave	Rockville Pike	2186 6 2011 169 621	58 11 552	Bou Ave	Rockville Pike	36 1656 211 1903	CLV v/c LOS	1165 0.752 C

[illegible]

	Excl. Right	Right Vol.			Adjacent Overlap Vol.			Overlap		
Approach		AM	PM	LUF	AM	PM	LUF	AM	PM	LUF
Eastbound	Yes	25	36		1.00	36	57	0.00	0	0
Westbound	No	n/a	n/a		n/a	n/a		n/a	0	0
Northbound	Yes	211	526		0.00	552	452	0.60	211	526
Southbound	No	n/a	n/a		n/a	n/a		n/a	0	0

Bou Ave Rockville Pike Bou Ave Rockville Pike	<table border="1"> <thead> <tr> <th>Direction</th> <th>Lane Group</th> <th>Lane Group Volume</th> <th>Right Turn Overlap</th> <th>Lane Use Factor (LUF)</th> <th>Volume</th> <th>Opposing Lefts</th> <th>Lane Use Factor (LUF)</th> <th>Opposing Volume</th> <th>Critical Lane Volume (CLV)</th> <th>Included in CLV</th> </tr> </thead> <tbody> <tr> <td rowspan="2">EB</td> <td>LT</td> <td>48</td> <td rowspan="2">0</td> <td>1.00</td> <td>48</td> <td rowspan="2"></td> <td rowspan="2"></td> <td rowspan="2"></td> <td>48</td> <td rowspan="2">*</td> </tr> <tr> <td>R</td> <td>36</td> <td>1.00</td> <td>36</td> <td>36</td> </tr> <tr> <td rowspan="2">WB</td> <td>2L</td> <td>452</td> <td rowspan="2">0</td> <td>0.60</td> <td>271</td> <td rowspan="2"></td> <td rowspan="2"></td> <td rowspan="2"></td> <td>271</td> <td rowspan="2">*</td> </tr> <tr> <td>TR</td> <td>229</td> <td>1.00</td> <td>229</td> <td>229</td> </tr> <tr> <td rowspan="2">NB</td> <td>3T</td> <td>2417</td> <td rowspan="2">526</td> <td>0.37</td> <td>894</td> <td rowspan="2">279</td> <td rowspan="2">1.10</td> <td rowspan="2">307</td> <td>1201</td> <td rowspan="2">*</td> </tr> <tr> <td>R</td> <td>526</td> <td>1.00</td> <td>0</td> <td>307</td> </tr> <tr> <td>SB</td> <td>2T+TR</td> <td>1739</td> <td>0</td> <td>0.37</td> <td>643</td> <td>57</td> <td>1.10</td> <td>63</td> <td>706</td> <td></td> </tr> <tr> <td colspan="9">Note:</td> <td>CLV</td> <td>1520</td> </tr> <tr> <td colspan="9"></td> <td>v/c</td> <td>0.981</td> </tr> <tr> <td colspan="9"></td> <td>LOS</td> <td>E</td> </tr> </tbody> </table>	Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV	EB	LT	48	0	1.00	48				48	*	R	36	1.00	36	36	WB	2L	452	0	0.60	271				271	*	TR	229	1.00	229	229	NB	3T	2417	526	0.37	894	279	1.10	307	1201	*	R	526	1.00	0	307	SB	2T+TR	1739	0	0.37	643	57	1.10	63	706		Note:									CLV	1520										v/c	0.981										LOS	E
	Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV																																																																																													
	EB	LT	48	0	1.00	48				48	*																																																																																													
		R	36		1.00	36				36																																																																																														
	WB	2L	452	0	0.60	271				271	*																																																																																													
TR		229	1.00		229	229																																																																																																		
NB	3T	2417	526	0.37	894	279	1.10	307	1201	*																																																																																														
	R	526		1.00	0				307																																																																																															
SB	2T+TR	1739	0	0.37	643	57	1.10	63	706																																																																																															
Note:									CLV	1520																																																																																														
									v/c	0.981																																																																																														
									LOS	E																																																																																														

		Lane Use Factors				LOS		
		Number of Lanes	Left Turn LUF	Through LUF		GRADE	VALUE	
		1	1.1	1.00		A	1000.00	
		2	0.6	0.53		B	1150.00	
		3	0.4	0.37		C	1300.00	
		4		0.30		D	1450.00	
		5		0.25		E	1600.00	
						F	1800.00	

2

Critical Lane Volume and Level of Service Calculations

Intersection: **02. Rockville Pike / Pike Center / Federal Plaza**

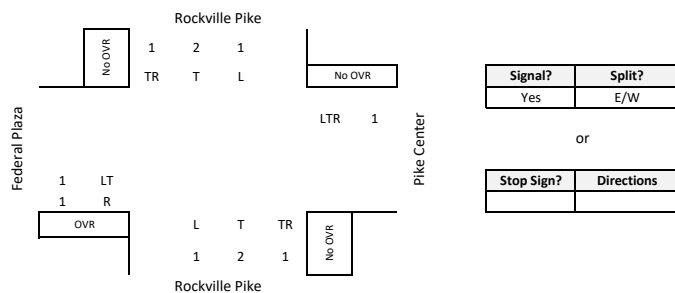
Jurisdiction: **Montgomery County, MD**

Scenario/Design Year: **Total Future Phase 1 Conditions**

Computed by: **W+A**



Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LT R	18 56	56	1.00 1.00	18 0				18	*
WB	LTR	18	0	1.00	18				18	*
NB	2T+TR	1572	0	0.37	582	9	1.10	10	592	
SB	2T+TR	2108	0	0.37	780	84	1.10	92	872	*
Note:									CLV	908
									v/c	0.586
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LT R	155 133	133	1.00 1.00	155 0				155	*
WB	LTR	90	0	1.00	90				90	*
NB	2T+TR	2418	0	0.37	895	36	1.10	40	935	*
SB	2T+TR	1816	0	0.37	672	197	1.10	217	889	
Note:									CLV	1180
									v/c	0.761
									LOS	C

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap			
		AM	PM		LUF	AM	PM		LUF	AM	PM		
Eastbound	Yes	56	133		1.00	84	197		1.10	56	133		
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

3

Critical Lane Volume and Level of Service Calculations

Intersection: **03. Rockville Pike / Gas Station**

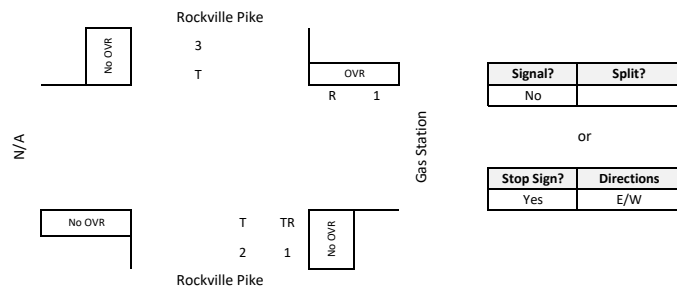
Jurisdiction: **Montgomery County, MD**

Scenario/Design Year: **Total Future Phase 1 Conditions**

Computed by: **W+A**



Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB										
WB	R	19	0	1.00	19				19	*
NB	2T+TR	1603	0	0.37	593				593	
SB	3T	2136	0	0.37	790				790	*
Note:									CLV	809
									v/c	0.522
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB										
WB	R	58	0	1.00	58				58	*
NB	2T+TR	2650	0	0.37	981				981	*
SB	3T	1885	0	0.37	697				697	
Note:									CLV	1039
									v/c	0.670
									LOS	B

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap			
		AM	PM		LUF	AM	PM		LUF	AM	PM		
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Westbound	Yes	19	58		1.00	0	0		0.00	0	0		
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

4

Critical Lane Volume and Level of Service Calculations

Intersection: 04. Rockville Pike / Twinbrook Park / Rollins Ave

Jurisdiction: Montgomery County, MD

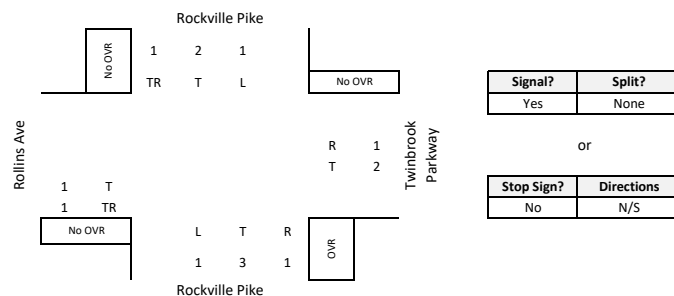
Scenario/Design Year: Total Future Phase 1 Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	388	0	0.53	206				206	*
WB	2T R	310 196	0	0.53 1.00	164 196				164 196	
NB	3T R	1463 106	0	0.37 1.00	541 106	200	1.10	220	761 326	
SB	2T+TR	2045	0	0.37	757	105	1.10	116	873	*
Note:									CLV	1079
									v/c	0.696
									LOS	B
					Congestion Equiv.					
					1550					

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	483	0	0.53	256				256	*
WB	2T R	314 167	0	0.53 1.00	166 167				166 167	
NB	3T R	2263 121	0	0.37 1.00	837 121	204	1.10	224	1061 345	*
SB	2T+TR	1885	0	0.37	697	145	1.10	160	857	
Note:									CLV	1317
									v/c	0.850
									LOS	D
					Congestion Equiv.					
					1550					

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Northbound	Yes	106	121		1.00	0	0		0.00	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

5

Critical Lane Volume and Level of Service Calculations

Intersection: 05. Twinbrook Park / Chapman Ave

Jurisdiction: Montgomery County, MD

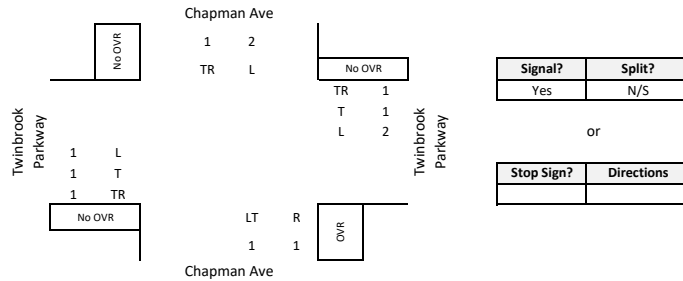
Scenario/Design Year: Total Future Phase 1 Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	578	0	0.53	306	534	0.60	320	626	*
WB	T+TR	563	0	0.53	298	40	1.10	44	342	
NB	LT R	123 197	197	1.00 1.00	123 0				123	*
SB	TR L	50 84	0	1.00 0.60	50 50				50	*
Note:									CLV	799
									v/c	0.515
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	873	0	0.53	463	469	0.60	281	744	*
WB	T+TR	727	0	0.53	385	68	1.10	75	460	
NB	LT R	178 592	281	1.00 1.00	178 311				311	*
SB	TR L	119 215	0	1.00 0.60	119 129				129	*
Note:									CLV	1184
									v/c	0.764
									LOS	C

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap			
		AM	PM		LUF	AM	PM		LUF	AM	PM		
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Northbound	Yes	197	592		1.00	534	469		0.60	197	281		
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		

Montgomery County LATR

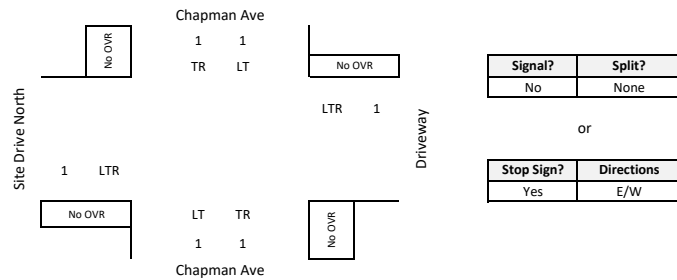
		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

**Critical Lane Volume
and
Level of Service Calculations**

Intersection: **06. Chapman Ave / Site Drive North**
 Jurisdiction: **Montgomery County, MD**
 Scenario/Design Year: **Total Future Phase 1 Conditions**
 Computed by: **W+A**



Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	0	0	1.00	0	1	1.10	1	1	
WB	LTR	5	0	1.00	5	0	1.10	0	5	*
NB	T+TR	319	0	0.53	169	5	1.10	6	175	
SB	T+TR	648	0	0.53	343	2	1.10	2	345	*
Note:									CLV	350
									v/c	0.226
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	5	0	1.00	5	4	1.10	4	9	
WB	LTR	12	0	1.00	12	2	1.10	2	14	*
NB	T+TR	751	0	0.53	398	5	1.10	6	404	*
SB	T+TR	638	0	0.53	338	3	1.10	3	341	
Note:									CLV	418
									v/c	0.270
									LOS	A

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

Critical Lane Volume and Level of Service Calculations

Intersection: 07. Chapman Ave / Rollins Ave

Jurisdiction: Montgomery County, MD

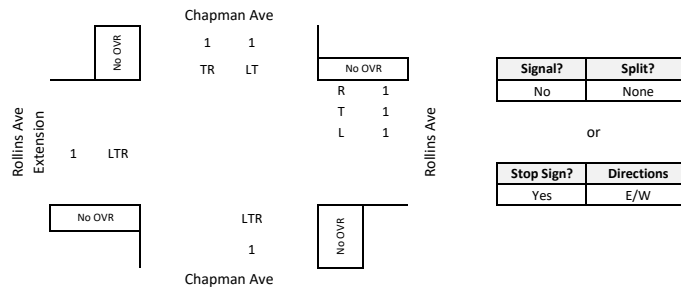
Scenario/Design Year: Total Future Phase 1 Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	25	0	1.00	25	32	1.10	35	60	*
WB	T R	6 33	0	1.00 1.00	6 33	0	1.10	0	6 33	
NB	LTR	386	0	1.00	386	36	1.10	40	426	*
SB	T+TR	571	0	0.53	303	1	1.10	1	304	
Note:								CLV	486	
								v/c	0.314	
								LOS	A	

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	19	0	1.00	19	59	1.10	65	84	
WB	T R	20 89	0	1.00 1.00	20 89	0	1.10	0	20 89	*
NB	LTR	714	0	1.00	714	45	1.10	50	764	*
SB	T+TR	597	0	0.53	316	0	1.10	0	316	
Note:								CLV	853	
								v/c	0.550	
								LOS	A	

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap			
		AM	PM		LUF	AM	PM		LUF	AM	PM		
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		

Montgomery County LATR

		Lane Use Factors				LOS	
		Number of Lanes	Left Turn LUF	Through LUF		GRADE	VALUE
		1	1.1	1.00		A	1000.00
		2	0.6	0.53		B	1150.00
		3	0.4	0.37		C	1300.00
		4		0.30		D	1450.00
		5		0.25		E	1600.00
						F	1800.00

