final report

July 16, 2019
Revised 8/26/19

Traffic Impact Study

One Park
Lexington Road at Grinstead Drive
Louisville, KY

Prepared for

Louisville Metro Planning Commission
Kentucky Transportation Cabinet

DIANE B. ZIMMERMAN
Traffic Engineering, LLC

12603 High Meadows Pike
Prospect, KY 40059
502.648.1858
dianebzim@att.net

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INTRODUCTION

JDG Triangle Partners, LLC is proposing to redevelop the Triangle located between Lexington Road, Grinstead Road and Etley Avenue. The development plan shows a mix of apartments, condominiums, office and retail. The size of each use is detailed in Trip Generation. **Figure 1** displays a map of the site. Access to the site will be from Lexington Road, Grinstead Drive and Etley Avenue. The purpose of this study is to examine the traffic impacts of the proposed development upon the adjacent highway system. For this study the impact area was defined to be the intersections of Lexington Road at Payne Street, Etley Avenue, Grinstead Drive, Alta Vista Road, and Grinstead Drive at Cherokee Road, at I 64 eastbound ramps and at I 64 westbound ramps.

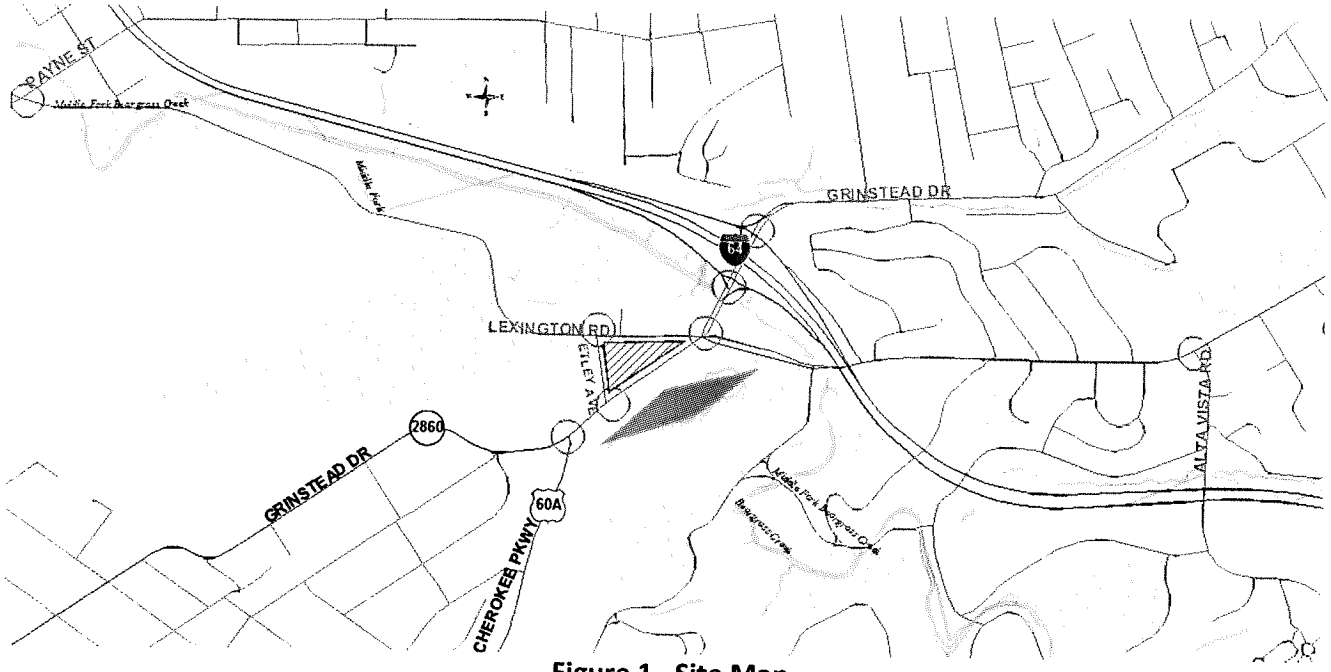

Figure 1. Site Map

EXISTING CONDITIONS

Lexington Road is maintained by Louisville Metro with an estimated 2019 ADT of 11,800 vehicles per day between Payne Street and Grinstead Drive, as estimated from a Metro Public Works count from 2016. The road is a two-lane road with a center turn lane, bike lanes and curb and gutter. The posted speed limit is 35 mph. There are sidewalks on both sides of the street at the project site. The intersection with Grinstead Drive, Payne Street and Alta Vista Road are controlled with traffic signals. There are left turn lanes at each intersection.

Grinstead Drive is maintained by the Kentucky Transportation Cabinet (KYTC) 2019 ADT of 27,300 vehicles per day between Lexington Road and Cherokee Parkway, as estimated from a 2018 Metro Public works count. The road is a four-lane road with eleven-foot lanes and curb and gutter. The posted speed limit is 35 mph. There are sidewalks on both sides of the street at the project site. The intersection with Cherokee Parkway and the I 64 ramps are controlled with traffic signals. There are left turn lanes at each intersection.

A.m. and p.m. peak hour traffic counts were obtained at the intersections on various dates in the spring of 2016, fall of 2017, 2018 and 2019 (see Appendix A). The a.m. peak hour occurred between 7:15 and 8:15 and the p.m. peak hour occurred between 4:45 and 5:45 p.m. Signal timing files were provided by Metro Public Works, Division of Traffic Engineering. **Figures 2** and **3** illustrate the existing peak hour traffic volumes.

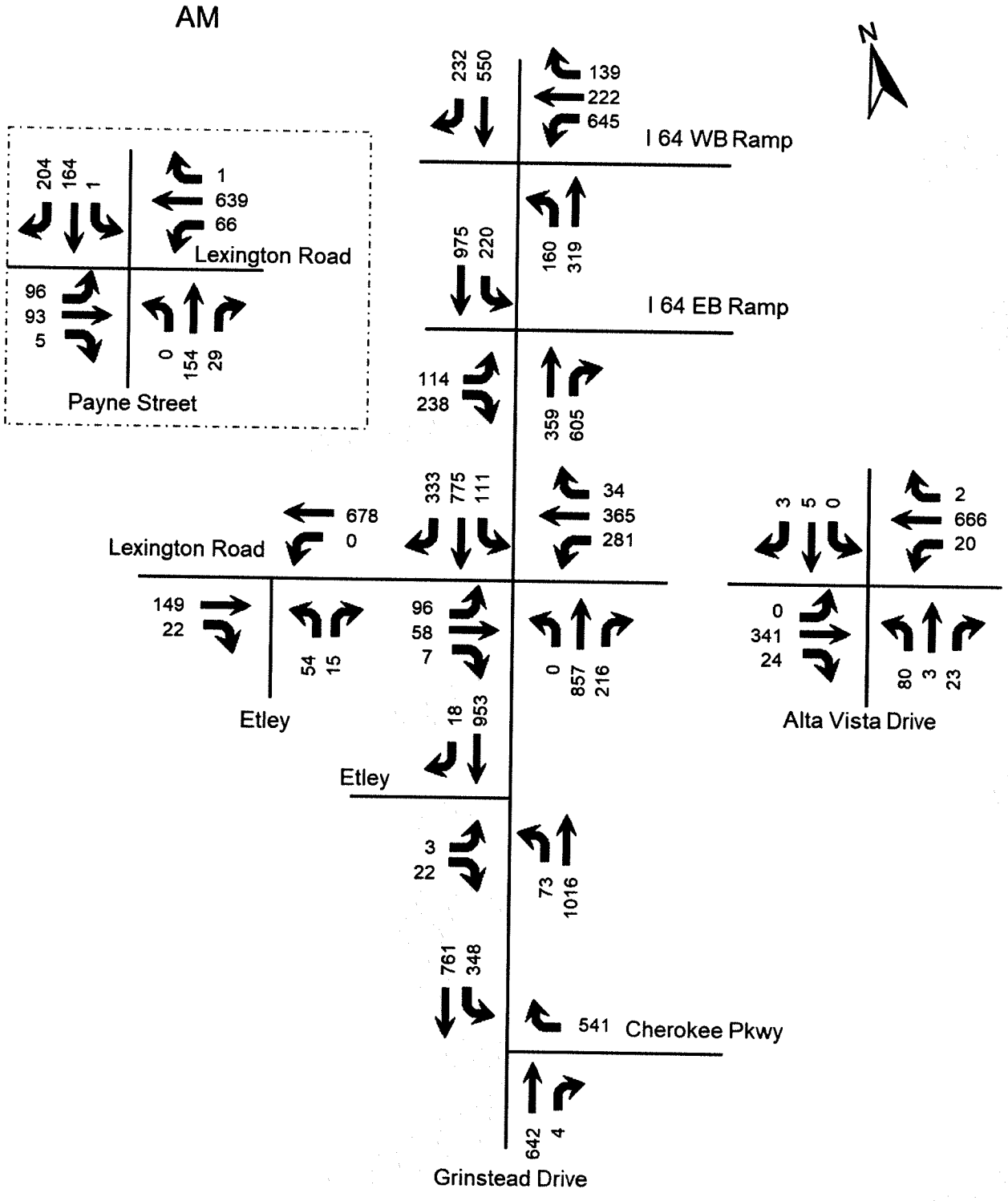

Figure 2. AM Existing Peak Hour Volumes

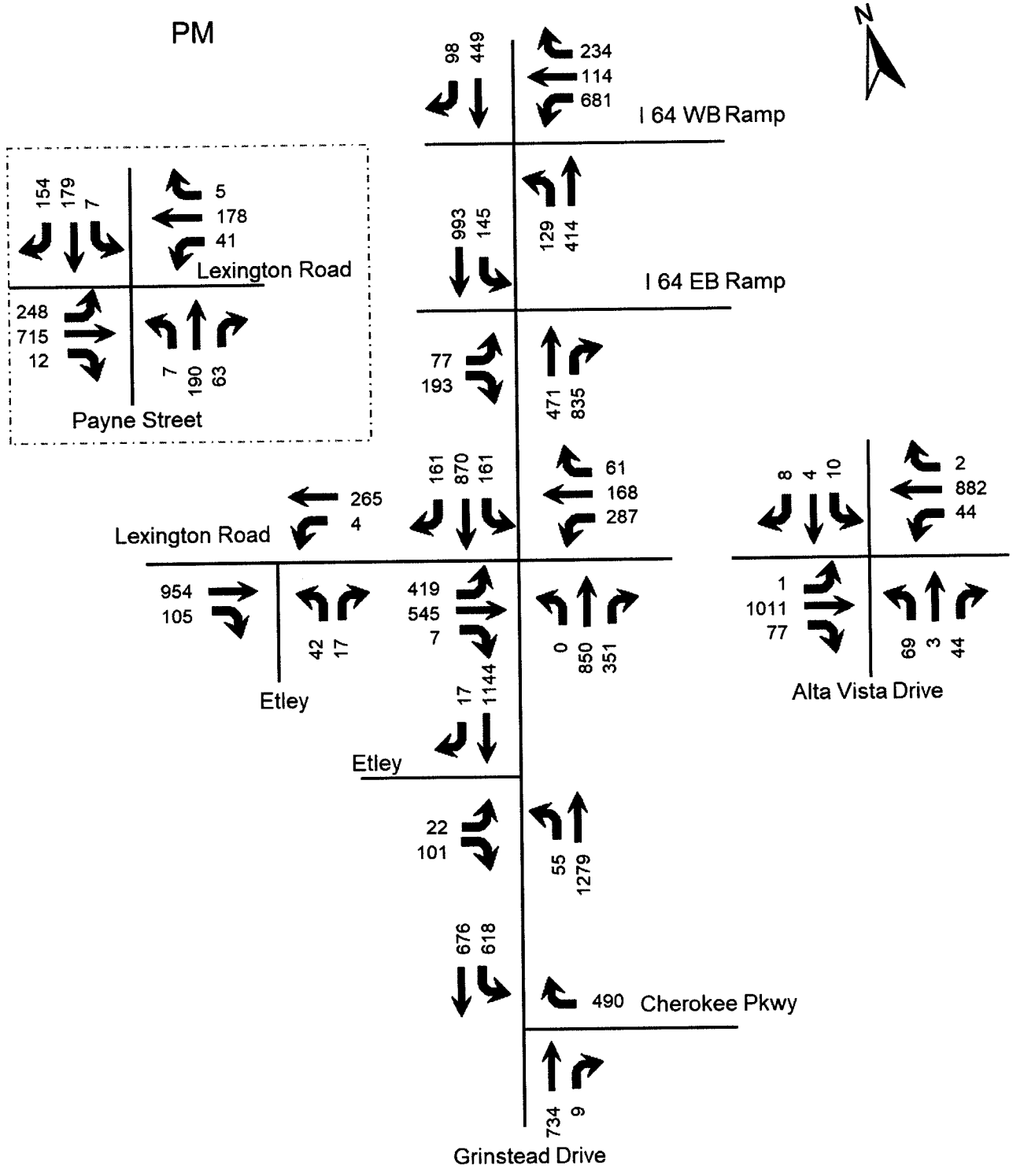

Figure 3. PM Existing Peak Hour Volumes

FUTURE CONDITIONS

The projected completion year for this development is 2023, so the analysis year for this study is 2023. To predict traffic conditions in 2023, one percent annual growth in traffic was added to the counts. This growth is based upon a review of the historical count data of the Kentucky Transportation Cabinet. **Figures 4 and 5** displays the 2023 No Build volumes.