8

Critical Lane Volume and Level of Service Calculations

Intersection: 08. Chapman Ave / Site Drive South

Jurisdiction: Montgomery County, MD

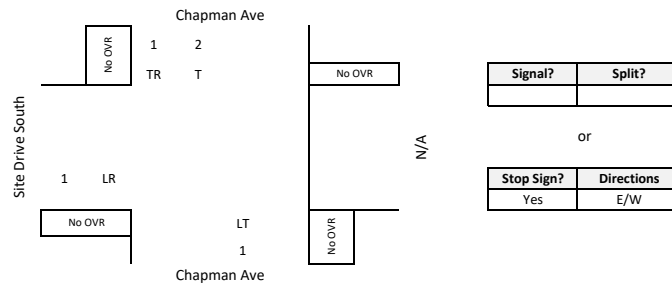
Scenario/Design Year: Total Future Phase 1 Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LR	0	0	1.10	0				0	*
WB										*
NB	LT	353	0	1.00	353				353	*
SB	T+TR	609	0	0.37	225	0	1.10	0	225	
Note:									CLV	353
									v/c	0.228
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LR	0	0	1.10	0				0	*
WB										*
NB	LT	728	0	1.00	728				728	*
SB	T+TR	703	0	0.37	260	0	1.10	0	260	
Note:									CLV	728
									v/c	0.470
									LOS	A

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap			
		AM	PM		LUF	AM	PM		LUF	AM	PM		
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

Critical Lane Volume and Level of Service Calculations

Intersection: **09. Chapman Ave / Bou Ave**

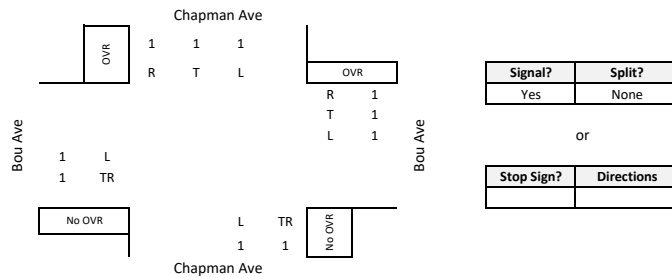
Jurisdiction: **Montgomery County, MD**

Scenario/Design Year: **Total Future Phase 1 Conditions**

Computed by: **W+A**



Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Bou Ave		Chapman Ave										Bou Ave	
		↔ 608 ↖ 390 ↗ 79 ↘ 139 ↕ 267 ↖ 166 ↗ 95 ↘ 6 ↔ 304 ↖ 147 ↗ 120 ↘ 37 ↔ 49 ↖ 4 ↗ 41 ↘ 4											
		Chapman Ave											

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Left	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV	
EB	TR	157	0	1.00	157	6	1.10	7	164		
WB	T	95		1.00	95	147	1.10	162	257	*	
	R	166	153	1.00	13						175
NB	TR	45	0	1.00	45	139	1.10	153	198		
SB	T	79		1.00	79	4	1.10	4	83	*	
	R	390	162	1.10	251						255
Note:									CLV	512	
									v/c	0.330	
		1550							LOS	A	

10

**Critical Lane Volume
and
Level of Service Calculations**

Intersection: 10. Bou Ave / Site Drive

Jurisdiction: Montgomery County, MD

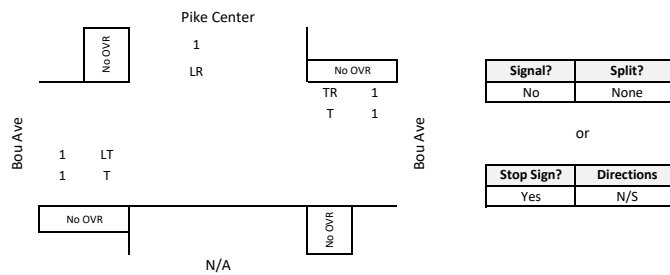
Scenario/Design Year: Total Future Phase 1 Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	2T	278	0	1.00	278	0	1.10	0	278	
WB	T+TR	524	0	0.53	278	111	1.10	122	400	*
NB										
SB	LR	107	0	1.10	118				118	*
Note:									CLV	518
									v/c	0.334
									LOS	A
					1550					

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	2T	523	0	1.00	523	0	1.10	0	523	*
WB	T+TR	507	0	0.53	269	190	1.10	209	478	
NB										
SB	LR	261	0	1.10	287				287	*
Note:									CLV	810
									v/c	0.523
									LOS	A
					1550					

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

11

Critical Lane Volume and Level of Service Calculations

Intersection: 11. Rollins Ave / East Jefferson St

Jurisdiction: Montgomery County, MD

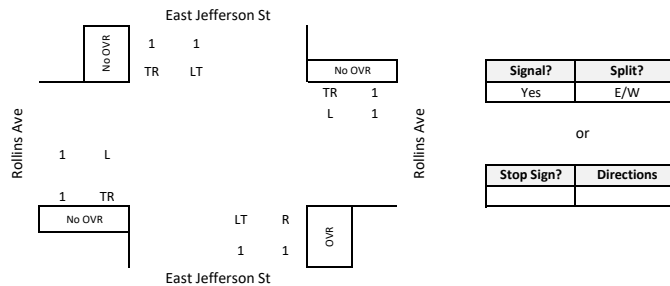
Scenario/Design Year: Total Future Phase 1 Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	88	0	1.00	88				88	*
WB	LTR	352	0	1.00	352				352	*
NB	LT R	252 358	0	1.10 1.00	277 358	20	1.10	22	299 380	*
SB	LTR	256	0	0.53	136	9	1.10	10	146	
Note:									CLV	820
									v/c	0.529
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	80	0	1.00	80				80	*
WB	LTR	533	0	1.00	533				533	*
NB	LT R	484 402	0	1.10 1.00	532 402	18	1.10	20	552 422	*
SB	LTR	299	0	0.53	158	7	1.10	8	166	
Note:									CLV	1165
									v/c	0.752
									LOS	C

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap			
		AM	PM		LUF	AM	PM		LUF	AM	PM		
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Northbound	Yes	358	402		1.00	282	390		0.00	0	0		
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

12

Critical Lane Volume and Level of Service Calculations

Intersection: 12. Rockville Pike / Halpine Rd

Jurisdiction: Montgomery County, MD

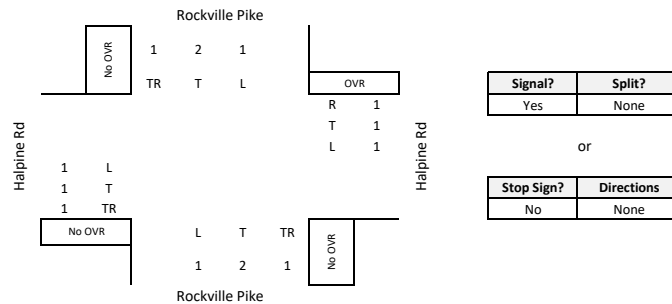
Scenario/Design Year: Total Future Phase 1 Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	108	0	0.53	57	176	1.10	194	251	*
WB	LTR	271	67	0.37	75	42	1.10	46	46	
NB	2T+TR	1607	0	0.37	595	63	1.10	69	664	
SB	2T+TR	1885	0	0.37	697	79	1.10	87	784	*
Note:									CLV	1035
									v/c	0.668
									LOS	B

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	153	0	0.53	81	210	1.10	231	312	*
WB	LTR	407	109	0.37	110	98	1.10	108	218	
NB	2T+TR	2366	0	0.37	875	99	1.10	109	984	*
SB	2T+TR	1875	0	0.37	694	197	1.10	217	911	
Note:									CLV	1296
									v/c	0.836
									LOS	C

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	Yes	67	127		1.00	63	99		1.10	67	109
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

13

**Critical Lane Volume
and
Level of Service Calculations**

Intersection: **13. Twinbrook Park / Parklawn Dr**

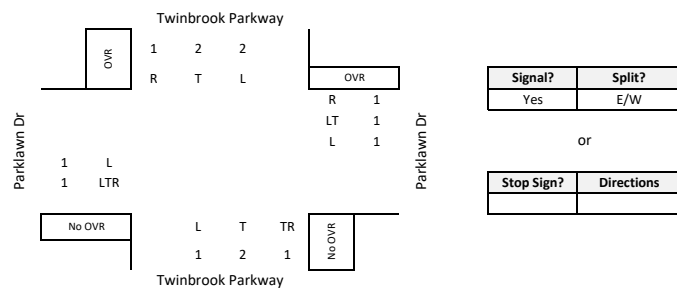
Jurisdiction: **Montgomery County, MD**

Scenario/Design Year: **Total Future Phase 1 Conditions**

Computed by: **W+A**



Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	111	0	0.60	67				67	*
WB	LT	182		0.60	109				109	*
NB	2T+TR	767	0	0.37	284	179	0.60	107	391	
SB	T	807		0.53	428				483	*
	R	63	40	1.00	23	50	1.10	55	78	
Note:									CLV	659
									v/c	0.425
									LOS	A
					Congestion Equiv.					
					1550					

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	144	0	0.60	86				86	*
WB	LT	343		0.60	206				206	*
NB	2T+TR	1470	0	0.37	544	133	0.60	80	624	*
SB	T	743		0.53	394				428	
	R	32	32	1.00	0	31	1.10	34	34	
Note:									CLV	916
									v/c	0.591
									LOS	A
					Congestion Equiv.					
					1550					

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap			
		AM	PM		LUF	AM	PM		LUF	AM	PM		
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Westbound	Yes	124	272		1.00	179	133		0.60	107	80		
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Southbound	Yes	63	32		1.00	36	44		1.10	40	32		

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

14

Critical Lane Volume and Level of Service Calculations

Intersection: 14. Nebel St / Randolph Rd

Jurisdiction: Montgomery County, MD

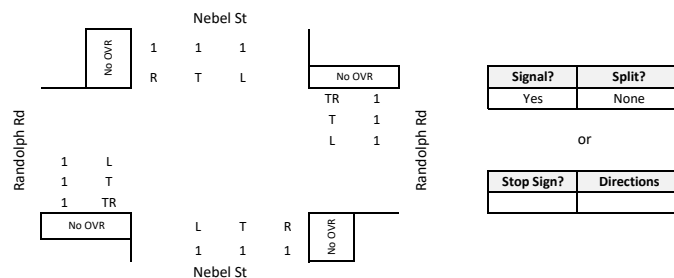
Scenario/Design Year: Total Future Phase 1 Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	732	0	0.53	388	261	1.10	287	675	*
WB	T+TR	1172	0	0.53	621	16	1.10	18	639	
NB	T	66	0	1.00	66	144	1.10	158	224	*
SB	T	74	0	1.00	74	80	1.10	88	162	
	R	14	0	1.00	14					
Note:									CLV	899
									v/c	0.580
									LOS	A
									1550	

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	1169	0	0.53	620	183	1.10	201	821	*
WB	T+TR	1012	0	0.53	536	21	1.10	23	559	
NB	T	145	0	1.00	145	294	1.10	323	468	*
SB	T	171	0	1.00	171	137	1.10	151	322	
	R	24	0	1.00	24				175	
Note:									CLV	1455
									v/c	0.939
									LOS	E
									1550	

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

17

Critical Lane Volume and Level of Service Calculations

Intersection: 17. Chapman Ave / Thompson Ave

Jurisdiction: Montgomery County, MD

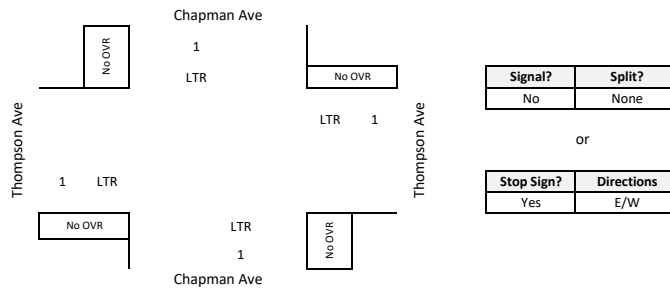
Scenario/Design Year: Total Future Phase 1 Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	42	0	1.00	42				42	
WB	LTR	47	0	1.00	47				47	*
NB	LTR	186	0	1.00	186				186	*
SB	LTR	160	0	1.00	160				160	
Note:									CLV	233
									v/c	0.150
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	165	0	1.00	165				165	*
WB	LTR	26	0	1.00	26				26	
NB	LTR	330	0	1.00	330				330	*
SB	LTR	315	0	1.00	315				315	
Note:									CLV	495
									v/c	0.319
									LOS	A

Right Turn Overlap

Approach	Excl. Right	Right Vol.			Adjacent Overlap Vol.			Overlap		
		AM	PM	LUF	AM	PM	LUF	AM	PM	LUF
Eastbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	
Westbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	
Northbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	
Southbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

16

**Critical Lane Volume
and
Level of Service Calculations**

Intersection: **16. Chapman Ave / Randolph Rd**

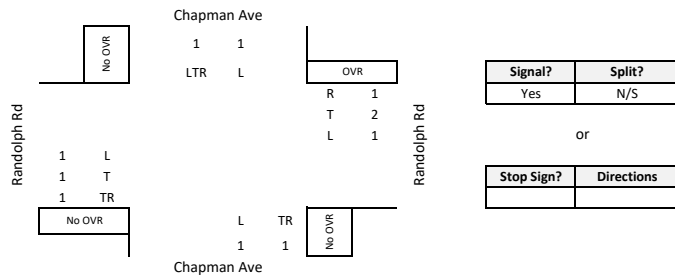
Jurisdiction: **Montgomery County, MD**

Scenario/Design Year: **Total Future Phase 1 Conditions**

Computed by: **W+A**



Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	785	0	0.53	416	9	1.10	10	426	
WB	T	1119	30	0.53	593	77	1.10	85	678	*
NB	LTR	21	0	1.00	21				21	*
SB	LTR	58	0	0.60	35				35	*
Note:									CLV	734
Congestion Equiv.									v/c	0.474
1550									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	1085	0	0.53	575	14	1.10	15	590	*
WB	T	803	127	0.53	426	144	1.10	158	584	
NB	LTR	94	0	1.00	94				94	*
SB	LTR	299	0	0.60	179				179	*
Note:									CLV	863
Congestion Equiv.									v/c	0.557
1550									LOS	A

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM	LUF		AM	PM	LUF		AM	PM
Eastbound	No	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0	0	
Westbound	Yes	66	127	1.00	27	152	1.10	30	127		
Northbound	No	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0	0	
Southbound	No	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0	0	

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

Rockville Pike

Hubbard Dr

No OVR

1 2 1

TR T L

TR 1

L 1

Hubbard Dr

1 L

1 TR

No OVR

L T TR

1 3 1

No OVR

Rockville Pike

Signal?	Split?
Yes	None

or

Stop Sign?	Directions

	<table border="1"> <thead> <tr> <th>Direction</th> <th>Lane Group</th> <th>Lane Group Volume</th> <th>Right Turn Overlap</th> <th>Lane Use Factor (LUF)</th> <th>Volume</th> <th>Opposing Lefts</th> <th>Lane Use Factor (LUF)</th> <th>Opposing Volume</th> <th>Critical Lane Volume (CLV)</th> </tr> </thead> <tbody> <tr> <td>EB</td> <td>TR</td> <td>20</td> <td>0</td> <td>1.00</td> <td>20</td> <td>77</td> <td>1.10</td> <td>85</td> <td>105</td> </tr> <tr> <td>WB</td> <td>TR</td> <td>66</td> <td>0</td> <td>1.00</td> <td>66</td> <td>20</td> <td>1.10</td> <td>22</td> <td>88</td> </tr> <tr> <td>NB</td> <td>3T+TR</td> <td>1931</td> <td>0</td> <td>0.30</td> <td>579</td> <td>48</td> <td>1.10</td> <td>53</td> <td>632</td> </tr> <tr> <td>SB</td> <td>2T+TR</td> <td>2624</td> <td>0</td> <td>0.37</td> <td>971</td> <td>25</td> <td>1.10</td> <td>28</td> <td>999</td> </tr> </tbody> </table>	Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	EB	TR	20	0	1.00	20	77	1.10	85	105	WB	TR	66	0	1.00	66	20	1.10	22	88	NB	3T+TR	1931	0	0.30	579	48	1.10	53	632	SB	2T+TR	2624	0	0.37	971	25	1.10	28	999
	Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)																																									
	EB	TR	20	0	1.00	20	77	1.10	85	105																																									
	WB	TR	66	0	1.00	66	20	1.10	22	88																																									
	NB	3T+TR	1931	0	0.30	579	48	1.10	53	632																																									
SB	2T+TR	2624	0	0.37	971	25	1.10	28	999																																										
Note:								CLV	1104																																										
	Congestion Equiv.							v/c	0.712																																										
	1550							LOS	B																																										

[illegible]

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap		
		AM	PM		LUF	AM	PM		LUF	AM	PM	
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	

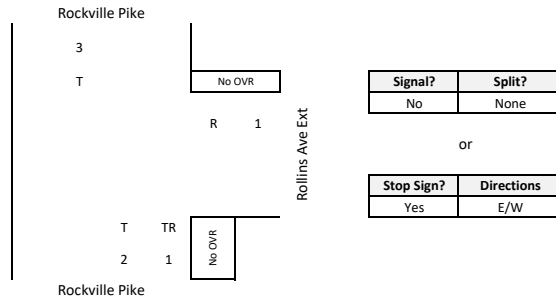
Hubbard Dr	 Rockville Pike ↔ 2371 ↖ 26 → 2184 ↗ 161 ↑ 337 ↓ 138 ↑ 13 ↘ 186 40 12 32 ↙ 84 ↔ ↘ 18 2732 → 250 ↘ 3000 ↔ Rockville Pike	Hubbard Dr	Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)		
			EB	TR L	44 40	0	1.00 1.10	44 44	186	1.10	205	249 249		
			WB	TR L	151 186	0	1.00 1.10	151 205	40	1.10	44	195 249		
			NB	3T+TR L	2982 18	0	0.30 1.10	895 20	161	1.10	177	1072 197		
			SB	2T+TR	2210	0	0.37 1.10	818 0	18	1.10	20	838 20		
			Note:										CLV	1321
				Congestion Equiv.						v/c	0.852			
	1550						LOS	D						

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

Critical Lane Volume and Level of Service Calculations

Intersection: **Rockville Pike / Rollins Ave Ext**
 Jurisdiction: **Montgomery County, MD**
 Scenario/Design Year: **Total Future Phase 1 Conditions**
 Computed by: **W+A**

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB										
WB	R	46	0	1.00	46				46	*
NB	2T+TR	1675	0	0.37	620				620	
SB	3T	2138	0	0.37	791				791	*
Note:									CLV	837
									v/c	0.523
									LOS	A
					Congestion Equiv.					
					1600					

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB										
WB	R	143	0	1.00	143				143	*
NB	2T+TR	2675	0	0.37	990				990	*
SB	3T	1996	0	0.37	739				739	
Note:									CLV	1133
									v/c	0.708
									LOS	B
					Congestion Equiv.					
					1600					

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap		
		AM	PM		LUF	AM	PM		LUF	AM	PM	
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

1

Critical Lane Volume and Level of Service Calculations

Intersection: 01. Rockville Pike / Bou Ave

Jurisdiction: Montgomery County, MD

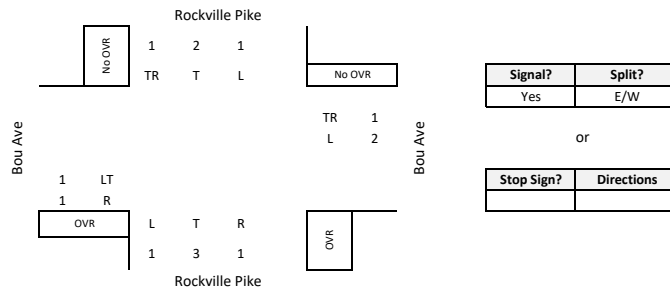
Scenario/Design Year: Total Future Phase 2 Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LT	35		1.00	35				35	*
	R	25	0	1.00	25				25	
WB	2L	571		0.60	343				343	*
	TR	60	0	1.00	60				60	
NB	3T	1750		0.37	648	141	1.10	155	803	*
	R	137	137	1.00	0				155	
SB	2T+TR	2045	0	0.37	757	36	1.10	40	797	
Note:									CLV	1181
									v/c	0.762
									LOS	C
									Congestion Equiv.	
									1550	

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LT	48		1.00	48				48	*
	R	36	0	1.00	36				36	
WB	2L	510		0.60	306				306	*
	TR	235	0	1.00	235				235	
NB	3T	2550		0.37	944	225	1.10	248	1192	*
	R	444	444	1.00	0				248	
SB	2T+TR	1714	0	0.37	634	57	1.10	63	697	
Note:									CLV	1546
									v/c	0.997
									LOS	E
									Congestion Equiv.	
									1550	

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	Yes	25	36		1.00	36	57		0.00	0	0
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Northbound	Yes	137	444		0.00	571	510		0.60	137	444
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors				LOS	
		Number of Lanes	Left Turn LUF	Through LUF		GRADE	VALUE
		1	1.1	1.00		A	1000.00
		2	0.6	0.53		B	1150.00
		3	0.4	0.37		C	1300.00
		4		0.30		D	1450.00
		5		0.25		E	1600.00
						F	1800.00

2

Critical Lane Volume and Level of Service Calculations

Intersection: **02. Rockville Pike / Pike Center / Federal Plaza**

Jurisdiction: **Montgomery County, MD**

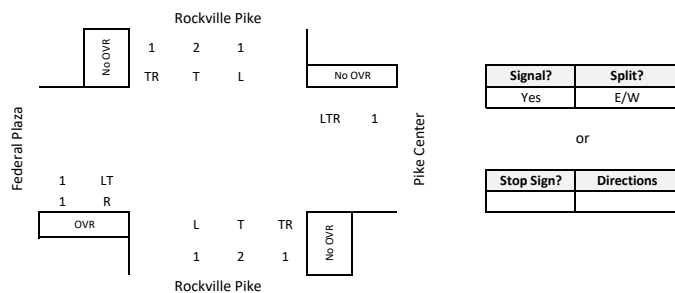
Scenario/Design Year: **Total Future Phase 2 Conditions**

Computed by: **W+A**



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LT R	18 56	56	1.00 1.00	18 0				18	*
WB	LTR	47	0	1.00	47				47	*
NB	2T+TR	1593	0	0.37	589	18	1.10	20	609	
SB	2T+TR	2072	0	0.37	767	84	1.10	92	859	*
Note:									CLV	924
									v/c	0.596
									LOS	A
									Congestion Equiv.	
									1550	

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LT R	155 133	133	1.00 1.00	155 0				155	*
WB	LTR	41	0	1.00	41				41	*
NB	2T+TR	2422	0	0.37	896	6	1.10	7	903	*
SB	2T+TR	1779	0	0.37	658	197	1.10	217	875	
Note:									CLV	1099
									v/c	0.709
									LOS	B
									Congestion Equiv.	
									1550	

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap			
		AM	PM		LUF	AM	PM		LUF	AM	PM		LUF
Eastbound	Yes	56	133		1.00	84	197		1.10	56	133		
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

3

Critical Lane Volume and Level of Service Calculations

Intersection: 03. Rockville Pike / Gas Station

Jurisdiction: Montgomery County, MD

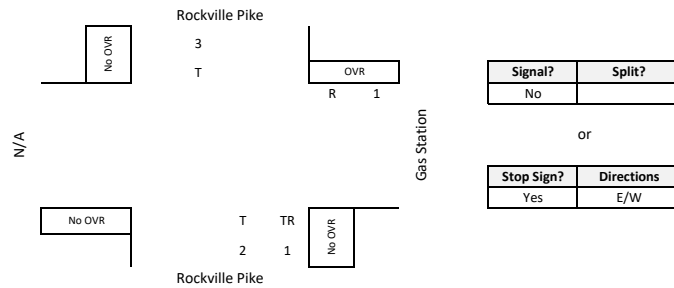
Scenario/Design Year: Total Future Phase 2 Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB										*
WB	R	0	0	1.00	0				0	*
NB	2T+TR	0	0	0.37	0				0	*
SB	3T	0	0	0.37	0				0	*
Note:									CLV	0
									v/c	0.000
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB										*
WB	R	0	0	1.00	0				0	*
NB	2T+TR	0	0	0.37	0				0	*
SB	3T	0	0	0.37	0				0	*
Note:									CLV	0
									v/c	0.000
									LOS	A

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap			
		AM	PM		LUF	AM	PM		LUF	AM	PM		
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Westbound	Yes	0	0		1.00	0	0		0.00	0	0		
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

4

Critical Lane Volume and Level of Service Calculations

Intersection: 04. Rockville Pike / Twinbrook Park / Rollins Ave

Jurisdiction: Montgomery County, MD

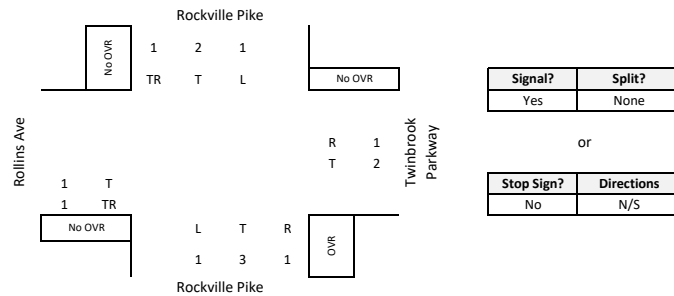
Scenario/Design Year: Total Future Phase 2 Conditions

Computed by: W+A



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Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	392	0	0.53	208				208	
WB	2T R	310 221	0	0.53 1.00	164 221				164 221	*
NB	3T R	1464 123	0	0.37 1.00	542 123	238	1.10	262	804 385	
SB	2T+TR	2018	0	0.37	747	105	1.10	116	863	*
Note:									CLV	1084
									v/c	0.699
									LOS	B

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	483	0	0.53	256				256	*
WB	2T R	309 204	0	0.53 1.00	164 204				164 204	
NB	3T R	2244 121	0	0.37 1.00	830 121	299	1.10	329	1159 450	*
SB	2T+TR	1820	0	0.37	673	145	1.10	160	833	
Note:									CLV	1415
									v/c	0.913
									LOS	D

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Northbound	Yes	123	121		1.00	0	0		0.00	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

5

Critical Lane Volume and Level of Service Calculations

Intersection: 05. Twinbrook Park / Chapman Ave

Jurisdiction: Montgomery County, MD

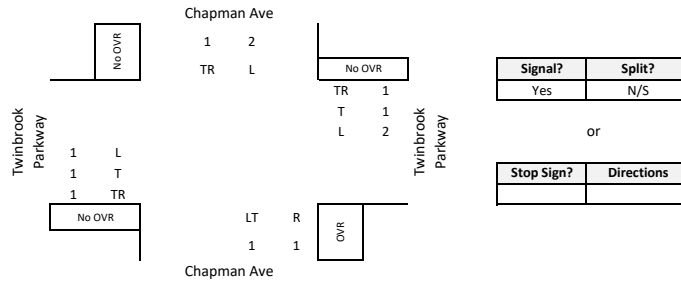
Scenario/Design Year: Total Future Phase 2 Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	637	0	0.53	338	534	0.60	320	658	*
WB	T+TR	563	0	0.53	298	40	1.10	44	342	
NB	LT	148		1.00	148				148	*
SB	TR	197	197	1.00	0					
	L	50		1.00	50				50	*
		84	0	0.60	50					
Note:									CLV	856
									v/c	0.552
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	968	0	0.53	513	469	0.60	281	794	*
WB	T+TR	727	0	0.53	385	68	1.10	75	460	
NB	LT	218		1.00	218				218	*
SB	TR	592	281	1.00	311				311	*
	L	119		1.00	119				119	*
		215	0	0.60	129					
Note:									CLV	1234
									v/c	0.796
									LOS	C

Right Turn Overlap

	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap		
Approach		AM	PM		LUF	AM	PM		LUF	AM	PM	
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Northbound	Yes	197	592		1.00	534	469		0.60	197	281	
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

6

Critical Lane Volume and Level of Service Calculations

Intersection: 06. Chapman Ave / Site Drive North

Jurisdiction: Montgomery County, MD

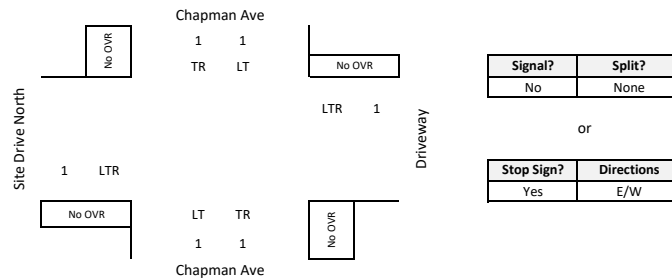
Scenario/Design Year: Total Future Phase 2 Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	35	0	1.00	35	1	1.10	1	36	*
WB	LTR	5	0	1.00	5	24	1.10	26	31	
NB	T+TR L	319 8	0	0.53 1.10	169 9	5	1.10	6	175 15	
SB	T+TR L	707 5	0	0.53 1.10	375 6	8	1.10	9	384 15	*
Note:									CLV	420
									v/c	0.271
									LOS	A
					Congestion Equiv.					
					1550					