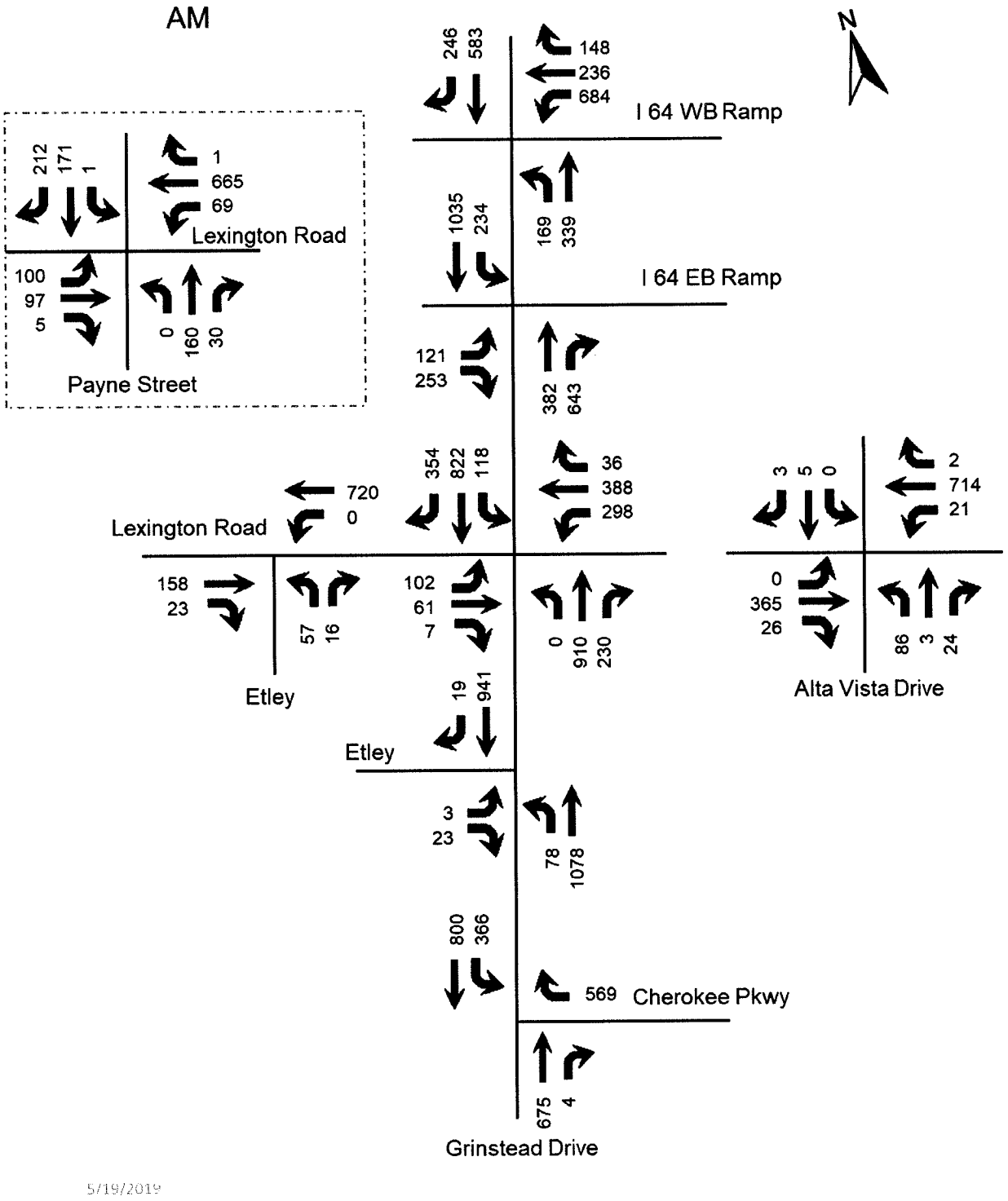

Figure 4. 2023 No Build AM Peak Hour Volumes

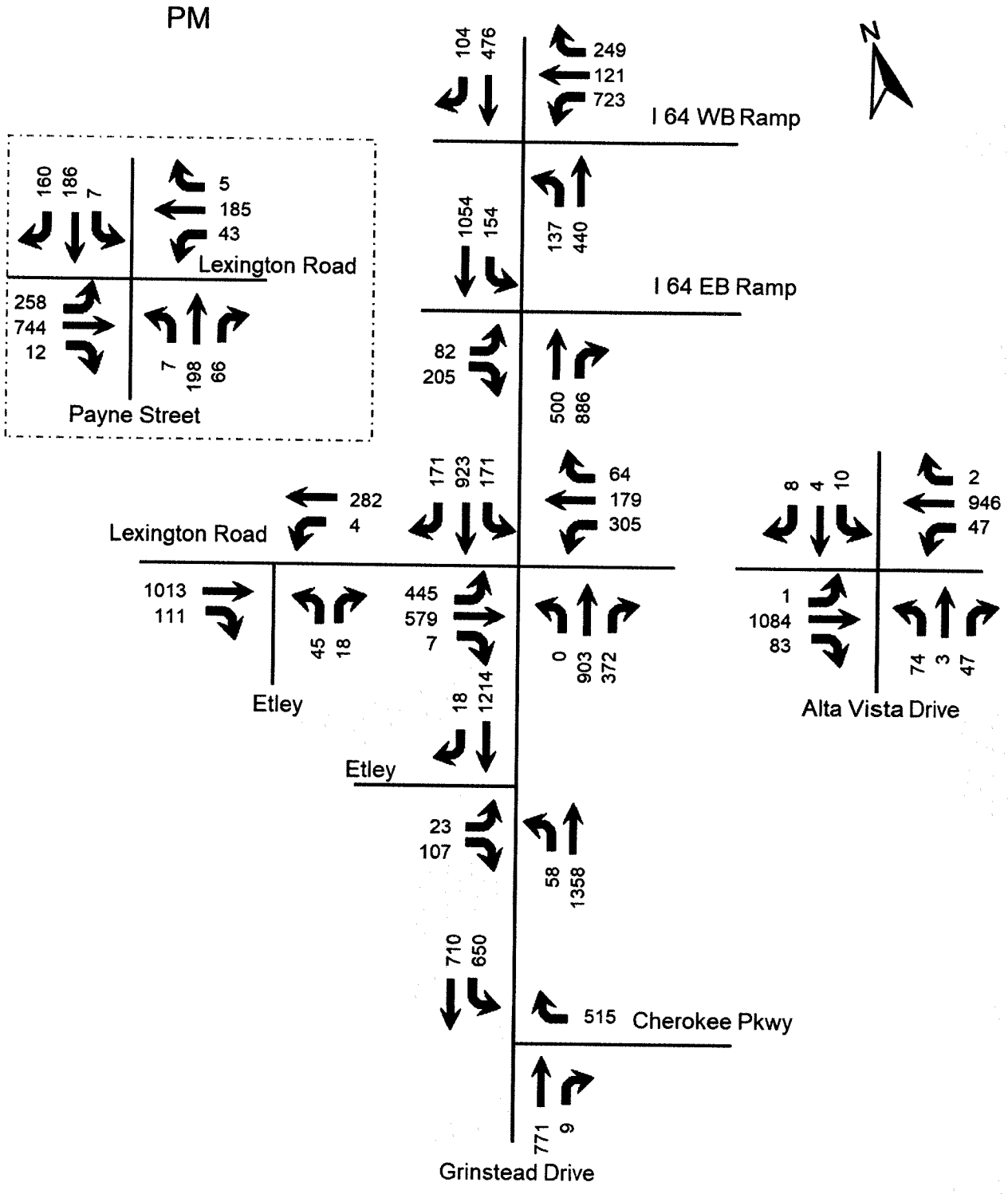

Figure 5. 2023 No Build PM Peak Hour Volumes

TRIP GENERATION

The Institute of Transportation Engineers Trip Generation Manual, 10th Edition contains trip generation rates for a wide range of developments. The results of the trip generation analysis are shown in **Table 1**. The internal capture and pass-by trip procedures outlined in the Trip Generation Handbook, 3rd Edition were applied. The new trips were assigned to the highway network with the percentages shown in **Figure 6**. The pass-by trips were assigned using the existing peak hour distribution. **Figures 7 and 8** show the trips generated by this development and distributed throughout the road network for the year 2023 during the peak hours. The pass-by trips are shown in parenthesis. **Figures 9** shows the existing pm peak hour trips generated by the existing site listed in **Table 2** that were subtracted from the network. During the pm peak hours, the garage exits on Lexington Road and Grinstead Drive will have illuminated signs directing drivers for "Right turn only".

Figure 10 and 11 display the individual turning movements for the year 2023 for the peak hours when the development is completed.

Table 1. Peak Hour Trips Generated by Proposed Site

AM Peak Hour

			Total Trips			Internal Trips				External Trips			Pass-by Trips		New Trips		
Land use	ITE Code	Intensity	In	Out	Total	In	Out	Total	%	In	Out	Total	%	Volume	In	Out	Total
Office	710	149,400 sf	144	23	167	12	10	22	13.2%	132	13	145	0%	0	132	13	145
Shopping Center	820	26,158 sf	102	63	165	9	16	25	15.2%	93	47	140	0%	0	93	47	140
Grocery	850	15,121 sf	35	23	58					35	23	58	0%	0	35	23	58
High Turnover Rest.	932	2,126 sf	12	9	21	11	5	16	76.9%	1	4	5	0%	0	1	4	5
Quality Rest.	931	12,058 sf	5	4	9	5	2	7	76.2%	0	2	2	0%	0	0	2	2
Multi-Family	222	421 units	31	100	131	2	6	8	6.1%	29	94	123	0%	0	29	94	123
		Total	329	222	551	39	39	78	14.2%	290	183	473	0.0%	0	290	183	473

PM Peak Hour

			Total Trips			Internal Trips				External Trips			Pass-by Trips		New Trips		
Land use	ITE Code	Intensity	In	Out	Total	In	Out	Total	%	In	Out	Total	%	Volume	In	Out	Total
Office	710	149,400 sf	27	140	167	7	20	27	16.2%	20	120	140	0%	0	20	120	140
Shopping Center	820	26,158 sf	96	105	201	25	37	61	30.6%	71	68	140	34%	47	47	45	92
Grocery	850	15,121 sf	97	93	190	25	32	58	30.3%	72	61	132	36%	48	46	39	85
High Turnover Rest.	932	2,126 sf	13	8	21	6	5	11	52.0%	7	3	10	43%	4	4	2	6
Quality Rest.	931	12,058 sf	63	31	94	29	19	48	51.2%	34	12	46	44%	20	19	7	26
Multi-Family	222	421 units	93	59	152	53	32	85	55.9%	40	27	67	0%	0	40	27	67
		Total	389	436	825	145	145	290	35.2%	244	291	535	22.4%	120	176	239	415

Table 2. PM Peak Hour Trips Generated by Existing Site

			Total Trips			Pass-by Trips		New Trips		
Land use	ITE Code	Intensity	In	Out	Total	%	Volume	In	Out	Total
Gas Station	944	8 pump	56	56	112	42%	47	32	32	65
Shopping Center	820	17,900 sf	73	79	152	34%	52	48	52	100
Quality Restaurant	931	10,456 sf	55	27	82	44%	36	31	15	46
		Total	184	162	346	39.0%	135	112	99	211