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	52	0	1.00	52	4	1.10	4	56	
WB	LTR	12	0	1.00	12	42	1.10	46	58	*
NB	T+TR L	751 55	0	0.53 1.10	398 61	5	1.10	6	404 67	
SB	T+TR L	733 5	0	0.53 1.10	388 6	55	1.10	61	449 67	*
Note:									CLV	507
									v/c	0.327
									LOS	A
					Congestion Equiv.					
					1550					

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

Critical Lane Volume and Level of Service Calculations

Intersection: 07. Chapman Ave / Rollins Ave

Jurisdiction: Montgomery County, MD

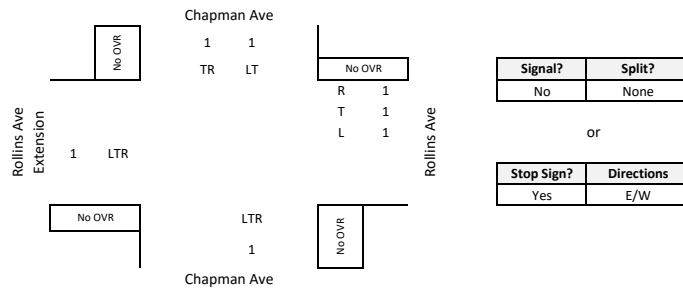
Scenario/Design Year: Total Future Phase 2 Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	53	0	1.00	53	32	1.10	35	88	*
WB	T R	6 33	0	1.00 1.00	6 33	0	1.10	0	6 33	
NB	LTR	392	0	1.00	392	36	1.10	40	432	*
SB	T+TR	618	0	0.53	328	1	1.10	1	329	
Note:									CLV	520
									v/c	0.335
									LOS	A
					1550					

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	70	0	1.00	70	59	1.10	65	135	
WB	T R	20 89	0	1.00 1.00	20 89	45	1.10	50	70 139	*
NB	LTR	760	0	1.00	760	45	1.10	50	810	*
SB	T+TR	667	0	0.53	354	39	1.10	43	397	
Note:									CLV	949
									v/c	0.612
									LOS	A
					1550					

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap			
		AM	PM		LUF	AM	PM		LUF	AM	PM		
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0		

Montgomery County LATR

		Lane Use Factors				LOS	
		Number of Lanes	Left Turn LUF	Through LUF		GRADE	VALUE
		1	1.1	1.00		A	1000.00
		2	0.6	0.53		B	1150.00
		3	0.4	0.37		C	1300.00
		4		0.30		D	1450.00
		5		0.25		E	1600.00
						F	1800.00

8

Critical Lane Volume and Level of Service Calculations

Intersection: 08. Chapman Ave / Site Drive South

Jurisdiction: Montgomery County, MD

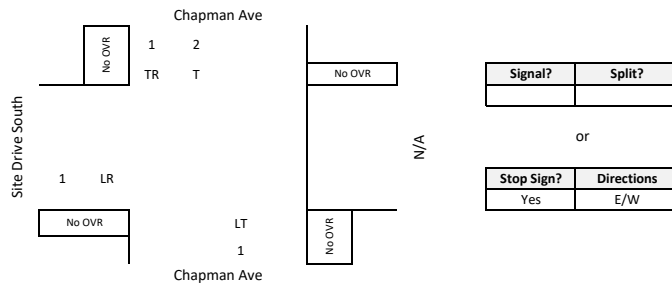
Scenario/Design Year: Total Future Phase 2 Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LR	0	0	1.10	0				0	*
WB										*
NB	LT	0	0	1.00	0				0	*
SB	T+TR	0	0	0.37	0	0	1.10	0	0	*
Note:									CLV	0
									v/c	0.000
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LR	0	0	1.10	0				0	*
WB									0	*
NB	LT	0	0	1.00	0				0	*
SB	T+TR	0	0	0.37	0	0		0	0	*
Note:									CLV	0
									v/c	0.000
									LOS	A

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap		
		AM	PM		LUF	AM	PM		LUF	AM	PM	
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

Critical Lane Volume and Level of Service Calculations

Intersection: **09. Chapman Ave / Bou Ave**

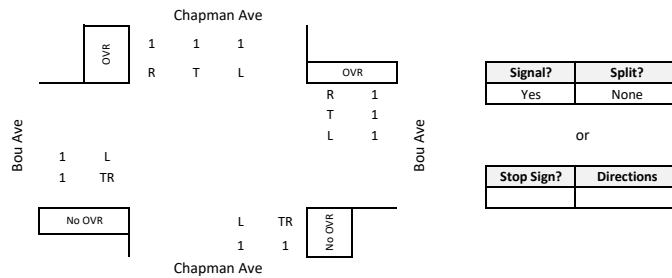
Jurisdiction: **Montgomery County, MD**

Scenario/Design Year: **Total Future Phase 2 Conditions**

Computed by: **W+A**



Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	156	0	1.00	156	6	1.10	7	163	
WB	T	92		1.00	92	147	1.10	162	254	*
	R	172	164	1.00	8				170	
NB	TR	45	0	1.00	45	149	1.10	164	209	
SB	T	79		1.00	79	4	1.10	4	83	*
	R	447	162	1.10	314				318	
Note:									CLV	572
									v/c	0.369
									LOS	A
					1550					

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	299	0	1.00	299	15	1.10	17	316	
WB	T	166		1.00	166	355	1.10	391	557	*
	R	273	273	1.00	0				391	
NB	TR	169	0	1.00	169	258	1.10	284	453	*
									284	
SB	T	127		1.00	127	17	1.10	19	146	
	R	368	368	1.10	0				19	
Note:									CLV	1010
									v/c	0.652
									LOS	B
					1550					

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap		
		AM	PM		LUF	AM	PM		LUF	AM	PM	
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Westbound	Yes	172	273	1.00	149	258		1.10	164	273		
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Southbound	Yes	447	368	1.00	147	355		1.10	162	368		

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

10

Critical Lane Volume and Level of Service Calculations

Intersection: 10. Bou Ave / Site Drive

Jurisdiction: Montgomery County, MD

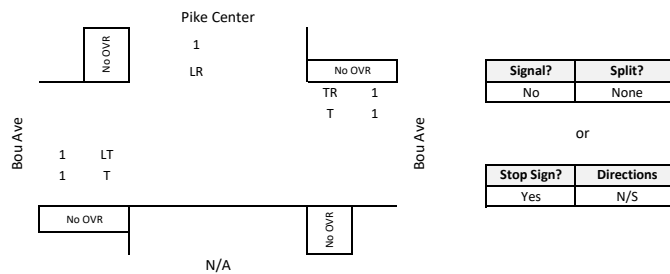
Scenario/Design Year: Total Future Phase 2 Conditions

Computed by: W+A



WELLS + ASSOCIATES

Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	2T	278	0	1.00	278	0	1.10	0	278	
WB	T+TR	578	0	0.53	306	9	1.10	10	316	*
NB										
SB	LR	61	0	1.10	67				67	*
Note:									CLV	383
Congestion Equiv.									v/c	0.247
1550									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	2T	554	0	1.00	554	0	1.10	0	554	*
WB	T+TR	544	0	0.53	288	21	1.10	23	311	
NB										
SB	LR	282	0	1.10	310				310	*
Note:									CLV	864
Congestion Equiv.									v/c	0.557
1550									LOS	A

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

11

Critical Lane Volume and Level of Service Calculations

Intersection: 11. Rollins Ave / East Jefferson St

Jurisdiction: Montgomery County, MD

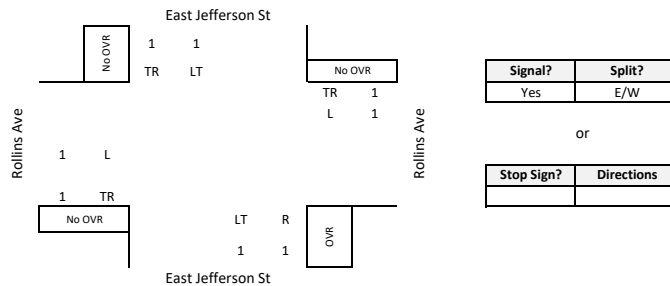
Scenario/Design Year: Total Future Phase 2 Conditions

Computed by: W+A



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Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	71	0	1.00	71				71	*
WB	LTR	352	0	1.00	352				352	*
NB	LT R	252 362	0	1.10 1.00	277 362	20	1.10	22	299 384	*
SB	LTR	256	0	0.53	136	9	1.10	10	146	
Note:									CLV	807
									v/c	0.521
									LOS	A

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	70	0	1.00	70				70	*
WB	LTR	533	0	1.00	533				533	*
NB	LT R	484 396	0	1.10 1.00	532 396	18	1.10	20	552 416	*
SB	LTR	299	0	0.53	158	7	1.10	8	166	
Note:									CLV	1155
									v/c	0.745
									LOS	C

Right Turn Overlap

Approach	Excl. Right	Right Vol.			Adjacent Overlap Vol.				Overlap		
		AM	PM	LUF	AM	PM	LUF	AM	PM	LUF	
Eastbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	0	
Westbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	0	
Northbound	Yes	362	396	1.00	282	390	0.00	0	0	0	
Southbound	No	n/a	n/a	n/a	n/a	n/a	n/a	0	0	0	

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

12

Critical Lane Volume and Level of Service Calculations

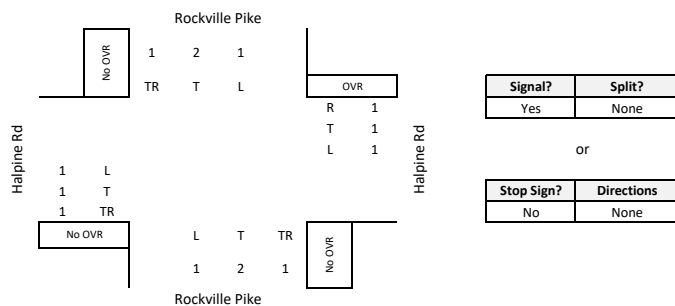
Intersection: 12. Rockville Pike / Halpine Rd

Jurisdiction: Montgomery County, MD
 Scenario/Design Year: Total Future Phase 2 Conditions
 Computed by: W+A



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Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	108	0	0.53	57	176	1.10	194	251	*
WB	LTR	271	67	0.37	75	42	1.10	46	46	
NB	2T+TR	1633	0	0.37	604	63	1.10	69	673	
SB	2T+TR	1896	0	0.37	702	79	1.10	87	789	*
Note:									CLV	1040
									v/c	0.671
									LOS	B

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	153	0	0.53	81	210	1.10	231	312	*
WB	LTR	407	109	0.37	110	98	1.10	108	218	
NB	2T+TR	2381	0	0.37	881	99	1.10	109	990	*
SB	2T+TR	1905	0	0.37	705	197	1.10	217	922	
Note:									CLV	1302
									v/c	0.840
									LOS	D

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	Yes	67	127		1.00	63	99		1.10	67	109
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

13

Critical Lane Volume and Level of Service Calculations

Intersection: 13. Twinbrook Park / Parklawn Dr

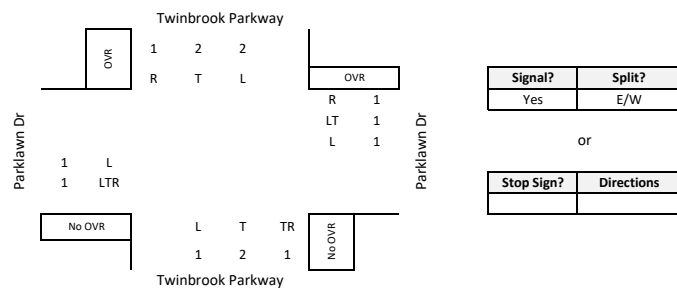
Jurisdiction: Montgomery County, MD

Scenario/Design Year: Total Future Phase 2 Conditions

Computed by: W+A



Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	111	0	0.53	59				59	*
WB	LT R	182		0.60	109				109	*
NB	2T+TR	767	0	0.37	284	179	0.60	107	391	
SB	T R	870		0.53	461				516	*
		63	40	1.00	23	50	1.10	55	78	
Note:									CLV	684
									v/c	0.441
									LOS	A
					Congestion Equiv.					
					1550					

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	144	0	0.60	86				86	*
WB	LT R	343		0.60	206				206	*
NB	2T+TR	1470	0	0.37	544	133	0.60	80	624	*
SB	T+TR R	775		0.53	411				445	
		32	32	1.00	0	31	1.10	34	34	
Note:									CLV	916
									v/c	0.591
									LOS	A
					Congestion Equiv.					
					1550					

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	Yes	124	272		1.00	179	133		0.60	107	80
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	Yes	63	32		1.00	36	44		1.10	40	32

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

14

Critical Lane Volume and Level of Service Calculations

Intersection: 14. Nebel St / Randolph Rd

Jurisdiction: Montgomery County, MD

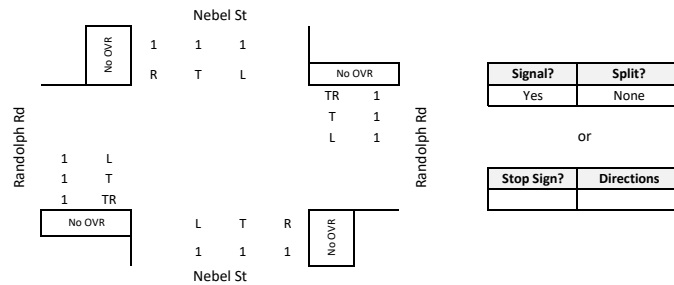
Scenario/Design Year: Total Future Phase 2 Conditions

Computed by: W+A



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Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	754	0	0.53	400	177	1.10	195	595	
WB	T+TR	1259	0	0.53	667	16	1.10	18	685	*
NB	T	66	0	1.00	66	153	1.10	168	234	*
SB	T	74	0	1.00	74	102	1.10	112	186	
	R	14	0	1.00	14					
Note:									CLV	919
									v/c	0.593
									LOS	A
					Congestion Equiv.					
					1550					

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	1168	0	0.53	619	183	1.10	201	820	*
WB	T+TR	1018	0	0.53	540	21	1.10	23	563	
NB	T	145	0	1.00	145	298	1.10	328	473	*
SB	T	171	0	1.00	171	125	1.10	138	309	
	R	24	0	1.00	24				162	
Note:									CLV	1459
									v/c	0.941
									LOS	E
					Congestion Equiv.					
					1550					

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap		
		AM	PM		LUF	AM	PM		LUF	AM	PM	
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