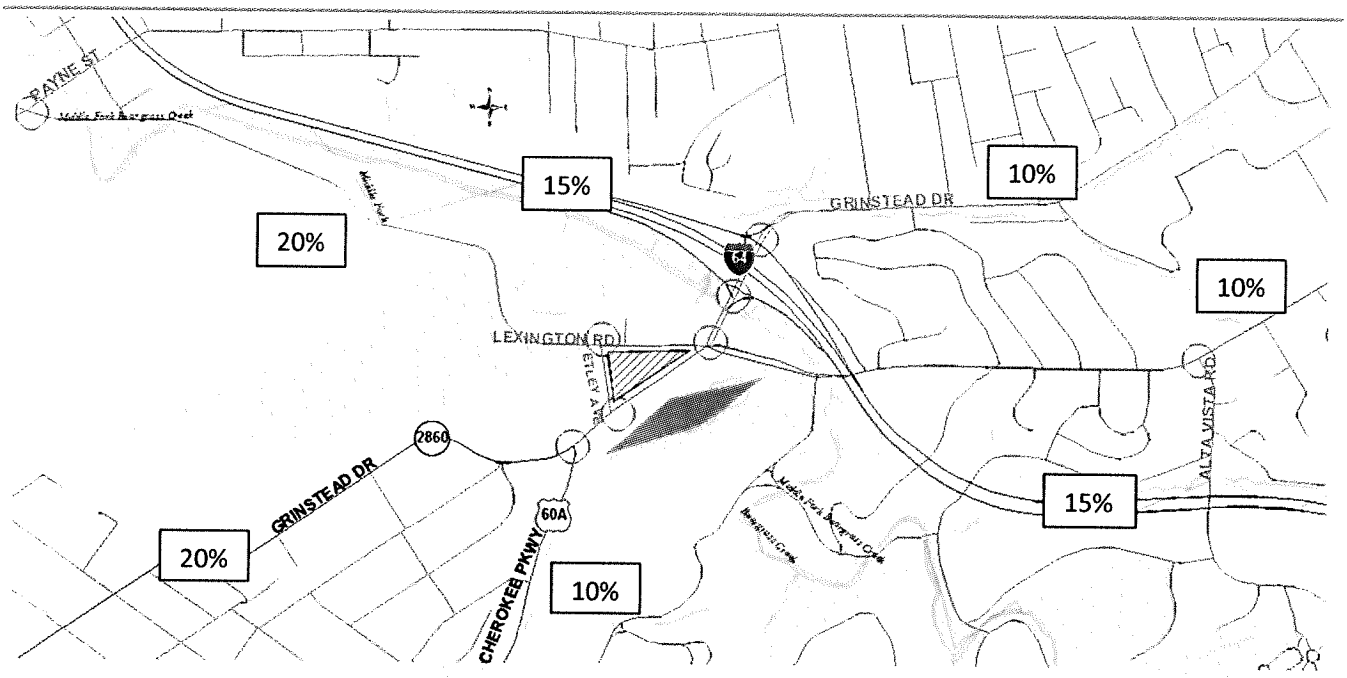

Figure 6. Trip Distribution Percentages

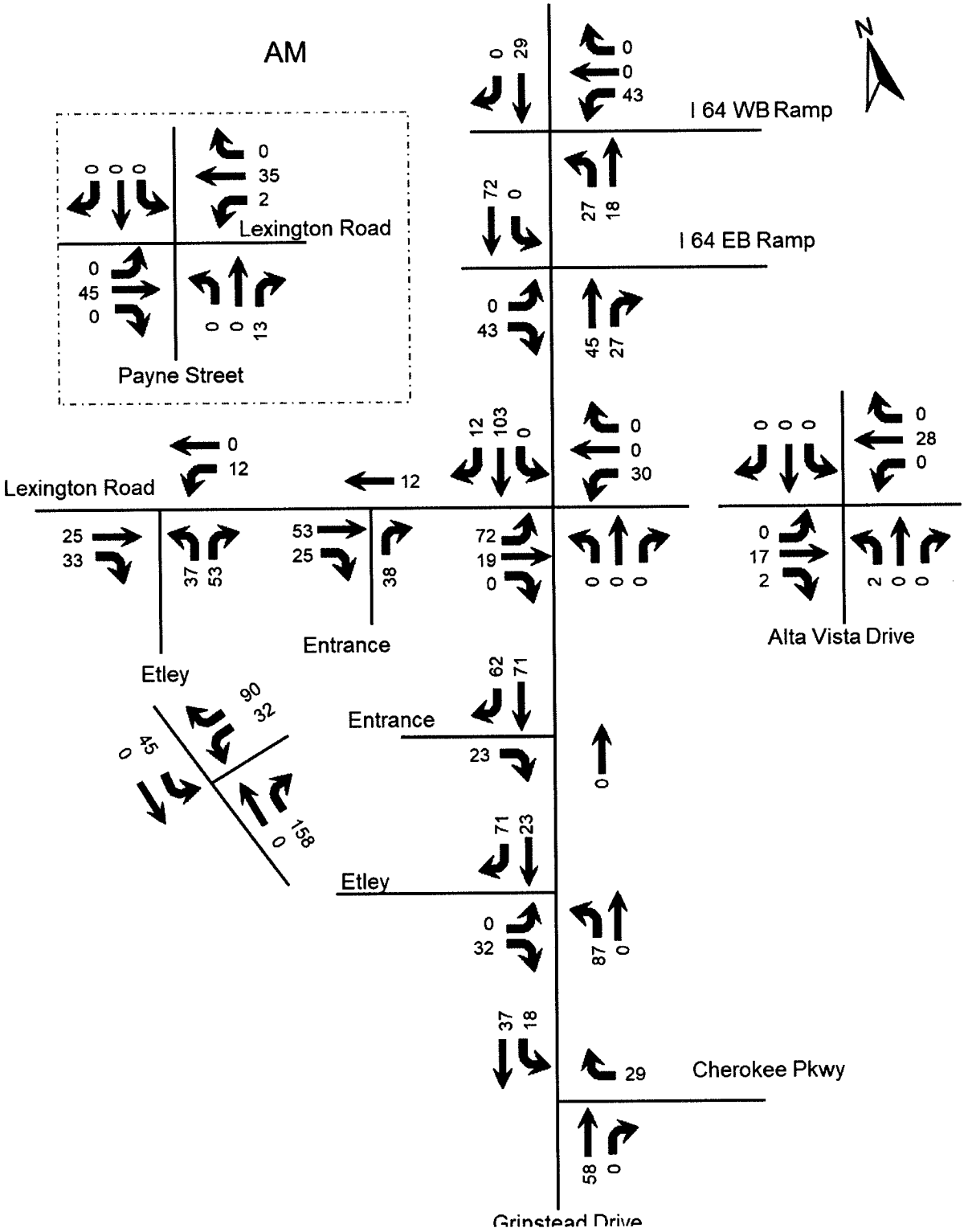

Figure 7. AM Peak Hour Trips Generated by Site

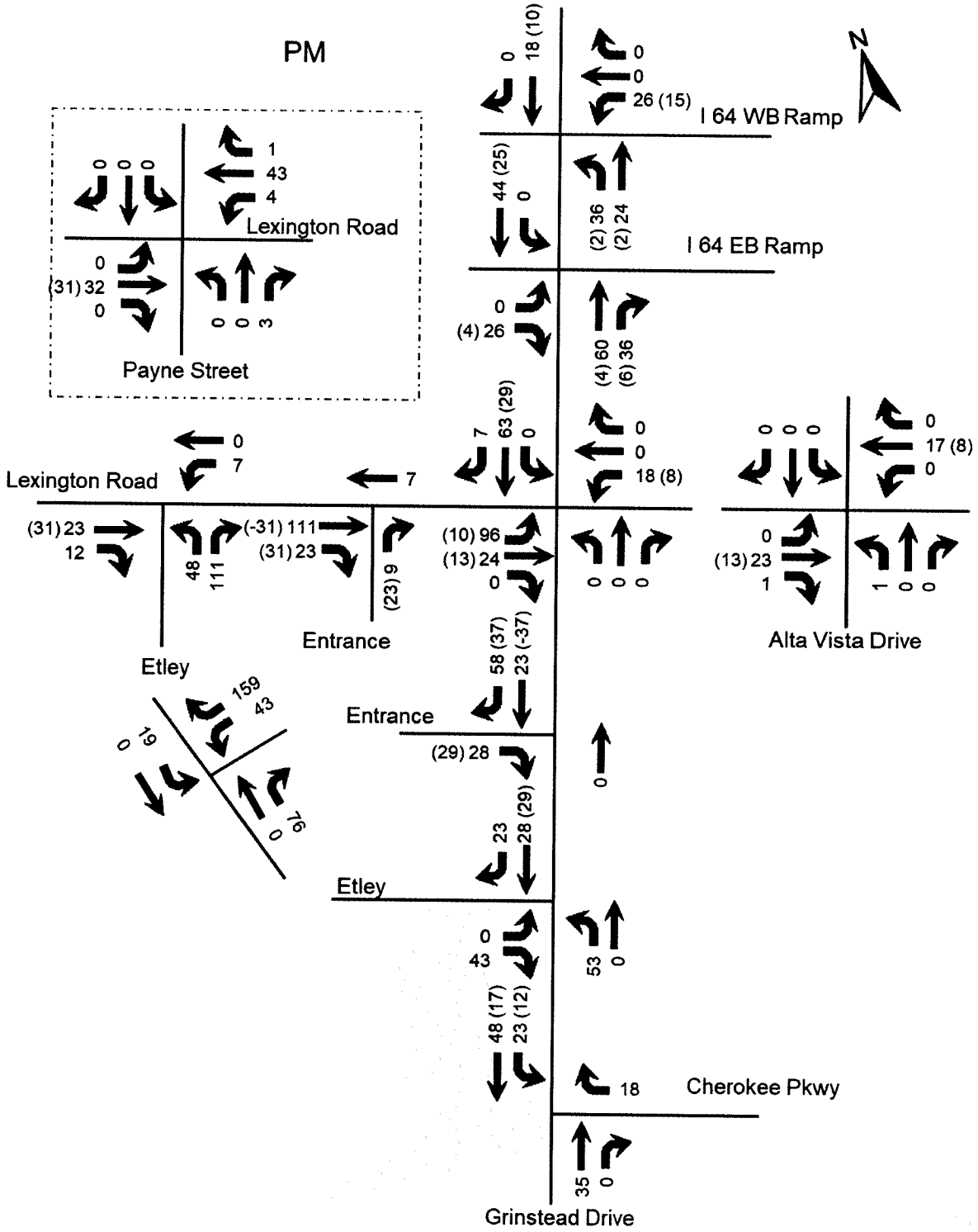

Figure 8. PM Peak Hour Trips Generated by Site

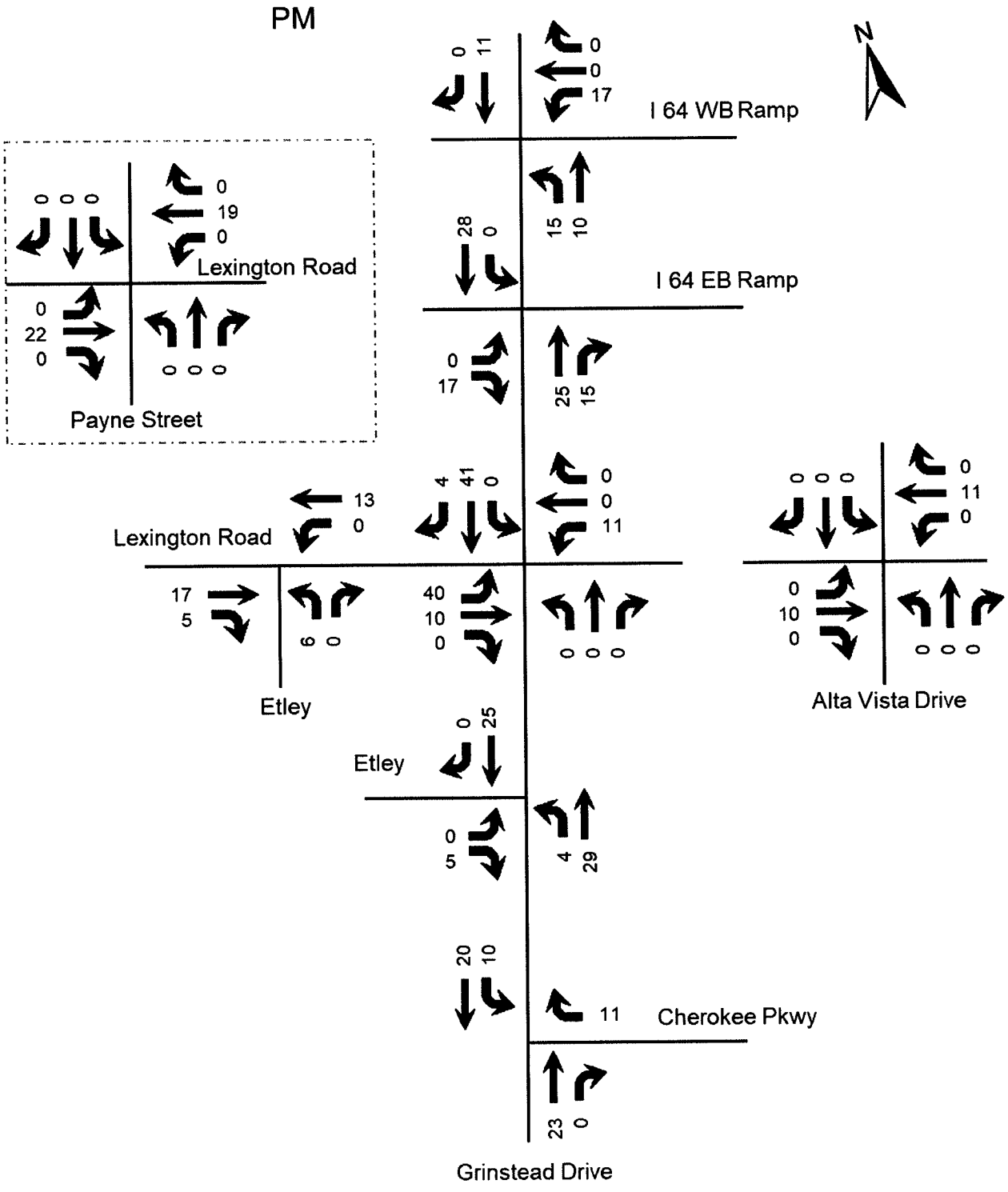

Figure 9. PM Peak Hour Trips Generated by Existing Site

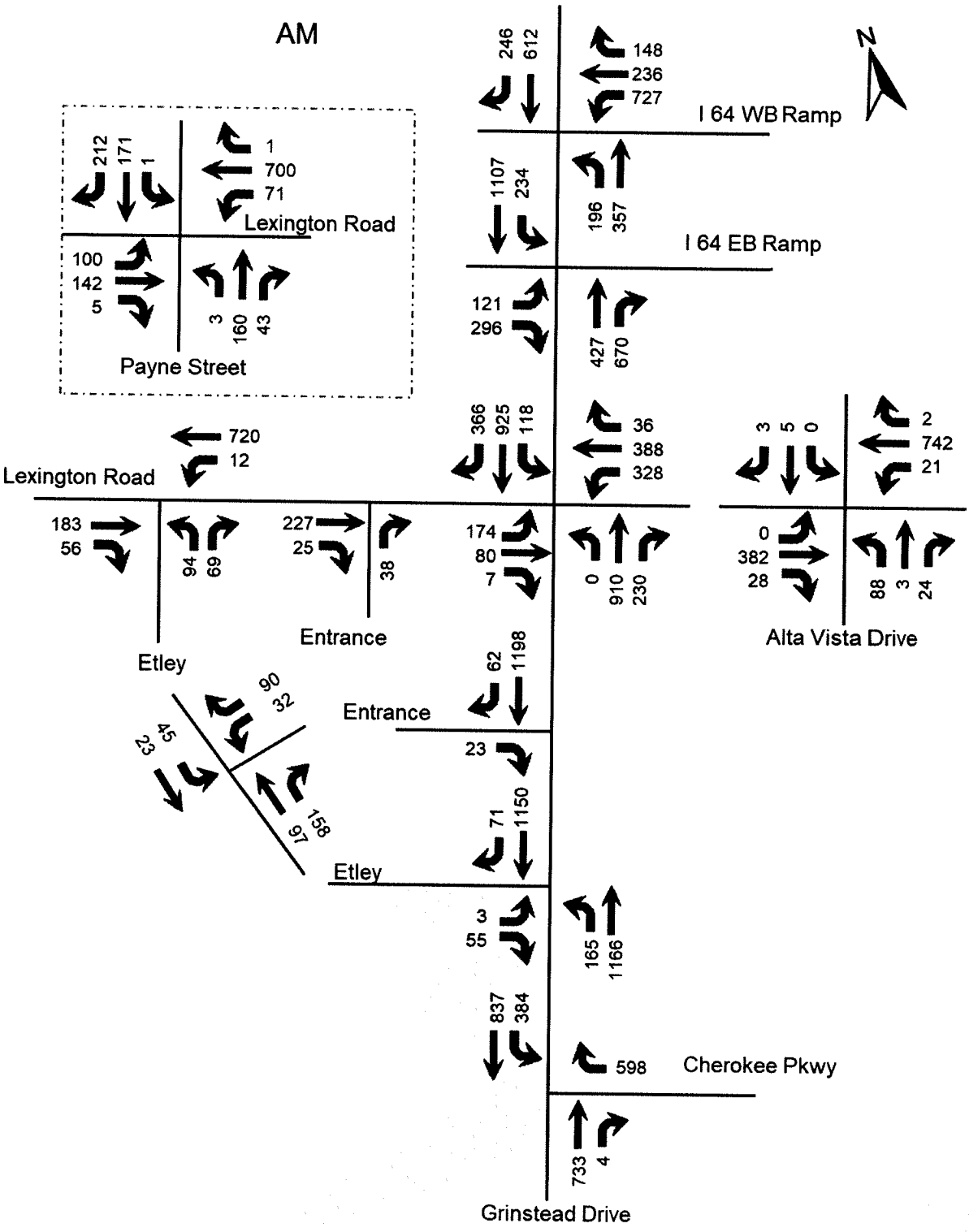

Figure 10. 2023 AM Peak Hour Build

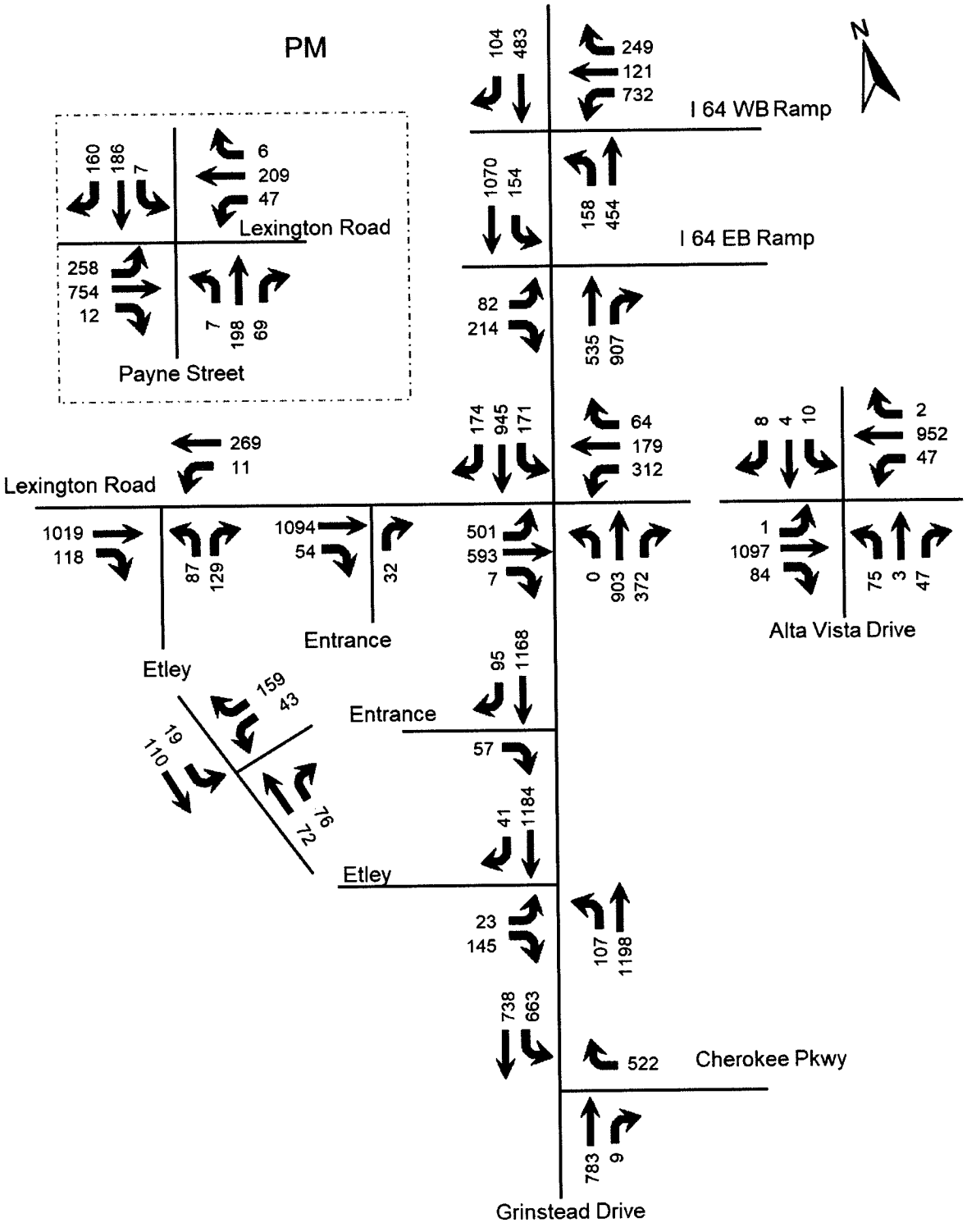

Figure 11. 2023 PM Peak Hour Build

ANALYSIS

The qualitative measure of operation for a roadway facility or intersection is evaluated by assigning a "Level of Service". Level of Service is a ranking scale from A through F, "A" is the best operating condition and "F" is the worst. Level of Service results depend upon the facility that is analyzed. In this case, the Level of Service is based upon the total delay experienced at an intersection.

To evaluate the impact of the proposed development, the vehicle delays at the intersections were determined using procedures detailed in the Highway Capacity Manual, 6th edition. Future Level of Service and delays were determined for the intersections using Synchro (version 10.3.122) traffic analysis software. The Level of Service and seconds of delay and are summarized in **Table 3**.

Table 3. Peak Hour Level of Service

	A.M.			P.M.		
Approach	2017 Existing	2023 No Build	2023 Build	2017 Existing	2023 No Build	2023 Build
Grinstead Drive at I 64 Westbound	**C 27.7**	**C 29.2**	**C 31.9**	**C 31.9**	**C 33.5**	**C 34.4**
I 64 ramp Westbound	C 29.2	C 30.2	C 32.6	C 31.0	C 33.9	D 36.3
Grinstead Drive Northbound	C 24.4	C 26.3	C 30.3	B 18.4	B 18.1	B 17.5
Grinstead Drive Southbound	C 27.8	C 29.3	C 31.9	D 50.6	D 51.3	D 51.5
Grinstead Drive at I 64 Eastbound	**A 5.7**	**A 5.8**	**A 8.1**	**B 15.8**	**B 16.2**	**B 18.1**
I 64 ramp Eastbound	D 48.2	D 47.8	D 47.8	F 84.6	F 85.2	F 83.9
Grinstead Drive Northbound	A 7.6	A 8.0	A 8.0	A 0.1	A 0.1	A 8.7
Grinstead Drive Southbound	A 1.1	A 1.1	A 4.6	A 5.9	A 6.5	A 6.3
Grinstead Drive at Lexington Road	**C 23.3**	**D 39.4**	**D 50.1**	**D 50.8**	**E 55.6**	**E 63.6**
Lexington Road Eastbound	D 44.8	D 54.9	D 49.1	E 71.9	F 80.1	F 81.5
Lexington Road Westbound	D 39.7	D 49.5	E 64.2	E 71.8	E 71.4	E 71.5
Grinstead Drive Northbound	C 25.1	D 39.9	D 49.6	C 21.1	C 24.0	D 47.5
Grinstead Drive Southbound	A 9.6	C 31.4	D 43.2	D 54.5	E 60.5	E 60.7

	A.M.			P.M.		
Approach	2017 Existing	2023 No Build	2023 Build	2017 Existing	2023 No Build	2023 Build
Grinstead Drive at Etley Avenue						
Etley Avenue Eastbound	C 23.7	D 33.6	C 17.4	F 243.3	F 765.6	C 25.3
Grinstead Drive Northbound (left)	B 11.3	B 12.1	C 15.1	B 12.4	B 13.1	B 14.0
Grinstead Drive at Cherokee Parkway	**B 15.9**	**B 17.8**	**C 22.8**	**B 17.3**	**B 18.5**	**C 32.0**
Cherokee Parkway Westbound	D 47.5	D 54.8	E 75.7	C 30.3	C 31.2	C 29.4
Grinstead Drive Northbound	A 9.2	B 10.0	B 10.7	B 14.1	B 15.4	B 11.5
Grinstead Drive Southbound (left)	B 12.4	B 11.6	B 11.5	C 29.1	C 31.8	D 50.9
Lexington Road at Payne Street	**B 16.4**	**C 20.1**	**C 20.8**	**B 17.9**	**B 18.7**	**B 18.8**
Lexington Road Eastbound	B 11.2	B 17.9	B 17.1	B 13.5	B 14.9	B 15.3
Lexington Road Westbound	A 10.0	B 15.7	B 16.5	A 9.6	B 10.4	B 10.6
Payne Street Northbound	C 22.4	C 21.6	C 22.1	C 26.0	C 25.9	C 26.0
Payne Street Southbound	C 28.3	C 28.8	C 28.8	C 29.4	C 29.5	C 29.5
Lexington Road at Etley Avenue						
Lexington Road Westbound (left)	A 0	A 0	A 7.9	B 11	B 11.4	B 11.6
Etley Avenue Northbound	B 13	C 15.5	C 15.3	E 35.7	E 44.2	E 49.5
Lexington Road at Alta Vista Drive	**A 5.9**	**A 6.1**	**A 6.2**	**A 6.7**	**A 7.1**	**A 7.2**
Lexington Road Eastbound	A 3.9	A 4.1	A 4.1	A 6.1	A 6.6	A 6.8
Lexington Road Westbound	A 4.9	A 5.2	A 5.3	A 5.6	A 6.0	A 6.1
Alta Vista Drive Northbound	B 18.5	B 18.6	B 18.6	B 18.7	B 18.8	B 18.4
Alta Vista Drive Southbound	B 16.9	B 16.9	B 16.8	B 17.4	B 17.3	B 16.9

Approach	A.M.			P.M.		
	2017 Existing	2023 No Build	2023 Build	2017 Existing	2023 No Build	2023 Build
Etley Avenue at Garage						
Garage Exit			B 10.5			A 9.9
Etley Avenue Southbound (left)			A 7.9			A 7.6

Key: Level of Service, Delay in seconds per vehicle

Improvements that are included in the results are dual left turn lanes from Lexington Road in the existing median. At the Etley Avenue intersection with Lexington Road, the northbound approach will have a left and right turn lane. At the Etley Avenue intersection with Grinstead Drive, the southbound approach will have a left and a right turn lane. The intersection of Grinstead Drive at Etley Avenue will require a dedicated left turn lane.

PEDESTRIANS

The development will be surrounded by eight-foot sidewalks. Crosswalks adjacent to the site will be striped with the ladder style, which improve visibility of the crosswalk to drivers.

CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2023, there will be an impact to the existing highway network. To mitigate the impacts the following improvements will be completed with the development – an eastbound dual left turn lane on Lexington Road at Grinstead Drive, a northbound left turn lane on Etley Avenue at Lexington Road, a southbound left turn lane on Etley Avenue at Grinstead Drive, and a dedicated left turn lane on Grinstead Drive at Etley Avenue.

APPENDIX

Traffic Counts

Louisville, KY
Classified Turn Movement Count

Site 1 of 3
Lexington Rd
US-60 Lexington Rd
US-60 Grinstead Dr
Grinstead Dr

Marr Traffic
Transportation Data Collection

41 Peabody Street, Nashville, TN 37210
1 (615) 431-6750
1 (800) 615-3765

Lat/Long
38.245552°, -85.701600°

Date
Thursday 24 August 2017

Weather
Sunny Intervals
Temp: 27°C

	Eastbound Lexington Rd						Westbound US-60 Lexington Rd						Northbound US-60 Grinstead Dr						Southbound Grinstead Dr					
	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App
0700 - 0715	0	19	10	0	0	29	0	40	39	5	0	84	0	0	104	38	0	142	0	14	161	51	0	226
0715 - 0730	0	22	10	1	0	33	0	51	47	6	1	105	0	0	188	55	0	243	0	28	205	77	0	310
0730 - 0745	0	21	10	2	0	33	0	89	106	8	0	203	0	0	207	53	0	260	0	27	199	74	0	300
0745 - 0800	0	28	14	2	0	44	0	69	89	12	0	170	0	0	256	61	0	317	0	23	218	87	0	328
Hourly Total	0	90	44	5	0	139	0	249	281	31	1	562	0	0	755	207	0	962	0	92	783	289	0	1164
0800 - 0815	0	25	24	2	0	51	0	72	123	8	0	203	0	0	195	47	0	242	0	33	153	95	0	281
0815 - 0830	0	36	17	0	0	53	0	52	124	10	0	186	0	0	199	65	0	264	0	18	132	110	0	260
0830 - 0845	0	15	21	1	0	37	0	49	109	14	1	173	0	0	210	37	0	247	0	28	149	78	0	255
0845 - 0900	0	19	20	1	0	40	0	69	102	8	0	179	0	0	170	59	0	229	0	18	175	78	0	271
Hourly Total	0	95	82	4	0	181	0	242	458	40	1	741	0	0	774	208	0	982	0	97	609	361	0	1067
1600 - 1615	0	66	77	3	1	147	0	58	27	16	0	101	0	0	194	76	0	270	1	42	195	27	0	265
1615 - 1630	0	86	99	3	0	188	0	65	33	11	0	109	0	0	162	78	0	240	0	26	187	36	0	249
1630 - 1645	0	78	103	3	1	185	0	54	33	17	0	104	0	0	202	73	0	275	1	33	205	33	0	272
1645 - 1700	0	97	112	2	0	211	0	72	30	18	0	120	0	0	195	80	0	275	0	35	210	46	0	291
Hourly Total	0	327	391	11	2	731	0	249	123	62	0	434	0	0	753	307	0	1060	2	136	797	142	0	1077
1700 - 1715	0	96	125	0	0	221	0	70	47	12	1	130	0	0	216	78	0	294	0	41	229	35	1	306
1715 - 1730	0	110	141	2	2	255	0	81	50	16	0	147	0	0	230	90	0	320	0	32	229	35	0	296
1730 - 1745	0	83	132	2	2	219	0	64	41	15	0	120	0	0	209	103	0	312	1	52	202	45	0	300
1745 - 1800	0	64	95	2	2	163	0	77	31	8	1	117	0	0	215	69	2	286	0	43	225	37	1	306
Hourly Total	0	353	493	6	6	858	0	292	169	51	2	514	0	0	870	340	2	1212	1	168	885	152	2	1208
Grand Total	0	865	1010	26	8	1909	0	1032	1031	184	4	2251	0	0	3152	1062	2	4216	3	493	3074	944	2	4516
Cars	0	832	1002	24	-	1858	0	1015	1020	179	-	2214	0	0	3112	1046	-	4158	3	485	3034	912	-	4434
Trucks	0	33	5	0	-	38	0	12	5	3	-	20	0	0	36	13	-	49	0	7	32	30	-	69
P/Cycles	0	0	3	2	-	5	0	5	6	2	-	13	0	0	4	3	-	7	0	1	8	2	-	11
Cars (%)	0.00	96.18	99.50	100.00	-	98.00	0.00	98.83	99.51	98.35	-	99.10	0.00	0.00	98.86	98.77	-	98.84	100.00	98.58	98.96	96.82	-	98.47
Trucks (%)	0.00	3.82	0.50	0.00	-	2.00	0.00	1.17	0.49	1.65	-	0.90	0.00	0.00	1.14	1.23	-	1.16	0.00	1.42	1.04	3.18	-	1.53
P/Cycles (%)	0.00	0.00	0.30	8.33	-	0.26	0.00	0.49	0.59	1.10	-	0.58	0.00	0.00	0.13	0.28	-	0.17	0.00	0.20	0.26	0.21	-	0.24

	Eastbound Lexington Rd						Westbound US-60 Lexington Rd						Northbound US-60 Grinstead Dr						Southbound Grinstead Dr					
	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Right	Peds	App
0730 - 0745	0	21	10	2	0	33	0	89	106	8	0	203	0	0	207	53	0	260	0	27	199	74	0	300
0745 - 0800	0	28	14	2	0	44	0	69	89	12	0	170	0	0	256	61	0	317	0	23	218	87	0	328
0800 - 0815	0	25	24	2	0	51	0	72	123	8	0	203	0	0	195	47	0	242	0	33	153	95	0	281
0815 - 0830	0	36	17	0	0	53	0	52	124	10	0	186	0	0	199	65	0	264	0	18	132	110	0	260
AM Peak	**0**	**110**	**65**	**6**	**0**	**181**	**0**	**282**	**442**	**38**	**0**	**762**	**0**	**0**	**857**	**226**	**0**	**1083**	**0**	**101**	**702**	**366**	**0**	**1169**
1645 - 1700	0	97	112	2	0	211	0	72	30	18	0	120	0	0	195	80	0	275	0	35	210	46	0	291
1700 - 1715	0	96	125	0	0	221	0	70	47	12	1	130	0	0	216	78	0	294	0	41	229	35	1	306
1715 - 1730	0	110	141	2	2	255	0	81	50	16	0	147	0	0	230	90	0	320	0	32	229	35	0	296
1730 - 1745	0	83	132	2	2	219	0	64	41	15	0	120	0	0	209	103	0	312	1	52	202	45	0	300
PM Peak	**0**	**386**	**510**	**6**	**4**	**906**	**0**	**287**	**168**	**61**	**1**	**517**	**0**	**0**	**850**	**351**	**0**	**1201**	**1**	**160**	**870**	**161**	**1**	**1193**

*PM Peak hour westbound movements were inflated to reflect the westbound volumes at Etley Avenue. Simulation results were verified with WAZE data by Metro Traffic Engineering.

Louisville, KY
Classified Turn Movement Count

Site 3 of 3
I-64 W/Bound On-Ramp
I-64 W/Bound Off-Ramp
Grinstead Rd (South)
Grinstead Rd (North)

Marr Traffic
Transportation Data Collection

41 Peabody Street, Nashville, TN 37210
1 (615) 431-6750
1 (800) 615-3765

Lat/Long
38.247851°, -85.700115°

Date
Thursday 24 August 2017

Weather
Sunny Intervals
Temp: 27°C

	Westbound					Northbound					Southbound					
	I-64 W/Bound Off-Ramp					Grinstead Rd (South)					Grinstead Rd (North)					
	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Peds	App	U-Turn	Thru	Right	Peds	App	Int
0700 - 0715	137	24	55	0	216	0	31	43	0	74	0	95	38	0	133	423
0715 - 0730	169	38	73	0	280	0	29	71	0	100	0	144	62	0	206	586
0730 - 0745	160	62	29	1	252	0	43	79	0	122	0	160	53	0	213	587
0745 - 0800	173	74	14	0	261	0	55	83	0	138	0	138	53	0	191	590
Hourly Total	639	198	171	1	**1009**	0	158	276	0	**434**	0	537	206	0	**743**	**2186**
0800 - 0815	143	48	23	0	214	0	33	86	0	119	0	108	64	0	172	505
0815 - 0830	153	55	27	0	235	0	34	89	0	123	0	121	63	0	184	542
0830 - 0845	129	56	21	1	207	0	41	82	0	123	0	100	61	0	161	491
0845 - 0900	150	53	22	1	226	0	36	65	0	101	0	123	38	0	161	488
Hourly Total	575	212	93	2	**882**	0	144	322	0	**466**	0	452	226	0	**678**	**2026**
1600 - 1615	133	29	37	1	200	0	42	100	0	142	0	108	26	0	134	476
1615 - 1630	153	31	42	1	227	0	30	94	0	124	0	71	28	0	99	450
1630 - 1645	163	23	43	2	231	0	30	108	0	138	0	78	21	0	99	468
1645 - 1700	161	23	42	0	226	0	34	87	0	121	0	110	19	0	129	476
Hourly Total	610	106	164	4	**884**	0	136	389	0	**525**	0	367	94	0	**461**	**1870**
1700 - 1715	169	31	46	2	248	0	28	103	0	131	0	114	36	0	150	529
1715 - 1730	183	32	52	3	270	0	30	115	0	145	0	112	24	0	136	551
1730 - 1745	168	28	94	3	293	0	37	109	0	146	0	113	19	0	132	571
1745 - 1800	165	32	109	0	306	0	28	109	0	137	0	118	24	0	142	585
Hourly Total	685	123	301	8	**1117**	0	123	436	0	**559**	0	457	103	0	**560**	**2236**
Grand Total	2509	639	729	15	**3892**	0	561	1423	0	**1984**	0	1813	629	0	**2442**	**8318**
Cars	2466	637	714	-	3817	0	543	1394	-	1937	0	1777	623	-	2400	
Trucks	43	2	15	-	60	0	18	24	-	42	0	25	6	-	31	
P/Cycles	0	0	0	-	0	0	0	5	-	5	0	11	0	-	11	
Cars (%)	98.29	99.69	97.94	-	98.45	0.00	96.79	98.31	-	97.88	0.00	98.61	99.05	-	98.72	
Trucks (%)	1.71	0.31	2.06	-	1.55	0.00	3.21	1.69	-	2.12	0.00	1.39	0.95	-	1.28	
P/Cycles (%)	0.00	0.00	0.00	-	0.00	0.00	0.00	0.35	-	0.25	0.00	0.61	0.00	-	0.45	

	Westbound					Northbound					Southbound				
	I-64 W/Bound Off-Ramp					Grinstead Rd (South)					Grinstead Rd (North)				
	Left	Thru	Right	Peds	App	U-Turn	Left	Thru	Peds	App	U-Turn	Thru	Right	Peds	App
0715 - 0730	169	38	73	0	280	0	29	71	0	100	0	144	62	0	206
0730 - 0745	160	62	29	1	252	0	43	79	0	122	0	160	53	0	213
0745 - 0800	173	74	14	0	261	0	55	83	0	138	0	138	53	0	191
0800 - 0815	143	48	23	0	214	0	33	86	0	119	0	108	64	0	172
AM Peak	**645**	**222**	**139**	**1**	**1007**	**0**	**160**	**319**	**0**	**479**	**0**	**550**	**232**	**0**	**782**
1700 - 1715	169	31	46	2	248	0	28	103	0	131	0	114	36	0	150
1715 - 1730	183	32	52	3	270	0	30	115	0	145	0	112	24	0	136
1730 - 1745	168	28	94	3	293	0	37	109	0	146	0	113	19	0	132
1745 - 1800	165	32	109	0	306	0	28	109	0	137	0	118	24	0	142
PM Peak	685	123	301	8	**1117**	0	123	436	0	**559**	0	457	103	0	**560**

Louisville, KY
Classified Turn Movement Count

Site 2 of 3
I-64 E/Bound Off-Ramp
I-64 E/Bound On-Ramp
Grinstead Rd (South)
Grinstead Rd (North)

Marr Traffic
Transportation Data Collection

41 Peabody Street, Nashville, TN 37210
1 (615) 431-6750
1 (800) 615-3765

Lat/Long
38.246723°, -85.700798°

Date
Thursday 24 August 2017

Weather
Sunny Intervals
Temp: 27°C

	Eastbound					Northbound					Southbound					
	I-64 E/Bound Off-Ramp					Grinstead Rd (South)					Grinstead Rd (North)					
	Left	Thru	Right	Peds	App	U-Turn	Thru	Right	Peds	App	U-Turn	Left	Thru	Peds	App	Int
0700 - 0715	17	0	41	0	58	1	53	84	0	138	0	47	190	0	237	433
0715 - 0730	40	0	61	0	101	0	66	143	0	209	0	68	246	0	314	624
0730 - 0745	20	0	60	0	80	0	99	139	0	238	0	64	243	0	307	625
0745 - 0800	29	0	50	0	79	0	110	178	0	288	0	42	274	0	316	683
Hourly Total	106	0	212	0	**318**	1	328	544	0	**873**	0	221	953	0	**1174**	**2365**
0800 - 0815	25	0	67	0	92	0	84	145	0	229	0	46	212	0	258	579
0815 - 0830	30	0	53	0	83	0	99	153	0	252	0	58	213	0	271	606
0830 - 0845	28	0	58	1	87	0	105	125	0	230	0	48	187	0	235	552
0845 - 0900	19	0	54	0	73	0	75	127	0	202	0	42	223	0	265	540
Hourly Total	102	0	232	1	**335**	0	363	550	0	**913**	0	194	835	0	**1029**	**2277**
1600 - 1615	28	0	67	0	95	0	110	171	0	281	0	44	196	0	240	616
1615 - 1630	21	1	50	1	73	0	102	157	0	259	0	28	200	0	228	560
1630 - 1645	21	0	58	2	81	0	115	181	0	296	0	23	215	0	238	615
1645 - 1700	18	0	55	0	73	0	111	198	0	309	0	35	236	0	271	653
Hourly Total	88	1	230	3	**322**	0	438	707	0	**1145**	0	130	847	0	**977**	**2444**
1700 - 1715	19	0	57	2	78	0	112	214	0	326	0	37	250	0	287	691
1715 - 1730	22	0	39	3	64	0	121	243	0	364	0	39	255	0	294	722
1730 - 1745	18	0	42	2	62	0	127	180	0	307	0	34	252	0	286	655
1745 - 1800	32	0	62	0	94	0	105	174	0	279	0	25	248	0	273	646
Hourly Total	91	0	200	7	**298**	0	465	811	0	**1276**	0	135	1005	0	**1140**	**2714**
Grand Total	387	1	874	11	**1273**	1	1594	2612	0	**4207**	0	680	3640	0	**4320**	**9800**
Cars	374	1	861	-	1236	1	1560	2568	-	4129	0	668	3573	-	4241	
Trucks	13	0	13	-	26	0	29	43	-	72	0	12	56	-	68	
P/Cycles	0	0	0	-	0	0	5	1	-	6	0	0	11	-	11	
Cars (%)	96.64	100.00	98.51	-	97.94	100.00	98.17	98.35	-	98.29	0.00	98.24	98.46	-	98.42	
Trucks (%)	3.36	0.00	1.49	-	2.06	0.00	1.83	1.65	-	1.71	0.00	1.76	1.54	-	1.58	
P/Cycles (%)	0.00	0.00	0.00	-	0.00	0.00	0.31	0.04	-	0.14	0.00	0.00	0.30	-	0.26	

	Eastbound					Northbound					Southbound				
	I-64 E/Bound Off-Ramp					Grinstead Rd (South)					Grinstead Rd (North)				
	Left	Thru	Right	Peds	App	U-Turn	Thru	Right	Peds	App	U-Turn	Left	Thru	Peds	App
0715 - 0730	40	0	61	0	101	0	66	143	0	209	0	68	246	0	314
0730 - 0745	20	0	60	0	80	0	99	139	0	238	0	64	243	0	307
0745 - 0800	29	0	50	0	79	0	110	178	0	288	0	42	274	0	316
0800 - 0815	25	0	67	0	92	0	84	145	0	229	0	46	212	0	258
AM Peak	**114**	**0**	**238**	**0**	**352**	**0**	**359**	**605**	**0**	**964**	**0**	**220**	**975**	**0**	**1195**
1645 - 1700	18	0	55	0	73	0	111	198	0	309	0	35	236	0	271
1700 - 1715	19	0	57	2	78	0	112	214	0	326	0	37	250	0	287
1715 - 1730	22	0	39	3	64	0	121	243	0	364	0	39	255	0	294
1730 - 1745	18	0	42	2	62	0	127	180	0	307	0	34	252	0	286
PM Peak	**77**	**0**	**193**	**7**	**277**	**0**	**471**	**835**	**0**	**1306**	**0**	**145**	**993**	**0**	**1138**

11/1/2017

Groundbreaking by Design

	Etley Ave						Grinstead Dr						Grinstead Dr						
	Southbound						Westbound						Eastbound						
Start Time	Left	Right	U-Turn	App To	Peds C	Peds C	Thru	Right	U-Turn	App To	Peds C	Peds C	Left	Thru	U-Turn	App To	Peds C	Peds C	Int Tota
7:00:00	0	8	0	**8**	0	0	152	5	0	**157**	0	0	1	135	0	**136**	0	0	**301**
7:15:00	1	8	0	**9**	1	0	219	1	0	**220**	0	0	13	202	0	**215**	0	0	**444**
7:30:00	0	6	0	**6**	0	0	255	1	0	**256**	0	0	10	302	0	**312**	0	0	**574**
7:45:00	1	6	0	**7**	0	0	311	5	0	**316**	0	0	24	294	0	**318**	0	0	**641**
8:00:00	2	3	0	**5**	1	0	206	5	0	**211**	0	0	19	238	0	**257**	0	0	**473**
8:15:00	0	7	0	**7**	0	0	181	7	0	**188**	0	0	20	182	0	**202**	0	0	**397**
8:30:00	3	8	0	**11**	0	0	209	1	0	**210**	0	0	11	216	0	**227**	0	0	**448**
8:45:00	0	10	0	**10**	0	0	204	5	0	**209**	0	0	11	205	0	**216**	0	0	**435**
16:00:00	3	16	0	**19**	0	0	252	2	0	**254**	0	0	19	273	0	**292**	0	0	**565**
16:15:00	1	18	0	**19**	0	0	255	3	0	**258**	0	0	24	268	0	**292**	0	0	**569**
16:30:00	2	31	0	**33**	0	0	228	6	0	**234**	0	0	14	306	0	**320**	0	0	**587**
16:45:00	4	23	0	**27**	0	0	291	2	0	**293**	0	0	14	318	0	**332**	0	0	**652**
17:00:00	6	22	0	**28**	0	1	288	6	0	**294**	0	0	12	318	0	**330**	0	0	**652**
17:15:00	4	27	0	**31**	0	0	265	4	0	**269**	0	0	16	347	0	**363**	0	0	**663**
17:30:00	8	29	0	**37**	0	0	300	5	0	**305**	0	0	13	296	0	**309**	0	0	**651**
17:45:00	1	33	0	**34**	0	0	253	1	0	**254**	0	0	16	262	0	**278**	0	0	**566**
Grand Total	36	255	0	**291**	2	1	3869	59	0	**3928**	0	0	237	4162	0	**4399**	0	0	**8618**
% Approach	12.4%	87.6%	0.0%				98.5%	1.5%	0.0%				5.4%	94.6%	0.0%				
Lights and N	33	254	0	**287**			3821	59	0	**3880**			232	4123	0	**4355**			**8522**
% Lights and	91.7%	99.6%	0.0%	**98.6%**			98.8%	100.0%	0.0%	**98.8%**			97.9%	99.1%	0.0%	**99.0%**			**98.9%**
Heavy	3	1	0	**4**			48	0	0	**48**			5	38	0	**43**			**95**
% Heavy	8.3%	0.4%	0.0%	**1.4%**			1.2%	0.0%	0.0%	**1.2%**			2.1%	0.9%	0.0%	**1.0%**			**1.1%**
Bicycles on	0	0	0	**0**			0	0	0	**0**			0	1	0	**1**			**1**
Pedestrians					2	1					0	0					0	0	