17

**Critical Lane Volume
and
Level of Service Calculations**

Intersection: 17. Chapman Ave / Thompson Ave

Jurisdiction: Montgomery County, MD

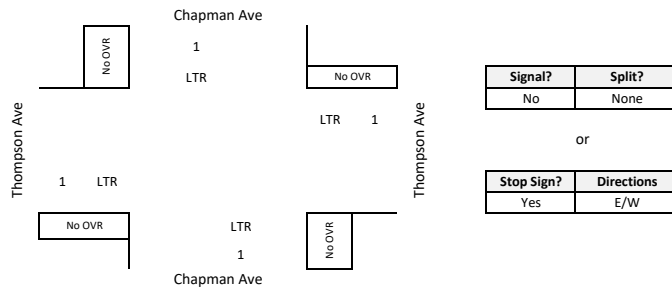
Scenario/Design Year: Total Future Phase 2 Conditions

Computed by: W+A



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Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	42	0	1.00	42				42	
WB	LTR	47	0	1.00	47				47	*
NB	LTR	186	0	1.00	186				186	*
SB	LTR	160	0	1.00	160				160	
Note:									CLV	233
									v/c	0.150
									LOS	A
									Congestion Equiv.	
									1550	

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	LTR	165	0	1.00	165				165	*
WB	LTR	26	0	1.00	26				26	
NB	LTR	330	0	1.00	330				330	*
SB	LTR	315	0	1.00	315				315	
Note:									CLV	495
									v/c	0.319
									LOS	A
									Congestion Equiv.	
									1550	

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap		
		AM	PM		LUF	AM	PM		LUF	AM	PM	
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

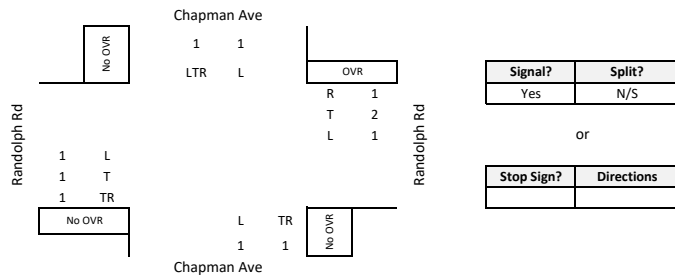
16

**Critical Lane Volume
and
Level of Service Calculations**

Intersection: **16. Chapman Ave / Randolph Rd**
 Jurisdiction: **Montgomery County, MD**
 Scenario/Design Year: **Total Future Phase 2 Conditions**
 Computed by: **W+A**



Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	807	0	0.53	428	9	1.10	10	438	
WB	T	1225		0.53	649				734	*
	R	66	30	1.00	36	77	1.10	85	121	
NB	LTR	21	0	1.00	21				21	*
SB	LTR	58	0	0.60	35				35	*
Note:									CLV	790
									v/c	0.510
									LOS	A
					1550					

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	T+TR	1084	0	0.53	575	14	1.10	15	590	*
									15	
WB	T	791		0.53	419				577	
	R	127	127	1.00	0	144	1.10	158	158	
NB	LTR	94	0	1.00	94				94	*
									0	
SB	LTR	299	0	0.60	179				179	*
									0	
Note:									CLV	863
									v/c	0.557
									LOS	A
					1550					

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	Yes	66	127		1.00	27	152		1.10	30	127
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

15

Critical Lane Volume and Level of Service Calculations

Intersection: 15. Rockville Pike / Hubbard Dr

Jurisdiction: Montgomery County, MD

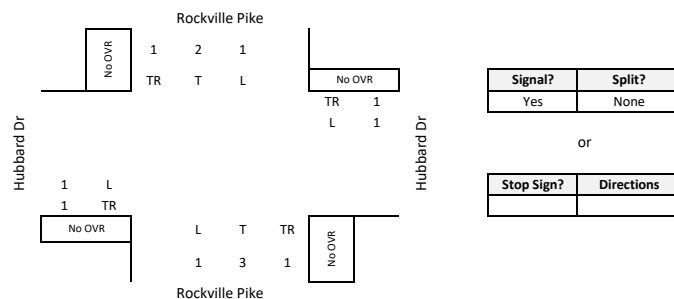
Scenario/Design Year: Total Future Phase 2 Conditions

Computed by: W+A



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Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	20	0	1.00	20	77	1.10	85	105	*
WB	TR	66	0	1.00	66	20	1.10	22	88	
NB	3T+TR	1951	0	0.30	585	48	1.10	53	638	
SB	2T+TR	2671	0	0.37	988	25	1.10	28	1016	*
Note:									CLV	1121
									v/c	0.723
									LOS	B

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB	TR	44	0	1.00	44	186	1.10	205	249	
WB	TR	151	0	1.00	151	40	1.10	44	195	*
NB	3T+TR	3036	0	0.30	911	161	1.10	177	1088	*
SB	2T+TR	2247	0	0.37	831	18	1.10	20	851	
Note:									CLV	1337
									v/c	0.863
									LOS	D

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap	
		AM	PM		LUF	AM	PM		LUF	AM	PM
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0

Montgomery County LATR

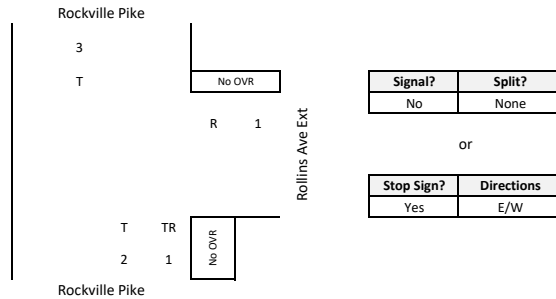
		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

Critical Lane Volume and Level of Service Calculations

Intersection: **Rockville Pike / Rollins Ave Ext**
 Jurisdiction: **Montgomery County, MD**
 Scenario/Design Year: **Total Future Phase 2 Conditions**
 Computed by: **W+A**



Intersection Lane Use & Traffic Control



AM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB										
WB	R	45	0	1.00	45				45	*
NB	2T+TR	1761	0	0.37	652				652	
SB	3T	2138	0	0.37	791				791	*
Note:									CLV	836
									v/c	0.523
									LOS	A
									1600	

Right Turn Overlap

Approach	Excl. Right	Right Vol.				Adjacent Overlap Vol.				Overlap		
		AM	PM		LUF	AM	PM		LUF	AM	PM	
Eastbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Westbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Northbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	
Southbound	No	n/a	n/a		n/a	n/a	n/a		n/a	0	0	

PM Peak Hour Critical Lane Volume Analysis

Direction	Lane Group	Lane Group Volume	Right Turn Overlap	Lane Use Factor (LUF)	Volume	Opposing Lefts	Lane Use Factor (LUF)	Opposing Volume	Critical Lane Volume (CLV)	Included in CLV
EB										
WB	R	143	0	1.00	143				143	*
NB	2T+TR	2814	0	0.37	1041				1041	*
SB	3T	1917	0	0.37	709				709	
Note:									CLV	1184
									v/c	0.740
									LOS	C
									1600	

Montgomery County LATR

		Lane Use Factors					
		Number of Lanes	Left Turn LUF	Through LUF			
		1	1.1	1.00			
		2	0.6	0.53			
		3	0.4	0.37			
		4		0.30			
		5		0.25			

Intersection	Policy Area	Operating Condition	Measure of Performance	Existing Conditions		Future Background Conditions		P1 Total Future Conditions		P2 Total Future Conditions		Background vs. Total Future	
				AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
01. Rockville Pike / Bou Ave	Orange	Signalized	CLV Pass/Fail (1550 CLV Max)	829 Pass	1154 Pass	1126 Pass	1386 Pass	1165 Pass	1520 Pass	1181 Pass	1546 Pass	+55 +4.9%	+160 +11.5%
02. Rockville Pike / Pike Center / Federal Plaza	Orange	Signalized	CLV Pass/Fail (1550 CLV Max)	625 Pass	874 Pass	907 Pass	1097 Pass	908 Pass	1180 Pass	924 Pass	1099 Pass	+17 +1.9%	+2 +0.2%
03. Rockville Pike / Gas Station	Orange	Unsignalized	CLV Pass/Fail (1550 CLV Max)	535 Pass	748 Pass	817 Pass	979 Pass	809 Pass	1039 Pass	0 Pass	0 Pass	-817 -100.0%	-979 -100.0%
04. Rockville Pike / Twinbrook Park / Rollins Ave	Red	Signalized	CLV Pass/Fail (1550 CLV Max)	778 Pass	977 Pass	1068 Pass	1259 Pass	1079 Pass	1317 Pass	1084 Pass	1415 Pass	+16 +1.5%	+156 +12.4%
05. Twinbrook Park / Chapman Ave	Red	Signalized	CLV Pass/Fail (1550 CLV Max)	724 Pass	1128 Pass	792 Pass	1184 Pass	799 Pass	1184 Pass	856 Pass	1234 Pass	+64 +8.1%	+50 +4.2%
06. Chapman Ave / Site Drive North	Orange	Unsignalized	CLV Pass/Fail (1550 CLV Max)	318 Pass	399 Pass	351 Pass	427 Pass	350 Pass	418 Pass	420 Pass	507 Pass	+69 +19.7%	+80 +18.7%
07. Chapman Ave / Rollins Ave	Orange	Unsignalized	CLV Pass/Fail (1550 CLV Max)	454 Pass	826 Pass	474 Pass	880 Pass	486 Pass	853 Pass	520 Pass	949 Pass	+46 +9.7%	+69 +7.8%
08. Chapman Ave / Site Drive South	Orange	Unsignalized	CLV Pass/Fail (1550 CLV Max)	343 Pass	675 Pass	363 Pass	729 Pass	353 Pass	728 Pass	0 Pass	0 Pass	-363 -100.0%	-729 -100.0%
09. Chapman Ave / Bou Ave	Orange	Signalized	CLV Pass/Fail (1550 CLV Max)	479 Pass	912 Pass	509 Pass	984 Pass	512 Pass	970 Pass	572 Pass	1010 Pass	+63 +12.4%	+26 +2.6%
10. Bou Ave / Site Drive	Orange	Unsignalized	CLV Pass/Fail (1550 CLV Max)	343 Pass	597 Pass	326 Pass	623 Pass	518 Pass	810 Pass	383 Pass	864 Pass	+57 +17.5%	+241 +38.7%
11. Rollins Ave / East Jefferson St	City of Rockville	Signalized	CLV Pass/Fail (1550 CLV Max)	729 Pass	1106 Pass	750 Pass	1165 Pass	820 Pass	1165 Pass	807 Pass	1155 Pass	+57 +7.6%	-10 -0.9%
12. Rockville Pike / Halpine Rd	Red	Signalized	CLV Pass/Fail (1550 CLV Max)	657 Pass	877 Pass	1024 Pass	1243 Pass	1035 Pass	1296 Pass	1040 Pass	1302 Pass	+16 +1.6%	+59 +4.7%
13. Twinbrook Park / Parklawn Dr	Red	Signalized	CLV Pass/Fail (1550 CLV Max)	636 Pass	900 Pass	657 Pass	916 Pass	659 Pass	916 Pass	684 Pass	916 Pass	+27 +4.1%	- -
14. Nebel St / Randolph Rd	Red	Signalized	CLV Pass/Fail (1550 CLV Max)	745 Pass	1228 Pass	849 Pass	1442 Pass	899 Pass	1455 Pass	919 Pass	1459 Pass	+70 +8.2%	+17 +1.2%
15. Rockville Pike / Hubbard Dr	Orange	Signalized	CLV Pass/Fail (1550 CLV Max)	806 Pass	1083 Pass	1097 Pass	1278 Pass	1104 Pass	1321 Pass	1121 Pass	1337 Pass	+24 +2.2%	+59 +4.6%
16. Chapman Ave / Randolph Rd	Red	Signalized	CLV Pass/Fail (1550 CLV Max)	678 Pass	802 Pass	736 Pass	842 Pass	734 Pass	863 Pass	790 Pass	863 Pass	+54 +7.3%	+21 +2.5%
17. Chapman Ave / Thompson Ave	Red	Unsignalized	CLV Pass/Fail (1550 CLV Max)	233 Pass	495 Pass	233 Pass	495 Pass	233 Pass	495 Pass	233 Pass	495 Pass	- -	- -
18. Rockville Pike / Rollins Ave Ext	Orange	Unsignalized	CLV Pass/Fail (1550 CLV Max)	0 Pass	0 Pass	0 Pass	0 Pass	837 Pass	1133 Pass	836 Pass	1184 Pass		