	Etley Ave						Grinstead Dr						Grinstead Dr						
	Southbound						Westbound						Eastbound						
Start Time	Left	Right	U-Turn	App To	Peds C	Peds C	Thru	Right	U-Turn	App To	Peds C	Peds C	Left	Thru	U-Turn	App To	Peds C	Peds C	Int Tota
7:15:00	1	8	0	**9**	1	0	219	1	0	**220**	0	0	13	202	0	**215**	0	0	**444**
7:30:00	0	6	0	**6**	0	0	255	1	0	**256**	0	0	10	302	0	**312**	0	0	**574**
7:45:00	1	6	0	**7**	0	0	311	5	0	**316**	0	0	24	294	0	**318**	0	0	**641**
8:00:00	2	3	0	**5**	1	0	206	5	0	**211**	0	0	19	238	0	**257**	0	0	**473**
AM Peak	**4**	**23**	**0**	**27**	**2**	**0**	**991**	**12**	**0**	**1003**	**0**	**0**	**66**	**1036**	**0**	**1102**	**0**	**0**	**2132**
16:45:00	4	23	0	**27**	0	0	291	2	0	**293**	0	0	14	318	0	**332**	0	0	**652**
17:00:00	6	22	0	**28**	0	1	288	6	0	**294**	0	0	12	318	0	**330**	0	0	**652**
17:15:00	4	27	0	**31**	0	0	265	4	0	**269**	0	0	16	347	0	**363**	0	0	**663**
17:30:00	8	29	0	**37**	0	0	300	5	0	**305**	0	0	13	296	0	**309**	0	0	**651**
PM Peak	**22**	**101**	**0**	**123**	**0**	**1**	**1144**	**17**	**0**	**1161**	**0**	**0**	**55**	**1279**	**0**	**1334**	**0**	**0**	**2618**

Qk4

File Name : Cherokee Pkwy & Grinstead Dr
Site Code :
Start Date : 5/15/2018
Page No : 1

Groups Printed- Cars - Trucks - Pedestrians

	From North	Grinstead Dr From East					Cherokee Pkwy From South					Grinstead Dr From West					
Start Time	App. Total	Left	Thru	Right	UTurns	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
07:00 AM	0	63	115	0	0	178	0	0	102	0	102	0	92	1	0	93	373
07:15 AM	0	90	202	0	0	292	0	0	109	0	109	0	116	1	0	117	518
07:30 AM	0	88	192	0	0	280	0	0	147	0	147	0	204	2	0	206	633
07:45 AM	0	87	227	0	0	314	0	0	155	0	155	0	196	1	0	197	666
Total	0	328	736	0	0	1064	0	0	513	0	513	0	608	5	0	613	2190
08:00 AM	0	83	140	0	0	223	0	0	130	0	130	0	126	0	0	126	479
08:15 AM	0	85	129	0	0	214	0	0	135	1	136	0	112	1	0	113	463
08:30 AM	0	66	149	0	0	215	0	0	130	2	132	0	117	0	0	117	464
08:45 AM	0	94	137	0	0	231	0	0	116	1	117	0	126	2	0	128	476
Total	0	328	555	0	0	883	0	0	511	4	515	0	481	3	0	484	1882
09:00 AM	0	70	112	0	0	182	0	0	111	0	111	0	115	1	0	116	409
09:15 AM	0	83	91	0	0	174	0	0	87	0	87	0	82	0	0	82	343
09:30 AM	0	69	85	0	0	154	1	0	103	0	104	0	87	0	0	87	345
09:45 AM	0	82	87	0	0	169	0	0	97	0	97	0	92	3	0	95	361
Total	0	304	375	0	0	679	1	0	398	0	399	0	376	4	0	380	1458
10:00 AM	0	71	89	0	0	160	0	0	101	1	102	0	87	0	0	87	349
10:15 AM	0	84	86	0	0	170	0	0	80	0	80	0	84	2	0	86	336
10:30 AM	0	65	96	0	0	161	0	0	77	0	77	0	100	1	0	101	339
10:45 AM	0	88	93	0	0	181	0	0	76	1	77	0	92	2	0	94	352
Total	0	308	364	0	0	672	0	0	334	2	336	0	363	5	0	368	1376
11:00 AM	0	77	88	0	0	165	0	0	80	0	80	0	92	2	0	94	339
11:15 AM	0	93	108	0	0	201	0	0	88	0	88	0	101	2	0	103	392
11:30 AM	0	92	113	0	0	205	0	0	96	1	97	0	97	2	0	99	401
11:45 AM	0	106	95	0	0	201	0	0	90	0	90	0	125	2	0	127	418
Total	0	368	404	0	0	772	0	0	354	1	355	0	415	8	0	423	1550
12:00 PM	0	109	100	0	0	209	1	0	99	0	100	0	120	0	0	120	429
12:15 PM	0	86	101	0	0	187	0	0	116	0	116	0	103	2	1	106	409
12:30 PM	0	84	96	0	0	180	0	0	99	0	99	0	111	2	0	113	392
12:45 PM	0	89	118	0	0	207	0	0	104	1	105	0	121	1	0	122	434
Total	0	368	415	0	0	783	1	0	418	1	420	0	455	5	1	461	1664
01:00 PM	0	104	118	0	0	222	0	0	93	0	93	0	129	0	0	129	444
01:15 PM	0	87	95	0	0	182	0	0	101	0	101	0	104	3	0	107	390
01:30 PM	0	100	103	0	0	203	0	0	98	1	99	0	126	1	1	128	430
01:45 PM	0	99	116	0	0	215	0	0	101	0	101	0	107	0	0	107	423
Total	0	390	432	0	0	822	0	0	393	1	394	0	466	4	1	471	1687
02:00 PM	0	105	94	0	0	199	0	0	110	1	111	0	115	1	0	116	426
02:15 PM	0	89	123	0	0	212	0	0	113	0	113	0	116	0	0	116	441
02:30 PM	0	113	118	0	0	231	0	0	123	0	123	0	139	3	0	142	496
02:45 PM	0	122	173	0	0	295	0	0	126	0	126	0	147	1	0	148	569
Total	0	429	508	0	0	937	0	0	472	1	473	0	517	5	0	522	1932
03:00 PM	0	120	149	0	0	269	0	0	135	0	135	0	198	6	0	204	608
03:15 PM	0	109	159	0	0	268	0	0	129	0	129	0	197	6	0	203	600
03:30 PM	0	115	135	0	0	250	0	0	156	0	156	0	150	1	1	152	558
03:45 PM	0	133	117	0	0	250	0	0	122	0	122	0	140	6	0	146	518
Total	0	477	560	0	0	1037	0	0	542	0	542	0	685	19	1	705	2284
04:00 PM	0	130	135	0	0	265	0	0	137	0	137	0	183	2	0	185	587
04:15 PM	0	141	143	0	0	284	0	0	123	1	124	0	161	3	0	164	572
04:30 PM	0	152	151	0	0	303	0	0	120	0	120	0	201	3	0	204	627
04:45 PM	0	142	144	0	0	286	0	0	119	0	119	0	188	3	0	191	596
Total	0	565	573	0	0	1138	0	0	499	1	500	0	733	11	0	744	2382
05:00 PM	0	139	153	0	0	292	0	0	117	0	117	0	198	1	0	199	608

Qk4

File Name : Cherokee Pkwy & Grinstead Dr
Site Code :
Start Date : 5/15/2018
Page No : 2

Groups Printed- Cars - Trucks - Pedestrians

	From North	Grinstead Dr From East					Cherokee Pkwy From South					Grinstead Dr From West					
Start Time	App. Total	Left	Thru	Right	UTurns	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
05:15 PM	0	153	170	0	0	323	0	0	131	1	132	0	203	4	0	207	662
05:30 PM	0	164	178	0	0	342	0	0	121	0	121	0	174	2	2	178	641
05:45 PM	0	162	175	0	0	337	0	0	121	1	122	0	159	2	0	161	620
Total	0	618	676	0	0	1294	0	0	490	2	492	0	734	9	2	745	2531
06:00 PM	0	135	108	0	0	243	0	0	100	0	100	0	164	1	0	165	508
06:15 PM	0	135	129	0	0	264	0	0	104	2	106	0	122	2	0	124	494
06:30 PM	0	135	128	0	0	263	0	0	105	1	106	0	101	3	0	104	473
06:45 PM	0	97	121	0	0	218	0	0	110	0	110	0	118	3	0	121	449
Total	0	502	486	0	0	988	0	0	419	3	422	0	505	9	0	514	1924
Grand Total	0	4985	6084	0	0	11069	2	0	5343	16	5361	0	6338	87	5	6430	22860
Apprch %		45	55	0	0		0	0	99.7	0.3		0	98.6	1.4	0.1		
Total %	0	21.8	26.6	0	0	48.4	0	0	23.4	0.1	23.5	0	27.7	0.4	0	28.1	
Cars	0	4928	5995	0	0	10923	2	0	5269	0	5271	0	6247	87	0	6334	22528
% Cars	0	98.9	98.5	0	0	98.7	100	0	98.6	0	98.3	0	98.6	100	0	98.5	98.5
Trucks	0	57	89	0	0	146	0	0	74	0	74	0	91	0	0	91	311
% Trucks	0	1.1	1.5	0	0	1.3	0	0	1.4	0	1.4	0	1.4	0	0	1.4	1.4
Pedestrians	0	0	0	0	0	0	0	0	0	16	16	0	0	0	5	5	21
% Pedestrians	0	0	0	0	0	0	0	0	0	100	0.3	0	0	0	100	0.1	0.1

	From North	Grinstead Dr From East					Cherokee Pkwy From South					Grinstead Dr From West					
Start Time	App. Total	Left	Thru	Right	UTurns	App. Total	Left	Thru	Right	Peds	App. Total	Left	Thru	Right	Peds	App. Total	Int. Total
eak Hour Analysis From 07:00 AM to 11:45 AM - Peak 1 of 1																	
eak Hour for Entire Intersection Begins at 07:15 AM																	
07:15 AM	0	**90**	202	0	0	292	0	0	109	0	109	0	116	1	0	117	518
07:30 AM	0	88	192	0	0	280	0	0	147	0	147	0	**204**	**2**	0	**206**	633
07:45 AM	0	87	**227**	0	0	**314**	0	0	**155**	0	**155**	0	196	1	0	197	**666**
08:00 AM	0	83	140	0	0	223	0	0	130	0	130	0	126	0	0	126	479
Total Volume	0	348	761	0	0	1109	0	0	541	0	541	0	642	4	0	646	2296
% App. Total		31.4	68.6	0	0		0	0	100	0		0	99.4	0.6	0		
PHF	.000	.967	.838	.000	.000	.883	.000	.000	.873	.000	.873	.000	.787	.500	.000	.784	.862
eak Hour Analysis From 12:00 PM to 06:45 PM - Peak 1 of 1																	
eak Hour for Entire Intersection Begins at 05:00 PM																	
05:00 PM	0	139	153	0	0	292	0	0	117	0	117	0	198	1	0	199	608
05:15 PM	0	153	170	0	0	323	0	0	**131**	**1**	**132**	0	**203**	**4**	0	**207**	**662**
05:30 PM	0	**164**	**178**	0	0	**342**	0	0	121	0	121	0	174	2	**2**	178	641
05:45 PM	0	162	175	0	0	337	0	0	121	1	122	0	159	2	0	161	620
Total Volume	0	618	676	0	0	1294	0	0	490	2	492	0	734	9	2	745	2531
% App. Total		47.8	52.2	0	0		0	0	99.6	0.4		0	98.5	1.2	0.3		
PHF	.000	.942	.949	.000	.000	.946	.000	.000	.935	.500	.932	.000	.904	.563	.250	.900	.956

Groundbreaking by Design.

	Lexington Rd						Etley Ave						Lexington Rd						
	Westbound						Northbound						Eastbound						
Start Time	Left	Thru	U-Turn	App To	Peds C	Peds C	Left	Right	U-Turn	App To	Peds C	Peds C	Thru	Right	U-Turn	App To	Peds C	Peds C	Int Tota
7:00:00	0	65	0	**65**	0	0	1	1	0	**2**	0	0	25	7	0	**32**	0	0	**99**
7:15:00	2	97	0	**99**	0	0	9	3	0	**12**	0	0	34	8	0	**42**	0	0	**153**
7:30:00	0	132	0	**132**	0	0	7	3	0	**10**	0	0	38	7	0	**45**	0	0	**187**
7:45:00	0	157	0	**157**	0	0	20	3	0	**23**	0	0	43	8	0	**51**	0	0	**231**
8:00:00	0	196	0	**196**	0	0	12	4	0	**16**	0	0	35	2	0	**37**	0	0	**249**
8:15:00	0	193	0	**193**	0	0	15	5	0	**20**	0	0	33	5	0	**38**	0	0	**251**
8:30:00	0	175	0	**175**	0	0	9	1	0	**10**	0	0	35	8	0	**43**	0	0	**228**
8:45:00	2	193	0	**195**	0	0	9	3	0	**12**	0	0	46	7	0	**53**	0	0	**260**
16:00:00	0	62	0	**62**	0	0	12	3	1	**16**	0	0	147	13	0	**160**	0	0	**238**
16:15:00	1	76	0	**77**	0	1	12	5	0	**17**	0	0	199	13	0	**212**	0	0	**306**
16:30:00	2	58	0	**60**	0	0	15	5	0	**20**	0	0	251	30	0	**281**	0	0	**361**
16:45:00	1	68	0	**69**	0	0	8	4	0	**12**	0	0	231	23	0	**254**	0	0	**335**
17:00:00	0	46	0	**46**	0	0	12	4	0	**16**	0	0	244	21	0	**265**	0	0	**327**
17:15:00	2	87	0	**89**	0	0	9	5	0	**14**	0	0	239	22	0	**261**	0	0	**364**
17:30:00	1	64	1	**66**	1	0	13	4	0	**17**	0	0	240	39	0	**279**	0	0	**362**
17:45:00	0	79	0	**79**	0	0	13	2	0	**15**	1	0	170	30	0	**200**	0	0	**294**
Grand To	11	1748	1	**1760**	1	1	176	55	1	**232**	1	0	2010	243	0	**2253**	0	0	**4245**
% Approa	0.6%	99.3%	0.1%				75.9%	23.7%	0.4%				89.2%	10.8%	0.0%				
Lights an	10	1722	1	**1733**			173	55	1	**229**			1986	241	0	**2227**			**4189**
% Lights	90.9%	98.5%	100.0%	**98.5%**			98.3%	100.0%	100.0%	**98.7%**			98.8%	99.2%	0.0%	**98.8%**			**98.7%**
Heavy	0	25	0	**25**			3	0	0	**3**			22	1	0	**23**			**51**
% Heavy	0.0%	1.4%	0.0%	**1.4%**			1.7%	0.0%	0.0%	**1.3%**			1.1%	0.4%	0.0%	**1.0%**			**1.2%**
Bicycles	1	1	0	**2**			0	0	0	**0**			2	1	0	**3**			**5**
Pedestrians					1	1					1	0					0	0	

	Lexington Rd						Etley Ave						Lexington Rd						
	Westbound						Northbound						Eastbound						
Start Time	Left	Thru	U-Turn	App To	Peds C	Peds C	Left	Right	U-Turn	App To	Peds C	Peds C	Thru	Right	U-Turn	App To	Peds C	Peds C	Int Tota
7:30:00	0	132	0	**132**	0	0	7	3	0	**10**	0	0	38	7	0	**45**	0	0	**187**
7:45:00	0	157	0	**157**	0	0	20	3	0	**23**	0	0	43	8	0	**51**	0	0	**231**
8:00:00	0	196	0	**196**	0	0	12	4	0	**16**	0	0	35	2	0	**37**	0	0	**249**
8:15:00	0	193	0	**193**	0	0	15	5	0	**20**	0	0	33	5	0	**38**	0	0	**251**
AM Peak	**0**	**678**	**0**	**678**	**0**	**0**	**54**	**15**	**0**	**69**	**0**	**0**	**149**	**22**	**0**	**171**	**0**	**0**	**918**
16:45:00	1	68	0	**69**	0	0	8	4	0	**12**	0	0	231	23	0	**254**	0	0	**335**
17:00:00	0	46	0	**46**	0	0	12	4	0	**16**	0	0	244	21	0	**265**	0	0	**327**
17:15:00	2	87	0	**89**	0	0	9	5	0	**14**	0	0	239	22	0	**261**	0	0	**364**
17:30:00	1	64	1	**66**	1	0	13	4	0	**17**	0	0	240	39	0	**279**	0	0	**362**
PM Peak	**4**	**265**	**1**	**270**	**1**	**0**	**42**	**17**	**0**	**59**	**0**	**0**	**954**	**105**	**0**	**1059**	**0**	**0**	**1388**

Qk4 - Louisville
815 W. Market St.
Suite 300
Louisville, Kentucky, United States 40202
502 585 2222 jlukat@qk4.com

Count Name: Lexington Rd & Payne St
Site Code:
Start Date: 02/05/2019
Page No: 1

Turning Movement Data

Time	Payne St Southbound						Lexington Rd Westbound						Payne St Northbound						Lexington Rd Eastbound						Int
	Right	Thru	Left	U-Turn	Peds	App Total	Right	Thru	Left	U-Turn	Peds	App Total	Right	Thru	Left	U-Turn	Peds	App Total	Right	Thru	Left	U-Turn	Peds	App Total	
AM	32	27	0	0		59	0	70	5	0		75	6	14	2	0		22	0	20	13	0		33	
AM	43	26	0	0		69	0	106	5	0		111	4	16	2	0		22	0	19	13	0		32	
AM	43	26	0	0		69	0	140	8	0		148	4	27	0	0		31	2	28	23	0		53	
AM	48	43	1	0		92	0	184	16	0		200	8	37	0	0		46	1	26	20	0		47	
Total	166	122	1	0		289	0	500	34	0		534	22	84	4	0		120	3	93	69	0		165	
AM	55	45	0	0		100	1	170	14	0		185	4	39	0	0		43	1	21	30	0		52	
AM	46	39	0	0		85	0	143	12	0		155	6	40	0	0		46	2	19	24	0		45	
AM	55	37	0	0		92	0	142	24	0		166	11	38	0	0		49	1	27	22	0		50	
AM	40	51	0	0		91	1	142	13	0		156	7	43	1	0		51	4	23	33	0		60	
Total	196	172	0	0		368	2	597	63	0		662	28	160	1	0		189	8	90	109	0		207	
AM	34	32	0	0		66	0	90	18	0		108	10	41	4	0		55	2	32	27	0		61	
AM	28	38	0	0		66	2	78	7	0		87	5	22	3	0		30	2	30	19	0		51	
AM	21	30	3	0		54	2	50	9	0		61	5	17	2	0		24	1	20	23	0		44	
AM	25	32	0	0		57	2	59	4	0		65	4	21	1	0		26	1	21	22	0		44	
Total	108	132	3	0		243	6	277	38	0		321	24	101	10	0		135	6	103	91	0		200	
AM	21	31	0	0		52	2	44	6	0		52	3	21	0	0		24	1	19	17	0		37	
AM	27	23	1	0		51	2	40	16	0		58	4	11	0	0		15	3	24	19	0		46	
AM	20	27	1	0		48	1	27	4	0		32	7	18	0	0		25	0	43	9	1		53	
AM	19	27	4	0		50	3	41	11	0		55	7	24	4	0		35	2	29	23	0		54	
Total	87	108	6	0		201	8	152	37	0		197	21	74	4	0		99	6	115	68	1		190	
AM	15	28	0	0		43	2	37	11	0		50	12	8	1	0		21	0	28	17	0		45	
AM	22	31	1	0		54	3	38	8	0		49	4	23	1	0		28	0	45	16	0		61	
AM	19	24	4	0		47	2	41	10	0		53	13	28	2	0		43	4	28	28	0		60	
AM	24	33	3	0		60	3	61	7	0		71	10	44	0	0		54	1	34	37	0		72	
Total	80	116	8	0		204	10	177	36	0		223	39	103	4	0		146	5	135	98	0		238	
PM	24	40	1	0		65	2	33	8	0		43	7	40	5	0		52	2	41	30	0		73	
PM	25	24	4	0		53	0	40	6	0		46	5	29	3	0		37	4	42	19	0		65	
PM	18	33	1	0		52	4	45	10	0		59	6	33	0	0		39	0	26	27	0		53	
PM	22	35	4	0		61	2	37	11	0		50	10	26	0	0		36	1	33	24	0		58	
Total	89	132	10	0		231	8	155	35	0		198	28	128	8	0		164	7	142	100	0		249	
PM	21	23	2	0		46	1	35	8	0		44	10	24	0	0		34	2	37	23	0		62	
PM	20	26	2	0		48	2	44	7	0		53	10	25	1	0		36	0	27	29	0		56	
PM	24	29	4	0		57	2	42	9	0		53	8	17	2	0		27	0	37	18	0		55	
PM	26	34	5	0		65	1	45	7	0		53	5	32	0	0		37	0	33	21	0		54	
2:30 PM	26	24	0	0		50	0	42	14	0		56	9	27	1	0		37	1	40	22	0		63	206
2:45 PM	20	25	2	0		47	0	29	4	0		33	5	28	0	0		33	1	43	31	0		75	188
Hourly Total	95	110	6	0		211	3	169	31	0		203	22	95	3	0		120	3	162	110	0		275	809
3:00 PM	31	45	2	0		78	1	32	10	0		43	11	27	1	0		39	3	60	33	0		96	256
3:15 PM	26	39	3	0		68	1	41	15	0		57	7	34	0	0		41	1	58	36	0		95	261
3:30 PM	25	60	1	0		86	1	36	11	0		48	15	36	1	0		52	3	74	43	0		120	308
3:45 PM	25	43	2	0		70	1	48	18	0		67	20	55	4	0		79	3	76	37	0		116	332
Hourly Total	107	187	8	0		302	4	157	54	0		215	53	152	6	0		211	10	268	149	0		427	1155
4:00 PM	38	29	3	0		70	2	38	5	0		45	19	45	2	0		66	0	88	45	0		133	314
4:15 PM	29	37	3	0		69	1	37	9	0		47	17	47	0	0		64	0	105	41	0		146	326
4:30 PM	39	51	1	0		91	0	35	10	0		45	20	42	0	0		62	2	152	49	0		203	401
4:45 PM	36	47	3	0		86	1	43	10	0		54	15	43	2	0		60	2	178	51	0		231	431
Hourly Total	142	164	10	0		316	4	153	34	0		191	71	177	4	0		252	4	523	186	0		713	1472
5:00 PM	47	51	1	0		99	2	46	9	0		57	21	51	1	0		73	1	208	77	0		286	515
5:15 PM	33	37	2	0		72	0	40	9	0		49	13	51	3	0		67	3	179	78	0		260	448
5:30 PM	38	44	1	0		83	2	49	13	0		64	14	45	1	0		60	6	150	42	0		198	405
5:45 PM	33	40	4	0		77	2	40	16	0		58	7	44	2	0		53	5	118	66	0		189	377
Hourly Total	151	172	8	0		331	6	175	47	0		228	55	191	7	0		253	15	655	263	0		933	1745
6:00 PM	19	42	1	0		62	0	30	13	0		43	21	46	1	0		68	0	79	40	0		119	292
6:15 PM	29	34	3	0		66	2	38	15	0		55	12	43	1	0		56	0	65	35	0		100	277
6:30 PM	26	30	4	0		60	0	33	9	0		42	8	29	1	0		38	0	51	20	0		71	211
6:45 PM	26	33	3	0		62	0	29	7	0		36	7	37	0	0		44	0	47	31	0		78	220
Hourly Total	100	139	11	0		250	2	130	44	0		176	48	155	3	0		206	0	242	126	0		368	1000
Grand Total	1412	1666	84	0		3162	59	2808	484	0		3351	444	1528	57	0		2029	69	2662	1460	1		4192	12734
Approach %	44.7	52.7	2.7	0.0		-	1.8	83.8	14.4	0.0		-	21.9	75.3	2.8	0.0		-	1.6	63.5	34.8	0.0		-	-
Total %	11.1	13.1	0.7	0.0		24.9	0.5	22.1	3.8	0.0		26.3	3.5	12.0	0.4	0.0		15.9	0.5	20.9	11.5	0.0		32.9	-
Lights	1350	1621	78	0		3049	55	2751	473	0		3279	431	1490	56	0		1976	67	2609	1393	1		4070	12374
% Lights	95.6	97.3	92.9	-		96.4	93.2	98.0	97.7	-		97.9	97.1	97.5	96.6	-		97.4	97.1	98.0	95.4	100.0		97.1	97.2
Other Vehicles	62	38	6	0		106	4	54	8	0		66	11	34	2	0		47	2	52	65	0		119	338
% Other Vehicles	4.4	2.3	7.1	-		3.4	6.8	1.9	1.7	-		2.0	2.5	2.2	3.5	-		2.3	2.9	2.0	4.5	0.0		2.8	2.7
Bicycles on Road	0	7	0	0		7	0	3	3	0		6	2	4	0	0		6	0	1	2	0		3	22
% Bicycles on Road	0.0	0.4	0.0	-		0.2	0.0	0.1	0.6	-		0.2	0.5	0.3	0.0	-		0.3	0.0	0.0	0.1	0.0		0.1	0.2
Pedestrians	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-
% Pedestrians	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-	-	-	-		-	-

Qk4 - Louisville
815 W. Market St.
Suite 300
Louisville, Kentucky, United States 40202
502.585.2222 jlukat@qk4.com

Count Name: Lexington Rd & Payne St
Site Code:
Start Date: 02/05/2019
Page No: 4

Turning Movement Peak Hour Data (7:45 AM)

Start Time	Payne St Southbound						Lexington Rd Westbound						Payne St Northbound						Lexington Rd Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
7:45 AM	48	43	1	0	0	92	0	164	16	0	0	200	8	37	0	0	0	45	1	26	20	0	0	47	384
8:00 AM	55	45	0	0	0	100	1	170	14	0	0	185	4	39	0	0	0	43	1	21	30	0	0	52	380
8:15 AM	46	39	0	0	0	85	0	143	12	0	0	155	6	40	0	0	0	46	2	19	24	0	0	45	331
8:30 AM	55	37	0	0	0	92	0	142	24	0	0	166	11	38	0	0	0	49	1	27	22	0	0	50	357
Total	204	164	1	0	0	369	1	639	66	0	0	706	29	154	0	0	0	183	5	93	96	0	0	194	1452
Approach %	55.3	44.4	0.3	0.0		-	0.1	90.5	9.3	0.0		-	15.8	84.2	0.0	0.0		-	2.6	47.9	49.5	0.0		-	-
Total %	14.0	11.3	0.1	0.0		25.4	0.1	44.0	4.5	0.0		48.6	2.0	10.6	0.0	0.0		12.6	0.3	6.4	6.6	0.0		13.4	-
PHF	0.927	0.911	0.250	0.000		0.923	0.250	0.868	0.686	0.000		0.883	0.659	0.963	0.000	0.000		0.934	0.625	0.861	0.800	0.000		0.933	0.945
Lights	198	157	1	0		356	1	637	66	0		704	29	144	0	0		173	5	89	90	0		184	1417
% Lights	97.1	95.7	100.0	-		96.5	100.0	99.7	100.0	-		99.7	100.0	93.5	-	-		94.5	100.0	95.7	93.8	-		94.8	97.6
Other Vehicles	6	6	0	0		12	0	1	0	0		1	0	8	0	0		8	0	4	6	0		10	31
% Other Vehicles	2.9	3.7	0.0	-		3.3	0.0	0.2	0.0	-		0.1	0.0	5.2	-	-		4.4	0.0	4.3	6.3	-		5.2	2.1
Bicycles on Road	0	1	0	0		1	0	1	0	0		1	0	2	0	0		2	0	0	0	0		0	4
% Bicycles on Road	0.0	0.6	0.0	-		0.3	0.0	0.2	0.0	-		0.1	0.0	1.3	-	-		1.1	0.0	0.0	0.0	-		0.0	0.3
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Qk4 - Louisville
815 W. Market St.
Suite 300
Louisville, Kentucky, United States 40202
502.585.2222 jlukat@qk4.com

Count Name: Lexington Rd & Payne St
Site Code:
Start Date: 02/05/2019
Page No: 6

Turning Movement Peak Hour Data (4:45 PM)

Start Time	Payne St Southbound						Lexington Rd Westbound						Payne St Northbound						Lexington Rd Eastbound						Int. Total
	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	Right	Thru	Left	U-Turn	Peds	App. Total	
4:45 PM	36	47	3	0	0	86	1	43	10	0	0	54	15	43	2	0	0	60	2	178	51	0	0	231	431
5:00 PM	47	51	1	0	0	99	2	46	9	0	0	57	21	51	1	0	0	73	1	208	77	0	0	286	515
5:15 PM	33	37	2	0	0	72	0	40	9	0	0	49	13	51	3	0	0	67	3	179	78	0	0	260	448
5:30 PM	38	44	1	0	0	83	2	49	13	0	0	64	14	45	1	0	0	60	6	150	42	0	0	198	405
Total	154	179	7	0	0	340	5	178	41	0	0	224	63	190	7	0	0	260	12	715	248	0	0	975	1799
Approach %	45.3	52.6	2.1	0.0		-	2.2	79.5	18.3	0.0		-	24.2	73.1	2.7	0.0		-	1.2	73.3	25.4	0.0		-	-
Total %	8.6	9.9	0.4	0.0		18.9	0.3	9.9	2.3	0.0		12.5	3.5	10.6	0.4	0.0		14.5	0.7	39.7	13.8	0.0		54.2	-
PHF	0.819	0.877	0.583	0.000		0.859	0.625	0.908	0.788	0.000		0.875	0.750	0.931	0.583	0.000		0.890	0.500	0.859	0.795	0.000		0.852	0.873
Lights	148	177	7	0		332	4	175	40	0		219	63	189	7	0		259	11	711	246	0		968	1778
% Lights	96.1	98.9	100.0	-		97.6	80.0	98.3	97.6	-		97.8	100.0	99.5	100.0	-		99.6	91.7	99.4	99.2	-		99.3	98.8
Other Vehicles	6	0	0	0		6	1	3	1	0		5	0	1	0	0		1	1	4	2	0		7	19
% Other Vehicles	3.9	0.0	0.0	-		1.8	20.0	1.7	2.4	-		2.2	0.0	0.5	0.0	-		0.4	8.3	0.6	0.8	-		0.7	1.1
Bicycles on Road	0	2	0	0		2	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	2
% Bicycles on Road	0.0	1.1	0.0	-		0.6	0.0	0.0	0.0	-		0.0	0.0	0.0	0.0	-		0.0	0.0	0.0	0.0	-		0.0	0.1
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Study Name Lexington & Alta Vista
Start Date 05/26/2016
Start Time 7:00 AM
Site Code

Groundbreaking by Design.

	Alta Vista Northbound				Lexington Road Eastbound				Alta Vista Southbound				Lexington Road Westbound				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	TOTAL
7:00 AM	5	0	9	0	4	36	0	0	1	0	1	0	0	92	0	0	148
7:15 AM	4	0	15	0	5	63	0	0	0	2	0	0	1	128	5	0	223
7:30 AM	7	0	18	0	9	69	0	0	1	1	0	0	0	170	5	0	280
7:45 AM	6	2	28	0	5	100	0	0	1	1	0	0	0	174	2	0	319
8:00 AM	6	1	19	0	5	109	0	0	1	1	0	0	1	194	8	0	345
8:15 AM	12	0	24	0	8	84	0	0	0	0	0	0	1	204	7	0	340
8:30 AM	17	0	16	0	11	105	0	1	1	0	0	0	2	199	10	0	362
8:45 AM	7	0	26	0	9	126	0	0	1	1	1	0	1	207	12	0	391
4:00 PM	6	0	6	0	27	149	0	0	1	1	1	0	0	178	9	0	378
4:15 PM	12	0	14	0	20	183	0	0	2	0	2	0	0	198	10	0	441
4:30 PM	15	0	12	0	18	218	0	0	5	0	2	0	1	187	13	0	471
4:45 PM	12	2	18	0	26	246	0	0	2	2	1	0	1	209	9	0	528
5:00 PM	11	0	18	0	17	242	1	0	1	2	2	0	0	253	10	0	557
5:15 PM	11	1	17	0	19	273	0	0	3	0	3	0	0	223	13	0	563
5:30 PM	10	0	16	0	15	250	0	0	2	0	4	0	1	197	12	0	507
5:45 PM	25	0	10	0	21	230	0	0	5	1	1	0	1	204	5	0	503

	Alta Vista Northbound				Lexington Road Eastbound				Alta Vista Southbound				Lexington Road Westbound				
Start Time	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	Right	Thru	Left	U-Turn	TOTAL
7:15 AM	4	0	15	0	5	63	0	0	0	2	0	0	1	128	5	0	223
7:30 AM	7	0	18	0	9	69	0	0	1	1	0	0	0	170	5	0	280
7:45 AM	6	2	28	0	5	100	0	0	1	1	0	0	0	174	2	0	319
8:00 AM	6	1	19	0	5	109	0	0	1	1	0	0	1	194	8	0	345
TOTAL	**23**	**3**	**80**	**0**	**24**	**341**	**0**	**0**	**3**	**5**	**0**	**0**	**2**	**666**	**20**	**0**	**1167**
4:45 PM	12	2	18	0	26	246	0	0	2	2	1	0	1	209	9	0	528
5:00 PM	11	0	18	0	17	242	1	0	1	2	2	0	0	253	10	0	557
5:15 PM	11	1	17	0	19	273	0	0	3	0	3	0	0	223	13	0	563
5:30 PM	10	0	16	0	15	250	0	0	2	0	4	0	1	197	12	0	507
TOTAL	**44**	**3**	**69**	**0**	**77**	**1011**	**1**	**0**	**8**	**4**	**10**	**0**	**2**	**882**	**44**	**0**	**2155**