APPENDIX F
COMPILED
QUEUEING RESULTS

Table 2
Pike Center
Composite Queuing Summary ¹

Approach/ Lane Group	Storage Length (ft)	Existing Conditions														Existing Conditions														
		AM Peak Hour														PM Peak Hour														
		Run 1 50	Run 1 95	Run 2 50	Run 2 95	Run 3 50	Run 3 95	Run 4 50	Run 4 95	Run 5 50	Run 5 95	Average 50	Average 95	Run 1 50	Run 1 95	Run 2 50	Run 2 95	Run 3 50	Run 3 95	Run 4 50	Run 4 95	Run 5 50	Run 5 95	Average 50	Average 95					
1. Rockville Pike / Bou Avenue -- Orange Policy Area																														
EBR	69	55	113	72	145	66	132	88	167	49	106	66	133	111	180	129	174	120	174	130	172	111	187	120	177					
WBL	90	28	73	35	75	29	71	41	79	28	69	32	73	47	83	40	80	42	85	49	87	43	83	44	84					
WBL	192	181	250	185	244	187	248	185	249	185	239	185	246	183	245	174	253	182	247	164	245	177	262	176	250					
NBL	192	181	248	184	252	187	239	185	249	185	247	184	247	189	254	182	262	191	252	180	251	184	277	185	259					
WBTR	200	55	165	62	184	53	146	80	197	58	166	62	172	154	239	137	233	142	243	148	238	143	231	145	237					
NBL	175	42	106	40	82	45	112	79	155	51	114	51	114	86	159	96	193	92	172	111	194	111	206	99	185					
NBT	394	90	237	97	257	115	297	113	281	87	218	100	258	212	447	241	482	280	487	283	530	270	510	257	491					
NBT	394	127	304	109	283	129	298	130	299	114	248	122	286	239	459	280	491	308	516	301	528	298	537	285	506					
NBT	394	112	275	103	272	119	277	124	287	109	232	113	269	226	452	273	480	288	508	301	532	289	518	275	498					
NBR	394	64	162	50	132	59	159	83	227	56	146	62	165	172	344	147	320	177	389	177	426	129	275	160	351					
SBL	245	91	199	87	181	87	175	92	197	88	196	89	190	238	329	250	339	259	297	247	357	243	332	247	331					
SBT	511	87	212	82	231	139	340	130	318	122	292	112	279	328	648	469	660	434	667	453	690	379	709	413	675					
SBT	511	110	265	98	262	150	348	159	373	138	328	131	315	211	471	189	453	165	392	152	375	157	415	175	421					
SBTR	511	115	273	111	298	165	386	173	383	147	332	142	334	190	444	174	405	152	355	147	369	164	409	165	396					
2. Rockville Pike / Pike Center Driveway / Federal Plaza Driveway -- Orange Policy Area																														
EBLT	79	43	102	39	115	40	92	50	107	50	119	44	107	134	176	126	181	135	178	137	199	124	193	131	185					
EBR	150	45	80	44	80	42	78	43	91	43	84	43	83	67	98	68	90	67	98	61	95	69	91	66	94					
WBLTR	42	21	55	13	37	11	33	16	38	5	35	13	40	56	107	42	86	58	108	48	93	47	99	50	99					
NBL	245	55	115	54	105	53	113	63	134	18	47	49	103	134	271	127	248	142	270	160	297	141	249	141	267					
NBT	511	8	38	6	27	8	34	4	26	44	98	14	45	187	426	171	451	218	492	238	496	244	523	212	478					
NBT	511	30	82	27	75	31	101	25	86	10	38	25	76	347	587	314	585	361	596	387	656	357	618	353	608					
NBTR	511	35	105	31	102	38	125	34	102	19	52	31	97	356	600	312	580	373	595	396	666	365	625	360	613					
SBL	175	16	48	17	47	18	53	22	55	22	63	19	53	22	70	22	58	22	75	38	117	20	67	25	77					
SBT	160	42	92	34	73	29	71	39	80	13	43	31	72	134	199	142	216	142	214	146	214	134	206	140	210					
SBT	160	40	87	29	67	34	82	30	73	38	81	34	78	113	198	100	179	88	176	97	177	99	174	99	181					
SBTR	160	34	83	28	67	25	73	27	76	43	82	31	76			109	184	97	175	103	185	111	194	105	185					
3. Rockville Pike/ Shell Gas Station Driveway - Unsignalized -- Orange Policy Area																														
WBR	50	12	35	30	15	14	40	14	42	12	36	16	34	30	53	31	60	29	56	38	60	35	61	33	58					
NBT	160	0	0					2	17	1	6	1	8	1	14	7	57					2	16	3	29					
NBT	160													18	80	23	104	14	73	57	179	52	167	33	121					
NBTR	160													21	110	2	109	11	66	48	169	50	163	30	123					
SBT	238													94	276	179	371	177	378	210	397	149	366	162	358					
SBT	238													61	218	64	215	25	117	42	165	84	261	55	195					
SBT	238													52	194	32	132	19	95	40	159	44	163	37	149					
4. Rockville Pike / Twinbrook Pkwy / Rollins Ave -- Red Policy Area																														
EBT	1299	65	146	131	77	102	207	124	323	58	126	96	176	168	353	310	752				477	1076	238	621	298	701				
EBTR	1299	96	170	207	109	124	216	167	350	115	182	142	205	193	365	338	799				511	1148	269	673	328	746				
WBT	549	70	138	220	61	84	194	48	115	76	181	100	138	64	126	59	132				63	138	57	132	61	132				
WBT	549	66	147	265	54	92	257	44	108	67	182	107	150	59	123	52	144	44	118	48	111	45	102	50	120					
WBR	150	47	128	175	51	55	150	35	91	58	142	74	112	41	109	48	120	41	107	35	80	48	124	43	108					
NBL	238	26	70	114	43	35	98	24	62	50	120	50	120	19	49	48	131	34	84	29	100	38	116	36	96					
NBT	238	61	125	237	75	53	112	66	128	49	106	93	109	152	253	129	237	127	218	166	277	147	261	144	249					
NBT	238	51	119	241	62	43	109	64	124	43	95	88	102	140	232	128	229	130	227	169	283	155	263	144	247					
NBT	238	40	105	200	46	37	113	51	124	26	74	71	92	129	222	123	230	108	210	162	289	154	290	135	248					
NBR	300	59	118	161	81	5	50	5	55	52	106	56	82	0	11	89	14	105	54	210	56	214	27	124						
SBL	400	89	169	195	74	62	146	55	127	88	185	98	140	98	214	149	371	201	500	228	499	138	361	163	389					
SBT	1180	71	158	251	68	89	160	72	146	71	168	111	140	279	415	318	518	695	1407	441	795	483	1130	443	853					
SBT	1180					71	144	61	140			66	142	245	372	278	472	570	1201	381	716	388	905	372	733					
SBTR	1180	69	163	66	182	62	152	58	134	69	167	65	160	202	309	220	355	427	970	242	391	296	658	277	537					
5. Chapman Ave / Twinbrook Pkwy -- Red Policy Area																														
EBL	175	18	94	11	37	20	97	31	134	4	15	17	75	62	184	79	224	65	199	73	210	65	202	69	204					

Background Conditions												Background Conditions											
AM Peak Hour												PM Peak Hour											
Run 1 50	Run 1 95	Run 2 50	Run 2 95	Run 3 50	Run 3 95	Run 4 50	Run 4 95	Run 5 50	Run 5 95	Average 50	Average 95	Run 1 50	Run 1 95	Run 2 50	Run 2 95	Run 3 50	Run 3 95	Run 4 50	Run 4 95	Run 5 50	Run 5 95	Average 50	Average 95
49	104	59	120	67	134	45	116	55	124	55	120	101	188	100	169	112	181	126	170	103	166	109	175
32	74	40	81	37	81	26	65	24	65	32	74	46	84	34	76	46	85	44	85	45	84	43	83
188	242	190	233	188	244	179	232	191	234	188	237	179	249	179	253	180	252	184	254	179	246	181	251
189	240	188	247	188	244	181	245	192	234	188	242	183	252	190	266	188	250	192	260	183	250	188	256
59	164	56	167	48	155	53	159	59	174	55	164	143	230	150	231	147	253	160	232	151	234	151	236
52	111	43	114	51	116	45	125	75	184	54	130	86	178	97	205	86	186	75	170	94	187	88	186
147	359	230	477	155	394	195	428	221	463	190	425	353	531	347	522	362	493	380	496	360	529	361	515
192	406	259	502	187	413	231	469	252	481	225	455	376	497	369	510	371	499	391	486	378	518	377	502
196	413	260	494	177	403	222	439	249	483	221	447	374	518	374	511	374	519	385	503	377	521	377	515
52	136	75	190	43	120	66	176	68	196	61	164	190	444	150	401	105	293	169	412	138	353	151	381
126	246	124	233	114	231	100	202	175	305	128	244	248	341	253	325	246	332	247	347	250	336	249	337
205	440	193	444	209	494	148	347	231	522	198	450	454	700	459	680	436	716	432	716	471	705	451	704
222	473	228	470	241	528	175	386	274	562	228	484	226	533	244	551	216	543	216	510	200	507	221	529
234	483	243	494	257	537	188	391	272	555	239	492	217	498	213	489	212	514	228	525	197	505	214	507
54	116	45	99	49	104	52	120	67	142	54	117	135	190	140	191	140	189	135	195	131	185	137	190
46	83	45	75	49	79	44	71	49	83	47	79	68	96	64	95	62	91	67	95	68	84	66	93
14	39	14	37	15	48	19	52	14	42	16	44	48	101	53	101	52	102	56	101	43	84	51	98
53	111	55	107	58	111	64	140	54	118	57	118	123	258	153	305	143	264	157	298	155	294	147	284
51	245	56	218	54	198	44	201	64	271	54	227	291	514	357	596	318	554	306	555	313	552	317	555
157	447	161	439	149	428	116	370	155	416	148	420	451	625	449	628	429	619	449	629	443	633	445	627
179	478	171	466	160	440	128	393	168	440	162	444	459	611	444	629	446	623	463	633	449	634	453	626
15	48	22	58	19	48	21	58	24	60	21	55	17	80	12	45	12	58	12	59	16	79	14	65
80	153	84	161	92	167	74	147	102	193	87	165	150	201	149	221	144	209	149	210	153	204	149	209
88	162	91	183	102	182	95	164	107	197	97	178	121	203	130	212	121	203	123	207	122	204	124	206
93	168	92	189	105	184	85	167	106	202	97	182	128	191	134	206	126	208	132	208	127	203	130	204
11	37	12	37	14	44	14	39	18	48	14	41	35	65	31	56	37	56	33	58	29	56	33	59
3	28				1	15	0	0	2	15	1	9	2	21	5	38				1	11	3	20
45	158	27	107	15	83	14	66	26	116	26	106	37	143	23	98	36	131	67	179	32	133	39	137
43	164	28	131	17	94	11	77	25	121	25	118	45	159	18	93	33	142	46	155	17	97	32	130
5	28	15	87	7	51	5	42	19	99	11	62	216	397	222	393	8	397	215	396	216	399	219	397
8	46	17	95	11	65	7	54	28	116	15	76	116	310	124	328	65	223	119	324	96	285	104	294
13	68	20	102	14	73	6	42	33	119	18	81	106	294	119	316	66	214	110	307	93	275	99	282
112	225	98	185	117	209	102	207	82	163	103	198	763	1581	454	1230	645	1480	672	1579	690	1561	645	1487
165	283	148	242	171	255	144	250	159	272	158	261	803	1631	488	1247	678	1515	691	1565	710	1569	674	1506
77	165	75	152	66	141	79	213	68	183	73	171	69	132	65	133	64	121	62	122	79	157	68	133
94	238	71	163	67	161	75	212	70	193	76	194	51	111	59	147	54	123	57	132	68	170	58	137
96	189	91	189	67	169	62	146	105	186	85	176	61	142	61	156	39	108	35	96	65	157	53	132
57	128	63	149	58	133	66	144	52	118	60	135	56	148	35	135	65	109	45	101	58	140	66	139
145	278	137	280	111	225	118	261	137	274	130	264	137	244	141	242	156	267	168	292	127	232	146	256
143	269	139	289	111	222	122	264	143	278	132	265	134	244	137	241	158	267	168	289	129	238	146	256
148	258	146	289	117	232	122	262	142	285	135	266	134	249	134	230	147	259	171	307	117	220	141	253
27	152	20	130	20	129	20	129	13	103	20	129	7	72	14	105					0	0	11	76
120	228	104	196	95	194	129	241	139	243	118	221	284	570	304	568	325	571	283	558	299	568	299	567
143	246	148	236	141	252	123	208	153	252	142	239	823	1479	841	1490	851	1505	717	1338	849	1515	817	1466
139	245	161	276	148	265	135	236	158	298	149	264	702	1278	666	1273	815	1449	684	1290	609	1151	696	1289
135	251	157	266	140	254	127	223	155	294	143	258	668	1206	615	1195	757	1366	611	1196	510	964	633	1188
20	95	17	76	13	51	18	79	17	80	17	77	46	153	57	179	46	157	46	166	49	166	49	165
235	530	148	282	157	346	139	284	183	312	173	351	177	340	276	524	232	394	240	507	217	377	229	429
276	567	205	354	201	408	188	343	232	389	2													

Phase 1 Conditions												Phase 1 Conditions																																					
AM Peak Hour												PM Peak Hour																																					
Run 1 50	Run 1 95	Run 2 50	Run 2 95	Run 3 50	Run 3 95	Run 4 50	Run 4 95	Run 5 50	Run 5 95	Average 50	Average 95	Run 1 50	Run 1 95	Run 2 50	Run 2 95	Run 3 50	Run 3 95	Run 4 50	Run 4 95	Run 5 50	Run 5 95	Average 50	Average 95	Run 1 50	Run 1 95	Run 2 50	Run 2 95	Run 3 50	Run 3 95	Run 4 50	Run 4 95	Run 5 50	Run 5 95	Average 50	Average 95														
66	133	65	133	87	155	60	139	59	129	67	138	123	162	111	162	93	178	104	159	108	172	108	167	33	79	34	74	34	82	35	73	33	70	34	76	42	89	48	85	42	82	74	81	52	75	46	82		
186	241	185	241	186	240	181	228	191	215	186	233	181	239	188	229	188	229	185	238	183	245	185	236	189	245	193	243	188	239	186	226	195	216	190	234	188	252	192	236	192	219	190	218	191	246	191	246	191	234
56	183	67	192	39	134	51	165	60	178	55	170	141	229	133	232	113	236	109	226	144	248	128	234	46	112	41	119	39	114	43	103	44	107	43	111	111	206	78	191	91	195	93	199	97	205	94	199		
233	478	201	444	182	431	153	368	217	469	197	438	373	487	363	526	382	525	367	512	382	517	373	513	233	478	201	444	182	431	153	368	217	469	197	438	373	487	363	526	382	525	367	512	382	517	373	513		
252	487	219	470	199	434	200	423	262	479	226	459	386	480	380	531	393	513	384	498	390	514	387	507	252	487	219	470	199	434	200	423	262	479	226	459	386	480	380	531	393	513	384	498	390	514	387	507		
257	483	218	460	212	439	189	401	273	482	230	453	391	477	381	533	392	512	387	512	392	499	389	507	257	483	218	460	212	439	189	401	273	482	230	453	391	477	381	533	392	512	387	512	392	499	389	507		
123	296	87	214	76	199	74	202	87	241	89	230	200	475	225	490	226	498	159	388	227	472	207	465	123	296	87	214	76	199	74	202	87	241	89	230	200	475	225	490	226	498	159	388	227	472	207	465		
145	221	130	205	141	219	160	211	148	214	145	214	169	204	162	218	171	195	161	222	166	208	166	209	145	221	130	205	141	219	160	211	148	214	145	214	169	204	162	218	171	195	161	222	166	208	166	209		
176	285	154	265	167	284	190	290	180	265	173	278	214	273	200	285	217	265	201	291	212	256	209	274	176	285	154	265	167	284	190	290	180	265	173	278	214	273	200	285	217	265	201	291	212	256	209	274		
168	270	160	272	143	270	152	253	162	249	157	263	130	243	116	245	114	237	123	252	106	222	118	240	168	270	160	272	143	270	152	253	162	249	157	263	130	243	116	245	114	237	123	252	106	222	118	240		
157	252	153	253	146	272	148	260	155	248	152	257	121	239	118	249	121	244	132	250	114	235	121	243	157	252	153	253	146	272	148	260	155	248	152	257	121	239	118	249	121	244	132	250	114	235	121	243		
25	65	14	39	18	45	29	68	16	48	20	53	107	161	115	170	116	167	105	171	115	177	112	169	25	65	14	39	18	45	29	68	16	48	20	53	107	161	115	170	116	167	105	171	115	177	112	169		
60	122	55	101	64	126	62	105	57	112	60	113	121	168	126	175	115	180	121	178	112	165	119	173	60	122	55	101	64	126	62	105	57	112	60	113	121	168	126	175	115	180	121	178	112	165	119	173		
12	38	15	41	17	44	13	44	11	34	14	40	70	120	84	127	67	122	67	116	63	111	70	119	12	38	15	41	17	44	13	44	11	34	14	40	70	120	84	127	67	122	67	116	63	111	70	119		
86	160	53	100	67	115	59	143	65	150	62	134	120	222	86	205	108	221	102	208	137	273	111	226	86	160	53	100	67	115	59	143	65	150	62	134	120	222	86	205	108	221	102	208	137	273	111	226		
86	250	65	218	43	168	91	276	66	220	70	226	199	308	180	367	190	358	212	356	214	335	199	345	86	250	65	218	43	168	91	276	66	220	70	226	199	308	180	367	190	358	212	356	214	335	199	345		
148	355	126	327	100	295	161	367	167	366	140	342	276	352	266	370	276	359	274	355	277	352	274	358	148	355	126	327	100	295	161	367	167	366	140	342	276	352	266	370	276	359	274	355	277	352	274	358		
152	356	139	334	104	301	166	363	177	373	148	345	279	348	269	363	281	349	278	353	284	358	278	354	152	356	139	334	104	301	166	363	177	373	148	345	279	348	269	363	281	349	278	353	284	358	278	354		
9	57	5	28	10	33	7	51	8	31	8	40	30	113	22	95	23	86	30	102	30	103	27	100	9	57	5	28	10	33	7	51	8	31	8	40	30	113	22	95	23	86	30	102	30	103	27	100		
126	221	93	187	99	198	149	215	108	199	115	204	154	203	150	204	155	209	156	205	156	206	154	205	126	221	93	187	99	198	149	215	108	199	115	204	154	203	150	204	155	209	156	205	156	206	154	205		
133	225	103	197	107	205	155	229	114	209	122	213	135	224	95	190	97	194	128	217	105	203	112	206	133	225	103	197	107	205	155	229	114	209	122	213	135	224	95	190	97	194	128	217	105	203	112	206		
127	225	102	192	114	204	149	220	115	207	121	210	138	218	95	186	102	200	134	216	109	199	116	204	127	225	102	192	114	204	149	220	115	207	121	210	138	218	95	186	102	200	134	216	109	199	116	204		
10	35	14	36	20	47	12	36	16	44	14	40	23	47	29	58	34	65	33	65	30	54	30	58	3	25	4	24	5	46	14	76	7	43	7	43	4	38	1	14	10	70	3	23	30	12	3	36		
3	25	4	24	5	46	14	76	7	43	7	43	4	38	1	14	10	70	3	23	30	12	3	36	3	25	4	24	5	46	14	76	7	43	7	43	4	38	1	14	10	70	3	23	30	12	3	36		
50	156	46																																															