Highway Capacity Reports

HCM 6th Signalized Intersection Summary

101: Grinstead Dr & I-64 WB Ramp

05/19/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	645	222	139	160	319	0	0	550	232
Future Volume (veh/h)	0	0	0	645	222	139	160	319	0	0	550	232
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1870	1870	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				672	231	145	167	332	0	0	573	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				2	2	2	2	2	0	0	2	2
Cap, veh/h				767	462	290	332	1515	0	0	1081	
Arrive On Green				0.43	0.43	0.43	0.02	0.14	0.00	0.00	0.30	0.00
Sat Flow, veh/h				1781	1074	674	1781	3647	0	0	3647	1585
Grp Volume(v), veh/h				672	0	376	167	332	0	0	573	0
Grp Sat Flow(s),veh/h/ln				1781	0	1749	1781	1777	0	0	1777	1585
Q Serve(g_s), s				31.1	0.0	14.0	5.5	7.5	0.0	0.0	12.0	0.0
Cycle Q Clear(g_c), s				31.1	0.0	14.0	5.5	7.5	0.0	0.0	12.0	0.0
Prop In Lane				1.00		0.39	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				767	0	753	332	1515	0	0	1081	
V/C Ratio(X)				0.88	0.00	0.50	0.50	0.22	0.00	0.00	0.53	
Avail Cap(c_a), veh/h				833	0	818	332	1515	0	0	1081	
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.99	0.99	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				23.4	0.0	18.6	21.0	25.4	0.0	0.0	26.0	0.0
Incr Delay (d2), s/veh				11.0	0.0	1.1	0.9	0.3	0.0	0.0	1.9	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				14.6	0.0	5.7	2.5	3.4	0.0	0.0	5.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				34.5	0.0	19.7	21.9	25.7	0.0	0.0	27.8	0.0
LnGrp LOS				C	A	B	C	C	A	A	C	
Approach Vol, veh/h					1048			499			573	A
Approach Delay, s/veh					29.2			24.4			27.8	
Approach LOS					C			C			C	

Timer - Assigned Phs	2	4	5	6
Phs Duration (G+Y+Rc), s	44.4	45.6	11.0	33.4
Change Period (Y+Rc), s	6.0	* 6.9	* 5.5	6.0
Max Green Setting (Gmax), s	35.0	* 42	* 5.5	24.0
Max Q Clear Time (g_c+I1), s	9.5	33.1	7.5	14.0
Green Ext Time (p_c), s	0.8	5.7	0.0	1.2

Intersection Summary	
HCM 6th Ctrl Delay	27.7
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
102: Grinstead Dr & I-64 EB Ramp

05/19/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	114	0	238	0	0	0	0	359	605	220	975	0
Future Volume (veh/h)	114	0	238	0	0	0	0	359	605	220	975	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	124	0	0				0	390	0	239	1060	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	159	0					0	2188		773	2692	0
Arrive On Green	0.09	0.00	0.00				0.00	0.62	0.00	0.10	1.00	0.00
Sat Flow, veh/h	1781	0	1585				0	3647	1585	1781	3647	0
Grp Volume(v), veh/h	124	0	0				0	390	0	239	1060	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1777	1585	1781	1777	0
Q Serve(g_s), s	6.1	0.0	0.0				0.0	4.3	0.0	4.2	0.0	0.0
Cycle Q Clear(g_c), s	6.1	0.0	0.0				0.0	4.3	0.0	4.2	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	159	0					0	2188		773	2692	0
V/C Ratio(X)	0.78	0.00					0.00	0.18		0.31	0.39	0.00
Avail Cap(c_a), veh/h	287	0					0	2188		876	2692	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	0.66	0.00	0.62	0.62	0.00
Uniform Delay (d), s/veh	40.1	0.0	0.0				0.0	7.5	0.0	4.6	0.0	0.0
Incr Delay (d2), s/veh	8.1	0.0	0.0				0.0	0.1	0.0	0.1	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.0	0.0	0.0				0.0	1.5	0.0	1.2	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.2	0.0	0.0				0.0	7.6	0.0	4.7	0.3	0.0
LnGrp LOS	D	A					A	A		A	A	A
Approach Vol, veh/h		124	A					390	A		1299	
Approach Delay, s/veh		48.2						7.6			1.1	
Approach LOS		D						A			A	

Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	12.8	62.7				75.5		14.5				
Change Period (Y+Rc), s	* 6.3	7.3				7.3		6.5				
Max Green Setting (Gmax), s	* 12	43.7				61.7		14.5				
Max Q Clear Time (g_c+I1), s	6.2	6.3				2.0		8.1				
Green Ext Time (p_c), s	0.3	2.8				10.4		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	5.7
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
103: Grinstead Dr & Lexington Rd

05/19/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	96	58	7	281	365	34	0	857	216	111	775	333
Future Volume (veh/h)	96	58	7	281	365	34	0	857	216	111	775	333
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	0	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	103	62	8	302	392	37	0	922	232	119	833	358
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	0	2	2	2	2	2
Cap, veh/h	140	249	32	576	547	51	0	1285	837	139	1256	538
Arrive On Green	0.08	0.08	0.08	0.17	0.17	0.17	0.00	0.36	0.36	0.16	1.00	1.00
Sat Flow, veh/h	1781	3173	402	3456	3283	308	0	3647	1585	1781	2423	1037
Grp Volume(v), veh/h	103	34	36	302	211	218	0	922	232	119	610	581
Grp Sat Flow(s),veh/h/ln	1781	1777	1798	1728	1777	1815	0	1777	1585	1781	1777	1684
Q Serve(g_s), s	5.1	1.6	1.7	7.2	10.1	10.2	0.0	20.1	7.3	5.9	0.0	0.0
Cycle Q Clear(g_c), s	5.1	1.6	1.7	7.2	10.1	10.2	0.0	20.1	7.3	5.9	0.0	0.0
Prop In Lane	1.00		0.22	1.00		0.17	0.00		1.00	1.00		0.62
Lane Grp Cap(c), veh/h	140	139	141	576	296	302	0	1285	837	139	921	873
V/C Ratio(X)	0.74	0.25	0.25	0.52	0.71	0.72	0.00	0.72	0.28	0.86	0.66	0.67
Avail Cap(c_a), veh/h	176	176	178	576	296	302	0	1285	837	139	921	873
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	1.00	1.00	0.94	0.94	0.94	0.00	1.00	1.00	0.87	0.87	0.87
Uniform Delay (d), s/veh	40.6	39.0	39.0	34.2	35.5	35.5	0.0	24.8	11.7	37.5	0.0	0.0
Incr Delay (d2), s/veh	8.0	0.3	0.3	0.8	7.4	7.6	0.0	3.5	0.8	34.7	3.3	3.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.7	0.7	3.0	4.9	5.1	0.0	8.6	3.7	3.7	0.8	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	48.6	39.3	39.3	35.1	42.9	43.1	0.0	28.2	12.6	72.2	3.3	3.5
LnGrp LOS	D	D	D	D	D	D	A	C	B	E	A	A
Approach Vol, veh/h		173			731			1154			1310	
Approach Delay, s/veh		44.8			39.7			25.1			9.6	
Approach LOS		D			D			C			A	

Timer - Assigned Phs	2	3	4	6	8
Phs Duration (G+Y+Rc), s	14.2	14.1	39.6	22.1	53.7
Change Period (Y+Rc), s	7.1	7.1	7.1	7.1	* 7.1
Max Green Setting (Gmax), s	8.9	7.0	30.7	15.0	* 46
Max Q Clear Time (g_c+I1), s	7.1	7.9	22.1	12.2	2.0
Green Ext Time (p_c), s	0.1	0.0	3.2	1.1	6.6

Intersection Summary	
HCM 6th Ctrl Delay	23.3
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
105: Grinstead Dr & Etley Ave

05/19/2019

Intersection	
Int Delay, s/veh	1.6

Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	3	22	73	1110	953	18
Future Vol, veh/h	3	22	73	1110	953	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	27	79	1207	1036	20

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1808	528	1056	0	-	0
Stage 1	1046	-	-	-	-	-
Stage 2	762	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	70	495	655	-	-	-
Stage 1	299	-	-	-	-	-
Stage 2	421	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	44	495	655	-	-	-
Mov Cap-2 Maneuver	44	-	-	-	-	-
Stage 1	190	-	-	-	-	-
Stage 2	421	-	-	-	-	-

Approach	SB	NE	SW
HCM Control Delay, s	23.7	2.4	0
HCM LOS	C		

Minor Lane/Major Mvmt	NEL	NET	SBLn1	SWT	SWR
Capacity (veh/h)	655	-	222	-	-
HCM Lane V/C Ratio	0.121	-	0.136	-	-
HCM Control Delay (s)	11.3	1.8	23.7	-	-
HCM Lane LOS	B	A	C	-	-
HCM 95th %tile Q(veh)	0.4	-	0.5	-	-

HCM Signalized Intersection Capacity Analysis
106: Grinstead Dr & Cherokee Pkwy

05/19/2019

Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (vph)	0	541	642	4	348	761
Future Volume (vph)	0	541	642	4	348	761
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5		5.5	4.0
Lane Util. Factor		1.00	0.95		1.00	1.00
Frt		0.86	1.00		1.00	1.00
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		1611	3536		1770	1863
Flt Permitted		1.00	1.00		1.00	1.00
Satd. Flow (perm)		1611	3536		1863	1863
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	569	676	4	366	801
RTOR Reduction (vph)	0	160	0	0	0	0
Lane Group Flow (vph)	0	409	680	0	366	801
Turn Type		Perm	NA		D.P+P	NA
Protected Phases			2		4	Free
Permitted Phases		4			2	
Actuated Green, G (s)		22.7	46.3		69.0	80.0
Effective Green, g (s)		22.7	46.3		69.0	80.0
Actuated g/C Ratio		0.28	0.58		0.86	1.00
Clearance Time (s)		5.5	5.5		5.5	
Vehicle Extension (s)		3.5	3.5		3.5	
Lane Grp Cap (vph)		457	2046		1580	1863
v/s Ratio Prot			0.19		0.07	0.43
v/s Ratio Perm		c0.25			0.13	
v/c Ratio		0.90	0.33		0.23	0.43
Uniform Delay, d1		27.5	8.8		12.3	0.0
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		20.0	0.4		0.1	0.7
Delay (s)		47.5	9.2		12.4	0.7
Level of Service		D	A		B	A
Approach Delay (s)	47.5		9.2			4.4
Approach LOS	D		A			A

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	60.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
107: Payne St & Lexington Rd

05/19/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	96	93	5	66	639	1	0	154	29	1	164	204
Future Volume (veh/h)	96	93	5	66	639	1	0	154	29	1	164	204
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	104	101	5	72	695	1	0	167	32	1	178	222
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	430	914	45	200	1820	3	0	424	81	48	211	262
Arrive On Green	0.57	0.57	0.57	0.57	0.57	0.57	0.00	0.28	0.28	0.28	0.28	0.28
Sat Flow, veh/h	588	1608	80	251	3202	5	0	1525	292	1	758	941
Grp Volume(v), veh/h	104	0	106	393	0	375	0	0	199	401	0	0
Grp Sat Flow(s),veh/h/ln	588	0	1688	1757	0	1701	0	0	1818	1700	0	0
Q Serve(g_s), s	6.7	0.0	2.2	0.0	0.0	9.2	0.0	0.0	6.7	0.0	0.0	0.0
Cycle Q Clear(g_c), s	15.9	0.0	2.2	8.6	0.0	9.2	0.0	0.0	6.7	16.7	0.0	0.0
Prop In Lane	1.00		0.05	0.18		0.00	0.00		0.16	0.00		0.55
Lane Grp Cap(c), veh/h	430	0	959	1055	0	967	0	0	506	521	0	0
V/C Ratio(X)	0.24	0.00	0.11	0.37	0.00	0.39	0.00	0.00	0.39	0.77	0.00	0.00
Avail Cap(c_a), veh/h	430	0	959	1055	0	967	0	0	778	776	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	13.4	0.0	7.5	8.8	0.0	9.0	0.0	0.0	21.9	25.6	0.0	0.0
Incr Delay (d2), s/veh	1.3	0.0	0.2	1.0	0.0	1.2	0.0	0.0	0.5	2.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	0.8	3.3	0.0	3.3	0.0	0.0	2.8	6.8	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.7	0.0	7.7	9.8	0.0	10.1	0.0	0.0	22.4	28.3	0.0	0.0
LnGrp LOS	B	A	A	A	A	B	A	A	C	C	A	A
Approach Vol, veh/h		210			768			199			401	
Approach Delay, s/veh		11.2			10.0			22.4			28.3	
Approach LOS		B			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		48.2		26.8		48.2		26.8				
Change Period (Y+Rc), s		5.6		* 5.9		5.6		* 5.9				
Max Green Setting (Gmax), s		31.4		* 32		31.4		* 32				
Max Q Clear Time (g_c+I1), s		17.9		18.7		11.2		8.7				
Green Ext Time (p_c), s		1.3		2.2		4.9		1.1				

Intersection Summary	
HCM 6th Ctrl Delay	16.4
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
104: Etley Ave & Lexington Rd 05/19/2019

Intersection						
Int Delay, s/veh	1					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	149	22	0	678	54	15
Future Vol, veh/h	149	22	0	678	54	15
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	164	24	0	745	59	16

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	188	0	549	94
Stage 1	-	-	-	-	176	-
Stage 2	-	-	-	-	373	-
Critical Hdwy	-	-	4.14	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	-	-	2.22	-	3.52	3.32
Pot Cap-1 Maneuver	-	-	1384	-	466	944
Stage 1	-	-	-	-	837	-
Stage 2	-	-	-	-	666	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1384	-	466	944
Mov Cap-2 Maneuver	-	-	-	-	466	-
Stage 1	-	-	-	-	837	-
Stage 2	-	-	-	-	666	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	13
HCM LOS			B

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	524	-	-	1384	-
HCM Lane V/C Ratio	0.145	-	-	-	-
HCM Control Delay (s)	13	-	-	0	-
HCM Lane LOS	B	-	-	A	-
HCM 95th %tile Q(veh)	0.5	-	-	0	-

HCM 6th Signalized Intersection Summary
108: Alta Vista Rd & Lexington Rd

05/19/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	0	341	24	20	666	2	80	3	23	0	5	3
Future Volume (veh/h)	0	341	24	20	666	2	80	3	23	0	5	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	401	28	24	784	2	94	4	27	0	6	4
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	2121	148	108	2194	6	282	22	46	0	150	100
Arrive On Green	0.00	0.63	0.63	0.63	0.63	0.63	0.14	0.14	0.14	0.00	0.14	0.14
Sat Flow, veh/h	0	3464	234	39	3486	9	1007	152	319	0	1047	698
Grp Volume(v), veh/h	0	211	218	421	0	389	125	0	0	0	0	10
Grp Sat Flow(s),veh/h/ln	0	1777	1828	1834	0	1700	1479	0	0	0	0	1745
Q Serve(g_s), s	0.0	2.3	2.3	0.0	0.0	5.0	3.1	0.0	0.0	0.0	0.0	0.2
Cycle Q Clear(g_c), s	0.0	2.3	2.3	4.9	0.0	5.0	3.6	0.0	0.0	0.0	0.0	0.2
Prop In Lane	0.00		0.13	0.06		0.01	0.75		0.22	0.00		0.40
Lane Grp Cap(c), veh/h	0	1118	1151	1237	0	1070	350	0	0	0	0	250
V/C Ratio(X)	0.00	0.19	0.19	0.34	0.00	0.36	0.36	0.00	0.00	0.00	0.00	0.04
Avail Cap(c_a), veh/h	0	1118	1151	1237	0	1070	802	0	0	0	0	793
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	3.6	3.6	4.1	0.0	4.1	18.3	0.0	0.0	0.0	0.0	16.9
Incr Delay (d2), s/veh	0.0	0.4	0.4	0.7	0.0	1.0	0.2	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.5	0.6	1.3	0.0	1.2	1.1	0.0	0.0	0.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	3.9	3.9	4.8	0.0	5.0	18.5	0.0	0.0	0.0	0.0	16.9
LnGrp LOS	A	A	A	A	A	A	B	A	A	A	A	B
Approach Vol, veh/h		429			810			125			10	
Approach Delay, s/veh		3.9			4.9			18.5			16.9	
Approach LOS		A			A			B			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	34.0	11.8	34.0	11.8
Change Period (Y+Rc), s	* 5.2	* 5.2	* 5.2	* 5.2
Max Green Setting (Gmax), s	* 29	* 21	* 29	* 21
Max Q Clear Time (g_c+I1), s	4.3	5.6	7.0	2.2
Green Ext Time (p_c), s	4.3	0.3	8.5	0.0

Intersection Summary	
HCM 6th Ctrl Delay	5.9
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
101: Grinstead Dr & I-64 WB Ramp

05/19/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	684	236	148	169	339	0	0	583	246
Future Volume (veh/h)	0	0	0	684	236	148	169	339	0	0	583	246
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1870	1870	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				712	246	154	176	353	0	0	607	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				2	2	2	2	2	0	0	2	2
Cap, veh/h				792	478	299	306	1465	0	0	1030	
Arrive On Green				0.44	0.44	0.44	0.02	0.14	0.00	0.00	0.29	0.00
Sat Flow, veh/h				1781	1076	673	1781	3647	0	0	3647	1585
Grp Volume(v), veh/h				712	0	400	176	353	0	0	607	0
Grp Sat Flow(s),veh/h/ln				1781	0	1749	1781	1777	0	0	1777	1585
Q Serve(g_s), s				33.3	0.0	14.8	5.5	8.0	0.0	0.0	13.2	0.0
Cycle Q Clear(g_c), s				33.3	0.0	14.8	5.5	8.0	0.0	0.0	13.2	0.0
Prop In Lane				1.00		0.38	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				792	0	777	306	1465	0	0	1030	
V/C Ratio(X)				0.90	0.00	0.51	0.58	0.24	0.00	0.00	0.59	
Avail Cap(c_a), veh/h				833	0	818	306	1465	0	0	1030	
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.98	0.98	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				23.1	0.0	18.0	23.2	26.3	0.0	0.0	27.4	0.0
Incr Delay (d2), s/veh				13.2	0.0	1.1	2.2	0.4	0.0	0.0	2.5	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				15.9	0.0	5.9	2.8	3.7	0.0	0.0	5.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				36.4	0.0	19.1	25.5	26.7	0.0	0.0	29.8	0.0
LnGrp LOS				D	A	B	C	C	A	A	C	
Approach Vol, veh/h					1112			529			607	A
Approach Delay, s/veh					30.2			26.3			29.8	
Approach LOS					C			C			C	