Phase 2 Conditions														Phase 2 Conditions													
AM Peak Hour														PM Peak Hour													
Run 1 S0	Run 1 S5	Run 2 S0	Run 2 S5	Run 3 S0	Run 3 S5	Run 4 S0	Run 4 S5	Run 5 S0	Run 5 S5	Average S0	Average S5	Run 1 S0	Run 1 S5	Run 2 S0	Run 2 S5	Run 3 S0	Run 3 S5	Run 4 S0	Run 4 S5	Run 5 S0	Run 5 S5	Average S0	Average S5				
44	102	52	109	79	139	35	91	42	88	50	106	72	114	149	117	73	109	76	99	77	110	89	110				
42	92	26	74	45	107	29	74	28	69	34	83	19	73	97	22	14	57	25	85	15	65	34	60				
192	234	169	275	174	258	188	245	191	239	183	250	68	215	204	95	55	184	62	191	89	191	89	175				
192	241	195	252	190	253	180	238	195	226	192	242	132	271	204	182	214	253	181	228	61	180	158	225				
54	172	91	201	117	236	53	165	35	113	70	177	129	197	191	147	160	215	150	208	67	131	139	180				
50	118	34	120	29	99	42	90	55	164	42	118	35	140	199	30	10	47	21	113	21	93	57	85				
222	487	154	398	222	507	142	340	318	545	212	455	392	429	423	122	65	289	380	508	376	484	327	366				
296	515	223	485	325	517	189	382	348	561	276	492	427	455	424	141	389	490	387	488	394	482	404	411				
297	539	349	541	324	554	200	399	349	549	304	516	407	425	442	254	382	481	387	488	393	475	402	425				
57	155	155	383	176	485	64	216	33	150	97	290	284	494	431	344	22	117	62	278	312	441	222	335				
128	212	128	229	104	200	95	172	133	201	118	203	167	183	179	164	163	210	158	207	158	198	165	192				
154	281	160	284	126	254	130	241	181	280	150	268	205	245	243	195	203	265	209	286	188	221	210	242				
133	258	150	255	125	250	139	246	161	260	142	254	72	215	56	182	46	166	42	156	51	173	53	178				
129	247	152	251	126	247	134	240	151	266	138	250	63	196	57	184	43	159	52	183	49	180	53	180				
23	67	19	55	15	50	17	47	19	54	19	55	34	117	29	106	122	39	50	136	32	120	53	104				
65	125	53	95	58	106	50	104	51	99	55	106	99	134	102	133	122	98	96	133	98	133	103	126				
34	80	19	46	20	56	29	72	23	53	25	61	23	44	22	41	49	21	24	48	28	53	29	41				
67	168	34	92	31	96	58	102	67	172	51	126	40	147	31	103	144	18	20	84	16	70	50	84				
123	311	21	111	29	139	42	157	90	268	61	197	61	231	41	181	252	28	35	165	26	137	83	148				
209	390	62	220	73	259	138	328	146	352	126	310	98	316	103	307	330	55	59	235	59	242	130	231				
215	389	103	321	73	263	136	326	262	439	158	348	103	327	104	316	290	50	63	235	59	239	124	233				
5	25	23	100	4	20	16	47	15	46	13	48	9	54	3	16	26	1	9	1	8	8	18					
5	116	258	133	290	4	171	75	147	111	224	104	218	203	300	205	300	238	130	215	299	214	297	215				
128	267	136	290	91	175	91	179	114	236	112	229	81	233	72	226	238	44	77	238	57	209	105	190				
129	275	135	294	92	186	96	187	109	234	112	235	85	242	78	240	239	43	78	240	60	218	108	197				
694	1505	161	434	711	1492	220	452	405	1023	438	981	758	1670	898	912	948	1758	829	1673	951	1754	877	1718				
171	1617	226	481	824	1633	286	518	468	1096	515	1069	776	1664	1377	1727	976	1766	864	1698	965	1759	899	1723				
50	124	44	97	42	108	64	141	42	94	48	113	20	73	36	119	14	64	33	112	20	83	25	90				
52	168	36	118	33	95	71	196	62	215	51	158	19	70	34	136	16	108	27	123	21	115	23	110				
64	153	50	138	57	141	107	200	88	202	73	163	30	119	45	144	23	104	38	134	24	108	32	122				
60	162	32	111	19	66	79	191	78	203	54	147	17	62	30	111	8	37	15	79	10	73	16	72				
218	393	88	233	113	298	205	354	167	357	158	327	78	266	72	246	67	247	57	203	68	262	68	245				
200	359	84	221	94	267	199	342	155	331	146	304	77	260	70	237	64	235	58	194	56	216	65	228				
177	320	78	203	94	252	168	285	146	302	133	272	59	212	55	189	52	198	38	146	47	184	50	186				
96	305				18	118	30	139	47	186	48	187	85	192			58	169					181				
279	523	230	495	231	447	178	288	215	453	227	441	248	403	103	365	371	536	358	563	355	528	287	479				
365	843	455	1125	166	459	124	207	290	801	280	687	887	1542	940	1584	996	1544	960	1538	981	1595	953	1561				
331	784	437	1086	166	447	124	208	279	740	267	653	441	859	380	876	144	558	947	1539	231	574	429	881				
167	334	405	1048	118	213	123	209	185	526	200	466	253	807	172	532	110	416	223	729	133	547	178	606				
30	132	34	146	26	128	51	185	42	172	37	153	23	103	11	67	15	92	15	92	19	110	17	93				
386	678	283	543	349	663	384	697	386	699	358	656	425	731	252	405	481	753	465	706	489	703	424	653				
476	771	346	604	473	744	441	729	449	727	437	715	461	735	262	416	487	717	492	714	496	681	440	660				
151	388	167	412	150	388	233	430	188	410	178	406	88	298	82	277	29	143	70	252	41	193	62	236				
304	389	318	333	316	356	311	381	300	404	310	373	306	373	293	365	297	382	293	374	300	387	298	376				
1014	1800	997	1729	1106	1738	1037	1746	1133	1767	1057	1758	1001	1729	937	1703	1107	1798	941	1779	1118	1753	1021	1752				
976	1810	875	1741	613	1588	894	1756	1021	1805	876	1738	958	1756	909	1704	1099	1816	934	1832	1111	1870	1002	1783				
101	174	104	177	92	158	88	177	101	171	99	171	36	134	44	146	23	86	44	136	19	85	33	117				
106	191	78	144	82	135	86	154	101	189	91	163	54	179	58	184	49	157	60	186	42	146	53	170				
22	51	22	52	18	47	25	63	27	69	23	56	30	93	48	128	23	82	26	85	24	85	30	95				
29	66	34	69	29	69	28	71	31	71	30	69	33	98	67	121	26	95	25	85	26	99	35	120				
67	150	66	169	57	114	47	104	54	109	58	129	361	691	691	660	415	713	399	709	423	719	385	696				
									0			0	256	691	211	637		256	691		241	673					
42	76	41	75	46	80	39	66	43	72	42	74	41	60	37	57	55	77	38	60	54	77	45	66				
4	18	2	12	6	25	4	16	2	14	4	17	23	44	28	62	23	43	21	41	33	70	26	52				
7	43	9	40	1	11	14	67	2	16	7	35	11	46	8	39	6	39	9	43	2	16	7	37				
7	41	1	9	1	9	8	48	6	40	5	29	22	90	26	94	15	70	26	98	13	60	20	82				
1	15	1	15	6	54	14	82	17	94	8	52	3	34	2	12	1	15	1	8				17				
157	278	153	273	169	271	142	266	169	271	158	272	144	268	134	263	163	268	149	277	160	267	150	269				
47	66	46	73	50	72	45	71	50	66	48	70	9	39	18	53	4	20	10	40	5	26	9	36				
63	121	67	125	86	127	68	135	77	128	72	127	14	56	7	32	10	40	64	101	6	27	20	51				
23	62	13	45	8	37	15	51	12	50	14	49	70	90	78	109	89	124	45	79	73	98	71	100				
5	25	1	8	1	8	8	63	11	69	5	35	136	228	162	240	162	209	177	269	158	251	159	239				
7	39	11	41	7	39	9	33	10	50	9	40	11	55	5	32	103	133	6	39	1	7	25	53				
87	152	90	158	96	152	91	161	96	155	92	156	90	165	77	146	97	158	79	140	85	136	86	149				

Table 4

Pike Center

Total Future Conditions Queuing Summary

Approach/ Lane Group	Storage Length (ft)	Existing Conditions				2034 Future Conditions without Development				2034 Phase 1 Future Conditions with Development				2039 Phase 2 Future Conditions with Development			
		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour		AM Peak Hour		PM Peak Hour	
		50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile	50th %tile	95th %tile
1. Rockville Pike ² / Bou Avenue -- Orange Policy Area																	
EBLT	69	66	133	120	177	55	120	109	175	67	138	108	167	50	106	89	110
EBR	90	32	73	44	84	32	74	43	83	34	76	46	82	34	83	34	60
WBL	192	185	246	176	250	188	237	181	251	186	233	185	236	183	250	89	175
WBL	192	184	247	185	259	188	242	188	256	190	234	191	234	192	242	158	225
WBTR	200	62	172	145	237	55	164	151	236	55	170	128	234	70	177	139	180
NBL	175	51	114	99	185	54	130	88	186	43	111	94	199	42	118	57	85
NBT	394	100	258	257	491	190	425	361	515	197	438	373	513	212	455	327	366
NBT	394	122	286	285	506	225	455	377	502	226	459	387	507	276	492	404	411
NBT	394	113	269	275	498	221	447	377	515	230	453	389	507	304	516	402	425
NBR	394	62	165	160	351	61	164	151	381	89	230	207	465	97	290	222	335
SBL	245	89	190	247	331	128	244	249	337	145	214	166	209	118	203	165	192
SBT	511	112	279	413	675	198	450	451	704	173	278	209	274	150	268	210	242
SBT	511	131	315	175	421	228	484	221	529	157	263	118	240	142	254	53	178
SBTR	511	142	334	165	396	239	492	214	507	152	257	121	243	138	250	53	180
2. Rockville Pike / Pike Center Driveway / Federal Plaza Driveway -- Orange Policy Area																	
EBLT	79	44	107	131	185	54	117	137	190	20	53	112	169	19	55	53	104
EBR	150	43	83	66	94	47	79	66	93	60	113	119	173	55	106	103	126
WBLTR	42	13	40	50	99	16	44	51	98	14	40	70	119	25	61	29	41
NBL	245	49	103	141	267	57	118	147	284	62	134	111	226	51	126	50	84
NBT	511	14	45	212	478	54	227	317	555	70	226	199	345	61	197	83	148
NBT	511	25	76	353	608	148	420	445	627	140	342	274	358	126	310	130	231
NBTR	511	31	97	360	613	162	444	453	626	148	345	278	354	158	348	124	233
SBL	175	19	53	25	77	21	55	14	65	8	40	27	100	13	48	8	18
SBT	160	31	72	140	210	87	165	149	209	115	204	154	205	104	218	215	265
SBT	160	34	78	99	181	97	178	124	206	122	213	112	206	112	229	105	190
SBTR	160	31	76	105	185	97	182	130	204	121	210	116	204	112	235	108	197

3. Rockville Pike/ Shell Gas Station Driveway - Unsignalized -- Orange Policy Area																	
WBR	50	16	34	33	58	14	41	33	59	14	40	30	58	None			
NBT	160	1	8	3	29	2	15	3	20	7	43	5	36				
NBT	160	0	0	33	121	26	106	39	137	55	172	39	137				
NBTR	160	0	0	30	123	25	118	32	130	57	182	31	131				
SBT	238	0	0	162	358	11	62	219	397	68	212	239	391				
SBT	238	0	0	55	195	15	76	104	294	74	222	73	241				
SBT	238	0	0	37	149	18	81	99	282	80	241	70	226				
4. Rockville Pike / Twinbrook Pkwy / Rollins Ave -- Red Policy Area																	
EBT	1299	96	176	298	701	103	198	645	1487	129	292	863	1714	438	981	877	1718
EBTR	1299	142	205	328	746	158	261	674	1506	196	376	889	1734	515	1069	899	1723
WBT	549	100	138	61	132	73	171	68	133	59	138	64	137	48	113	25	90
WBT	549	107	150	50	120	76	194	58	137	48	141	49	133	51	158	23	110
WBR	150	74	112	43	108	85	176	53	132	64	153	49	134	73	163	32	122
NBL	238	50	79	36	96	60	135	56	139	66	156	58	128	54	147	16	72
NBT	238	93	109	144	249	130	264	146	256	161	299	157	260	158	327	68	245
NBT	238	88	102	144	247	132	265	146	256	163	296	153	259	146	304	65	228
NBT	238	71	92	135	248	135	266	141	253	165	299	145	249	133	272	50	186
NBR	300	56	82	27	124	20	129	11	76	16	103	29	146	48	187	72	181
SBL	400	98	140	163	389	118	221	299	567	150	295	289	577	227	441	287	479
SBT	1180	111	140	443	853	142	239	817	1466	215	429	971	1552	280	687	953	1561
SBT	1180	66	142	372	733	149	264	696	1289	214	439	688	1252	267	653	429	881
SBTR	1180	65	160	277	537	143	258	633	1186	211	432	631	1167	200	466	178	606
5. Chapman Ave / Twinbrook Pkwy -- Red Policy Area																	
EBL	175	17	75	69	204	17	77	49	165	33	137	33	129	37	153	17	93
EBT	549	202	383	298	534	173	351	229	429	267	565	190	407	358	656	424	660
EBTR	549	239	421	331	590	221	413	255	466	313	615	227	456	437	715	440	653
WBL	300	218	413	230	393	210	412	218	379	194	410	225	396	178	406	62	233
WBL	300	309	366	279	386	307	367	277	383	310	363	295	390	310	373	298	376
WBT	1298	905	1651	716	1489	910	1693	634	1389	1025	1748	890	1709	1057	1758	1021	1752
WBTR	1298	778	1596	674	1442	843	1675	567	1312	888	1726	786	1635	876	1738	1002	1783
NBLT	167	53	116	117	187	91	167	112	190	88	154	111	183	99	171	33	117
NBR	167	99	173	174	210	98	177	174	205	88	156	172	205	91	163	53	170
SBL	300	15	57	71	156	14	53	74	154	23	57	69	123	23	56	30	95
SBL	300	55	104	120	211	46	95	136	255	31	74	79	147	30	69	35	120
SBT	530	50	105	137	278	49	108	179	399	58	128	215	440	58	129	385	696
SBR	300	0	0	9	94	0	0	28	167	0	0	38	240	0	0	241	673

6. Chapman Ave / Pike Center Driveway North - Unsignalized -- Orange Policy Area																	
EBLTR	50	2	13	21	54	0	0	13	40	0	0	12	39	42	74	45	66
WBLTR	50	1	14	10	32	4	18	15	44	4	20	23	58	4	17	26	52
NBLT	97	3	26	8	40	4	23	7	40	2	15	7	39	7	35	7	37
NBTR	97	6	37	92	137	5	28	87	139	4	23	91	157	5	29	20	82
SBLT	167	132	264	16	73	13	74	20	84	7	55	11	64	8	52	2	17
SBTR	167	0	0	118	257	135	267	115	254	156	267	144	271	158	272	150	269
7. Chapman Ave / Rollins Ave - Unsignalized -- Orange Policy Area																	
EBLTR	75	56	121	90	154	0	0	0	0	28	71	11	36	48	70	9	36
WBL	56	21	44	60	135	54	119	98	162	67	141	96	153	72	127	20	51
WBR	56	1	10	95	159	22	46	46	105	23	46	57	117	14	49	71	100
NBTR	112	20	68	42	108	3	19	76	155	8	38	83	170	5	35	159	239
SBLT	97	92	161	84	163	21	71	51	122	8	35	29	90	9	40	25	53
SBT	97	0	0	0	0	94	161	80	161	99	157	95	163	92	156	86	149
8. Chapman Ave / Pike Center Driveway South - Unsignalized -- Orange Policy Area																	
EBLR	35	2	11	10	29	2	12	5	23	None							
NBLT	46	2	12	81	158	1	16	52	139								
SBT	122	37	61	56	125	27	80	77	148								
SBT	122	34	47	24	78	8	37	25	80								
SBTR	122	111	143.6	101	155	106	153	102	153								
9. Chapman Ave / Bou Ave -- Orange Policy Area																	
EBL	201	49	80	84	137	43	75	98	161	32	64	90	138	35	62	98	158
EBTR	201	28	60	66	114	28	60	75	127	28	65	73	126	27	59	68	119
WBL	270	3	12	6	22	6	12	6	25	4	8	7	22	5	12	9	16
WBT	817	34	70	65	113	31	72	71	126	31	69	70	120	35	70	68	120
WBR	817	0	38	6	42	4	43	5	51	5	47	4	52	3	43	2	52
NBL	70	1	8	3	22	6	7.6	7	25	3	7	6	20	5	7	6	20
NBTR	130	14	39	59	113	15	37	66	116	15	45	60	112	11	40	59	112
SBL	46	43	82	95	178	57	109	123	251	56	106	117	235	65	114	120	256
SBT	46	31	60	53	94	28	62	55	96	33	65	54	91	33	64	49	92
SBR	46	4	33	6	37	4	38	5	29	5	39	3	39	4	43	7	36

10. Bou Ave / Pike Center Driveway - Unsignalized -- Orange Policy Area																	
EBLT	100	1	11	42	114	2	17	6	36	14	57	14	60	5	32	83	153
EBT	192	1	12	51	161	0	0	3	33	7	51	13	90	4	31	148	280
WBT	201	148	263	114	237	155	261	118	241	169	273	160	265	172	262	45	153
WBTR	201	166	280	170	284	173	276	171	286	184	284	191	281	192	274	112	226
SBLR	300	81	191	223	409	60	167	180	342	63	81	67	82	57	77	59	71
11. E Jefferson St / Rollins Ave -- City of Rockville																	
EBL	477	23	38	9	32	14	41	7	27	15	43	55	227	27	39	64	213
EBTR	477	61	78	49	108	47	87	99	263	50	92	258	701	75	143	229	543
WBL	1299	227	270	192	353	165	324	217	374	154	298	188	345	149	223	81	248
WBTR	1299	74	109	86	193	45	123	69	161	29	84	63	145	37	65	26	96
NBLT	295	88	128	185	323	62	134	156	322	68	136	153	350	119	177	142	292
NBR	295	40	63	87	225	39	81	132	325	38	83	260	566	84	176	189	384
SBLT	317	75	112	92	174	63	124	123	248	58	113	176	348	87	124	175	347
SBTR	317	22	38	34	109	17	50	72	201	22	67	112	260	49	73	124	317
12. Rockville Pike / Halpine Rd -- Red Policy Area																	
EBL	250	60	82	85	145	37	84	86	153	33	80	76	145	47	71	43	128
EBT	832	47	73	40	85	34	72	43	101	38	78	75	225	48	73	23	74
EBTR	832	49	71	51	107	41	79	73	157	39	80	156	377	40	61	206	417
WBL	497	17	26	14	43	144	236	297	558	146	235	360	600	171	227	264	397
WBT	497	39	53	47	98	29	74	103	298	25	63	233	543	36	60	18	67
WBR	450	71	104	98	173	54	110	102	259	53	113	58	198	74	104	41	133
NBL	165	54	76	120	204	63	144	115	198	69	160	103	190	97	148	37	127
NBT	1180	101	141	77	207	205	345	78	180	209	373	72	182	234	331	47	126
NBT	1180	110	162	77	180	232	388	78	178	231	405	73	182	260	358	31	105
NBTR	1180	102	162	67	151	259	431	83	174	264	455	84	187	287	390	34	113
SBL	175	73	115	84	199	54	154	115	245	51	155	125	265	82	143	41	156
SBT	449	261	345	330	502	366	535	431	554	325	484	620	878	308	378	311	347
SBT	449	159	302	243	411	282	439	371	546	270	438	554	862	232	350	249	337
SBTR	449	66	158	123	282	151	303	283	515	159	293	466	834	142	268	144	299

13. Twinbrook Pkwy / Parklawn Dr -- Red Policy Area																	
EBL	445	28	65	47	113	52	147	38	84	51	149	81	228	51	156	30	72
EBLTR	445	108	265	95	218	123	287	73	148	165	381	153	342	196	404	229	447
WBL	200	103	201	134	223	120	226	138	225	137	251	154	242	143	252	144	195
WBLTR	893	209	555	295	621	267	717	274	649	392	943	420	925	282	570	363	627
WBR	893	121	312	296	626	180	530	250	550	253	760	401	879	147	362	132	297
NBL	190	19	47	23	87	25	60	15	42	24	67	14	46	25	60	4	19
NBT	1298	34	86	169	312	32	89	146	268	35	95	124	226	32	78	53	171
NBT	1298	70	130	228	390	68	132	199	332	62	122	169	292	58	110	66	214
NBTR	1298	107	183	261	458	113	200	230	368	94	175	190	320	99	223	77	234
SBL	240	38	159	39	128	49	190	21	104	46	181	39	147	51	204	1	11
SBL	411	173	408	137	301	197	467	122	299	231	496	191	444	244	519	67	167
SBT	411	267	486	250	427	296	515	248	423	321	536	304	488	334	545	335	511
SBT	411	230	473	210	405	257	504	205	398	294	530	272	482	303	532	319	539
SBR	250	43	177	34	137	58	219	29	136	39	172	43	175	36	163	3	16
14. Nebel St / Randolph Rd -- Red Policy Area																	
EBL	140	19	35	19	67	17	59	31	110	20	74	28	97	17	58	11	48
EBT	598	113	157	205	357	133	246	393	622	136	252	345	584	128	238	163	444
EBTR	598	110	153	217	366	130	239	397	625	127	245	352	585	124	233	164	448
WBL	125	89	131	103	179	112	181	126	182	113	181	122	183	92	170	70	172
WBT	1100	194	243	211	350	230	415	264	427	225	393	271	447	209	343	154	332
WBTR	1100	185	237	222	356	218	385	260	404	215	372	265	435	192	326	249	352
NBL	100	65	91	77	139	45	97	66	142	49	104	84	157	68	121	73	135
NBT	557	78	88	114	217	44	96	381	717	57	119	325	576	62	124	89	170
NBR	557	75	105	247	393	114	183	483	692	87	158	403	551	65	125	97	213
SBL	250	95	121	121	204	94	180	125	219	78	147	112	209	79	154	44	147
SBT	1623	77	103	95	169	52	111	91	188	50	100	71	139	46	106	27	104
SBR	1623	24	30	19	50	14	41	16	49	12	39	13	43	11	38	3	19

15. Rockville Pike / Hubbard Dr / Plaza Driveway -- Orange Policy Area																	
EBL	148	20	35	33	73	17	51	38	90	13	41	35	83	35	97	95	195
EBTR	148	18	21	24	60	11	33	23	60	8	28	20	50	8	28	10	36
WBL	134	88	117	150	230	70	132	142	223	61	121	161	263	58	120	39	140
WBTR	134	52	75	89	162	50	100	114	202	47	98	164	313	78	155	147	192
NBL	1538	26	37	9	27	17	42	1149	2193	15	41	1228	2181	11	35	2	13
NBT	1538	89	129	238	391	155	303	1317	2030	156	294	1334	2041	159	273	144	237
NBT	1538	107	141	261	426	185	327	1323	2027	179	313	1338	2027	194	271	167	244
NBT	1538	62	96	222	378	142	282	1300	2041	140	270	1326	2027	196	275	184	244
NBTR	1538	81	115	235	419	76	164	1268	2063	76	168	1329	2010	145	279	217	237
SBL	180	59	58	92	189	40	118	89	187	37	105	77	183	33	116	28	109
SBT	394	160	187	117	248	173	360	158	296	166	348	142	283	180	335	84	220
SBT	394	147	201	137	270	186	378	184	328	190	381	159	302	199	363	80	237
SBTR	394	156	210	140	261	197	387	193	341	204	395	171	316	210	373	80	255
16. Chapman Ave / Randolph Rd / Josiah Henson Pkwy -- Red Policy Area																	
EBL	350	59	64	76	158	39	76	88	219	37	75	77	162	44	79	212	441
EBT	528	78	120	167	301	63	148	226	399	62	162	195	352	66	160	174	366
EBTR	528	57	102	148	281	49	126	208	374	50	143	171	319	47	129	88	260
WBL	165	10	26	12	41	5	20	12	45	7	32	9	29	5	20	5	23
WBT	598	83	128	86	230	46	125	65	168	46	141	78	213	44	125	91	339
WBT	598	78	133	96	246	48	136	74	184	43	139	97	252	45	132	325	754
WBR	215	10	43	30	116	3	14	16	67	7	36	31	118	4	16	125	302
NBL	250	18	28	49	99	9	30	46	95	11	36	45	94	10	31	34	97
NBTR	376	23	31	46	112	14	42	37	80	10	37	39	91	11	34	159	393
SBL	226	23	36	85	145	13	38	79	146	14	42	72	130	13	39	53	101
SBLTR	226	50	66	126	212	31	76	130	222	32	76	118	199	31	73	71	147
17. Chapman Ave / Thompson Ave - Unsignalized -- Red Policy Area																	
EBLTR	403	24	50	57	116	25	49	70	162	19	41	44	77	19	41	101	180
WBLTR	327	28	55	18	44	26	52	18	44	26	49	17	42	25	48	42	99
NBLTR	530	13	42	19	55	12	39	20	63	12	43	17	55	10	39	31	87
SBLTR	412	6	28	14	58	5	25	33	140	4	20	11	44	6	28	117	257

18. Rockville Pike (MD 355) / Rollins Ave Extension - Unsignalized											
WBR	80	FUTURE	FUTURE	11	38	74	143	13	41	26	73
NBT	178			17	90	105	240	29	120	19	102
NBT	178			45	150	135	250	73	202	84	190
NBTR	178			53	165	140	246	120	247	162	243
SBT	276			161	352	264	381	115	311	255	371
SBT	276			168	362	107	299	120	322	59	237
SBT	276			154	349	105	297	123	314	47	209

Notes:

1. Capacity analysis based on Highway Capacity Manual 2000 Edition methodology, using Synchro 11.
2. **Bold** movements indicate storage lanes