Timer - Assigned Phs	2	4	5	6
Phs Duration (G+Y+Rc), s	43.1	46.9	11.0	32.1
Change Period (Y+Rc), s	6.0	* 6.9	* 5.5	6.0
Max Green Setting (Gmax), s	35.0	* 42	* 5.5	24.0
Max Q Clear Time (g_c+I1), s	10.0	35.3	7.5	15.2
Green Ext Time (p_c), s	0.9	4.7	0.0	1.2

Intersection Summary	
HCM 6th Ctrl Delay	29.2
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
102: Grinstead Dr & I-64 EB Ramp

05/19/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	121	0	253	0	0	0	0	382	643	234	1035	0
Future Volume (veh/h)	121	0	253	0	0	0	0	382	643	234	1035	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	132	0	0				0	415	0	254	1125	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	168	0					0	2154		754	2674	0
Arrive On Green	0.09	0.00	0.00				0.00	0.61	0.00	0.10	1.00	0.00
Sat Flow, veh/h	1781	0	1585				0	3647	1585	1781	3647	0
Grp Volume(v), veh/h	132	0	0				0	415	0	254	1125	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1777	1585	1781	1777	0
Q Serve(g_s), s	6.5	0.0	0.0				0.0	4.7	0.0	4.5	0.0	0.0
Cycle Q Clear(g_c), s	6.5	0.0	0.0				0.0	4.7	0.0	4.5	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	168	0					0	2154		754	2674	0
V/C Ratio(X)	0.79	0.00					0.00	0.19		0.34	0.42	0.00
Avail Cap(c_a), veh/h	287	0					0	2154		850	2674	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.33	1.33	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	0.30	0.00	0.55	0.55	0.00
Uniform Delay (d), s/veh	39.9	0.0	0.0				0.0	7.9	0.0	4.8	0.0	0.0
Incr Delay (d2), s/veh	7.9	0.0	0.0				0.0	0.1	0.0	0.1	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	0.0				0.0	1.7	0.0	1.3	0.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.8	0.0	0.0				0.0	8.0	0.0	4.9	0.3	0.0
LnGrp LOS	D	A					A	A		A	A	A
Approach Vol, veh/h		132	A					415	A		1379	
Approach Delay, s/veh		47.8						8.0			1.1	
Approach LOS		D						A			A	

Timer - Assigned Phs	1	2				6		8				
Phs Duration (G+Y+Rc), s	13.2	61.8				75.0		15.0				
Change Period (Y+Rc), s	* 6.3	7.3				7.3		6.5				
Max Green Setting (Gmax), s	* 12	43.7				61.7		14.5				
Max Q Clear Time (g_c+I1), s	6.5	6.7				2.0		8.5				
Green Ext Time (p_c), s	0.3	3.0				11.5		0.3				

Intersection Summary	
HCM 6th Ctrl Delay	5.8
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
103: Grinstead Dr & Lexington Rd

05/19/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	102	61	7	298	388	36	0	910	230	118	822	354
Future Volume (veh/h)	102	61	7	298	388	36	0	910	230	118	822	354
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	0	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	110	66	8	320	417	39	0	978	247	127	884	381
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	0	2	2	2	2	2
Cap, veh/h	139	249	30	803	435	368	0	1037	831	147	1098	470
Arrive On Green	0.08	0.08	0.08	0.23	0.23	0.23	0.00	0.29	0.29	0.08	0.45	0.45
Sat Flow, veh/h	1781	3198	381	3456	1870	1585	0	3647	1585	1781	2423	1037
Grp Volume(v), veh/h	110	36	38	320	417	39	0	978	247	127	647	618
Grp Sat Flow(s),veh/h/ln	1781	1777	1802	1728	1870	1585	0	1777	1585	1781	1777	1684
Q Serve(g_s), s	5.5	1.7	1.8	7.0	19.8	1.7	0.0	24.2	7.9	6.3	28.2	28.6
Cycle Q Clear(g_c), s	5.5	1.7	1.8	7.0	19.8	1.7	0.0	24.2	7.9	6.3	28.2	28.6
Prop In Lane	1.00		0.21	1.00		1.00	0.00		1.00	1.00		0.62
Lane Grp Cap(c), veh/h	139	138	140	803	435	368	0	1037	831	147	805	763
V/C Ratio(X)	0.79	0.26	0.27	0.40	0.96	0.11	0.00	0.94	0.30	0.87	0.80	0.81
Avail Cap(c_a), veh/h	139	138	140	803	435	368	0	1039	832	147	836	792
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	40.8	39.0	39.1	29.2	34.1	27.2	0.0	31.1	12.1	40.8	21.2	21.3
Incr Delay (d2), s/veh	24.5	0.4	0.4	0.3	32.8	0.1	0.0	15.8	0.1	38.5	5.0	5.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.8	0.8	2.9	12.7	0.7	0.0	12.1	4.3	4.3	12.1	11.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.3	39.4	39.5	29.5	67.0	27.3	0.0	46.9	12.1	79.3	26.2	26.9
LnGrp LOS	E	D	D	C	E	C	A	D	B	E	C	C
Approach Vol, veh/h		184			776			1225			1392	
Approach Delay, s/veh		54.9			49.5			39.9			31.4	
Approach LOS		D			D			D			C	

Timer - Assigned Phs	2	3	4	6	8
Phs Duration (G+Y+Rc), s	14.1	14.5	33.4	28.0	47.9
Change Period (Y+Rc), s	7.1	7.1	7.1	7.1	* 7.1
Max Green Setting (Gmax), s	7.0	7.4	26.3	20.9	* 42
Max Q Clear Time (g_c+I1), s	7.5	8.3	26.2	21.8	30.6
Green Ext Time (p_c), s	0.0	0.0	0.1	0.0	4.9

Intersection Summary	
HCM 6th Ctrl Delay	39.4
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
105: Grinstead Dr & Etley Ave

05/19/2019

Intersection	
Int Delay, s/veh	2.2

Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	3	23	76	1057	941	19
Future Vol, veh/h	3	23	76	1057	941	19
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	83	83	83	83	83	83
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	4	28	92	1273	1134	23

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	1967	579	1157	0	-	0
Stage 1	1146	-	-	-	-	-
Stage 2	821	-	-	-	-	-
Critical Hdwy	6.84	6.94	4.14	-	-	-
Critical Hdwy Stg 1	5.84	-	-	-	-	-
Critical Hdwy Stg 2	5.84	-	-	-	-	-
Follow-up Hdwy	3.52	3.32	2.22	-	-	-
Pot Cap-1 Maneuver	55	458	600	-	-	-
Stage 1	265	-	-	-	-	-
Stage 2	393	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	26	458	600	-	-	-
Mov Cap-2 Maneuver	26	-	-	-	-	-
Stage 1	126	-	-	-	-	-
Stage 2	393	-	-	-	-	-

Approach	SB	NE	SW
HCM Control Delay, s	33.6	3.4	0
HCM LOS	D		

Minor Lane/Major Mvmt	NEL	NET	SBLn1	SWT	SWR
Capacity (veh/h)	600	-	157	-	-
HCM Lane V/C Ratio	0.153	-	0.2	-	-
HCM Control Delay (s)	12.1	2.8	33.6	-	-
HCM Lane LOS	B	A	D	-	-
HCM 95th %tile Q(veh)	0.5	-	0.7	-	-

HCM Signalized Intersection Capacity Analysis
106: Grinstead Dr & Cherokee Pkwy

05/19/2019

Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (vph)	0	569	675	4	366	800
Future Volume (vph)	0	569	675	4	366	800
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5		5.5	4.0
Lane Util. Factor		1.00	0.95		1.00	1.00
Frt		0.86	1.00		1.00	1.00
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		1611	3536		1770	1863
Flt Permitted		1.00	1.00		1.00	1.00
Satd. Flow (perm)		1611	3536		1863	1863
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	599	711	4	385	842
RTOR Reduction (vph)	0	144	0	0	0	0
Lane Group Flow (vph)	0	455	715	0	385	842
Turn Type		Perm	NA		D.P+P	NA
Protected Phases			2		4	Free
Permitted Phases		4			2	
Actuated Green, G (s)		23.7	44.5		68.2	79.2
Effective Green, g (s)		23.7	44.5		68.2	79.2
Actuated g/C Ratio		0.30	0.56		0.86	1.00
Clearance Time (s)		5.5	5.5		5.5	
Vehicle Extension (s)		3.5	3.5		3.5	
Lane Grp Cap (vph)		482	1986		1576	1863
v/s Ratio Prot			0.20		0.07	0.45
v/s Ratio Perm		c0.28			0.14	
v/c Ratio		0.94	0.36		0.24	0.45
Uniform Delay, d1		27.1	9.5		11.5	0.0
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		27.7	0.5		0.1	0.8
Delay (s)		54.8	10.0		11.6	0.8
Level of Service		D	B		B	A
Approach Delay (s)	54.8		10.0			4.2
Approach LOS	D		B			A

Intersection Summary			
HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	79.2	Sum of lost time (s)	11.0
Intersection Capacity Utilization	63.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
107: Payne St & Lexington Rd

05/19/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	97	5	69	665	1	0	160	30	7	171	212
Future Volume (veh/h)	100	97	5	69	665	1	0	160	30	7	171	212
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	111	107	5	76	731	1	0	176	33	8	188	233
Peak Hour Factor	0.90	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	288	981	46	768	1033	1	0	449	84	52	225	271
Arrive On Green	0.55	0.55	0.55	0.55	0.55	0.55	0.00	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	724	1773	83	1281	1867	3	0	1532	287	11	765	922
Grp Volume(v), veh/h	111	0	112	76	0	732	0	0	209	429	0	0
Grp Sat Flow(s),veh/h/ln	724	0	1855	1281	0	1870	0	0	1819	1698	0	0
Q Serve(g_s), s	10.0	0.0	2.2	2.2	0.0	21.6	0.0	0.0	6.9	3.2	0.0	0.0
Cycle Q Clear(g_c), s	31.5	0.0	2.2	4.4	0.0	21.6	0.0	0.0	6.9	17.9	0.0	0.0
Prop In Lane	1.00		0.04	1.00		0.00	0.00		0.16	0.02		0.54
Lane Grp Cap(c), veh/h	288	0	1026	768	0	1034	0	0	534	547	0	0
V/C Ratio(X)	0.38	0.00	0.11	0.10	0.00	0.71	0.00	0.00	0.39	0.78	0.00	0.00
Avail Cap(c_a), veh/h	288	0	1026	768	0	1034	0	0	752	749	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	23.9	0.0	8.0	9.0	0.0	12.3	0.0	0.0	21.2	25.0	0.0	0.0
Incr Delay (d2), s/veh	3.8	0.0	0.2	0.3	0.0	4.1	0.0	0.0	0.5	3.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.9	0.0	0.8	0.6	0.0	8.9	0.0	0.0	2.9	7.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	27.7	0.0	8.2	9.3	0.0	16.4	0.0	0.0	21.6	28.8	0.0	0.0
LnGrp LOS	C	A	A	A	A	B	A	A	C	C	A	A
Approach Vol, veh/h		223			808			209			429	
Approach Delay, s/veh		17.9			15.7			21.6			28.8	
Approach LOS		B			B			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		47.1		27.9		47.1		27.9				
Change Period (Y+Rc), s		5.6		* 5.9		5.6		* 5.9				
Max Green Setting (Gmax), s		32.5		* 31		32.5		* 31				
Max Q Clear Time (g_c+I1), s		33.5		19.9		23.6		8.9				
Green Ext Time (p_c), s		0.0		2.1		3.6		1.1				

Intersection Summary	
HCM 6th Ctrl Delay	20.1
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
104: Etley Ave & Lexington Rd

05/19/2019

Intersection	
Int Delay, s/veh	1.2

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	158	23	0	720	57	16
Future Vol, veh/h	158	23	0	720	57	16
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	174	25	0	791	63	18

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	199	0	978	100
Stage 1	-	-	-	-	187	-
Stage 2	-	-	-	-	791	-
Critical Hdwy	-	-	4.13	-	6.63	6.93
Critical Hdwy Stg 1	-	-	-	-	5.83	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	1372	-	262	937
Stage 1	-	-	-	-	827	-
Stage 2	-	-	-	-	446	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1372	-	262	937
Mov Cap-2 Maneuver	-	-	-	-	366	-
Stage 1	-	-	-	-	827	-
Stage 2	-	-	-	-	446	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0	15.5
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	422	-	-	1372	-
HCM Lane V/C Ratio	0.19	-	-	-	-
HCM Control Delay (s)	15.5	-	-	0	-
HCM Lane LOS	C	-	-	A	-
HCM 95th %tile Q(veh)	0.7	-	-	0	-

HCM 6th Signalized Intersection Summary
108: Alta Vista Rd & Lexington Rd

05/19/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑↑			↑↑↑			↑↑			↑↑	
Traffic Volume (veh/h)	0	365	26	21	714	2	86	3	24	0	5	3
Future Volume (veh/h)	0	365	26	21	714	2	86	3	24	0	5	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	429	31	25	840	2	101	4	28	0	6	4
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	2109	152	107	2187	5	288	20	45	0	153	102
Arrive On Green	0.00	0.63	0.63	0.63	0.63	0.63	0.15	0.15	0.15	0.00	0.15	0.15
Sat Flow, veh/h	0	3455	242	38	3486	8	1028	136	310	0	1047	698
Grp Volume(v), veh/h	0	226	234	450	0	417	133	0	0	0	0	10
Grp Sat Flow(s),veh/h/ln	0	1777	1827	1832	0	1701	1474	0	0	0	0	1745
Q Serve(g_s), s	0.0	2.5	2.5	0.0	0.0	5.5	3.4	0.0	0.0	0.0	0.0	0.2
Cycle Q Clear(g_c), s	0.0	2.5	2.5	5.4	0.0	5.5	3.8	0.0	0.0	0.0	0.0	0.2
Prop In Lane	0.00		0.13	0.06		0.00	0.76		0.21	0.00		0.40
Lane Grp Cap(c), veh/h	0	1115	1146	1232	0	1067	353	0	0	0	0	255
V/C Ratio(X)	0.00	0.20	0.20	0.37	0.00	0.39	0.38	0.00	0.00	0.00	0.00	0.04
Avail Cap(c_a), veh/h	0	1115	1146	1232	0	1067	799	0	0	0	0	790
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	3.7	3.7	4.2	0.0	4.2	18.3	0.0	0.0	0.0	0.0	16.8
Incr Delay (d2), s/veh	0.0	0.4	0.4	0.8	0.0	1.1	0.2	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.6	0.6	1.4	0.0	1.4	1.2	0.0	0.0	0.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	4.1	4.1	5.0	0.0	5.3	18.6	0.0	0.0	0.0	0.0	16.9
LnGrp LOS	A	A	A	A	A	A	B	A	A	A	A	B
Approach Vol, veh/h		460			867			133			10	
Approach Delay, s/veh		4.1			5.2			18.6			16.9	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		34.0		11.9		34.0		11.9				
Change Period (Y+Rc), s		*5.2		*5.2		*5.2		*5.2				
Max Green Setting (Gmax), s		*29		*21		*29		*21				
Max Q Clear Time (g_c+I1), s		4.5		5.8		7.5		2.2				
Green Ext Time (p_c), s		4.6		0.4		9.0		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	6.1
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
101: Grinstead Dr & I-64 WB Ramp

08/26/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	727	236	148	196	357	0	0	612	246
Future Volume (veh/h)	0	0	0	727	236	148	196	357	0	0	612	246
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1870	1870	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				757	246	154	204	372	0	0	638	0
Peak Hour Factor				0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %				2	2	2	2	2	0	0	2	2
Cap, veh/h				814	492	308	283	1420	0	0	986	
Arrive On Green				0.46	0.46	0.46	0.02	0.13	0.00	0.00	0.28	0.00
Sat Flow, veh/h				1781	1076	673	1781	3647	0	0	3647	1585
Grp Volume(v), veh/h				757	0	400	204	372	0	0	638	0
Grp Sat Flow(s),veh/h/ln				1781	0	1749	1781	1777	0	0	1777	1585
Q Serve(g_s), s				36.1	0.0	14.5	5.5	8.5	0.0	0.0	14.2	0.0
Cycle Q Clear(g_c), s				36.1	0.0	14.5	5.5	8.5	0.0	0.0	14.2	0.0
Prop In Lane				1.00		0.38	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				814	0	799	283	1420	0	0	986	
V/C Ratio(X)				0.93	0.00	0.50	0.72	0.26	0.00	0.00	0.65	
Avail Cap(c_a), veh/h				833	0	818	283	1420	0	0	986	
HCM Platoon Ratio				1.00	1.00	1.00	0.33	0.33	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.98	0.98	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				23.1	0.0	17.2	27.3	27.1	0.0	0.0	28.6	0.0
Incr Delay (d2), s/veh				17.2	0.0	1.0	8.0	0.4	0.0	0.0	3.3	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				17.9	0.0	5.8	2.2	3.9	0.0	0.0	6.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				40.2	0.0	18.2	35.3	27.6	0.0	0.0	31.9	0.0
LnGrp LOS				D	A	B	D	C	A	A	C	
Approach Vol, veh/h					1157			576			638	A
Approach Delay, s/veh					32.6			30.3			31.9	
Approach LOS					C			C			C	

Timer - Assigned Phs	2	4	5	6
Phs Duration (G+Y+Rc), s	42.0	48.0	11.0	31.0
Change Period (Y+Rc), s	6.0	* 6.9	* 5.5	6.0
Max Green Setting (Gmax), s	35.0	* 42	* 5.5	24.0
Max Q Clear Time (g_c+I1), s	10.5	38.1	7.5	16.2
Green Ext Time (p_c), s	0.9	3.0	0.0	1.2

Intersection Summary	
HCM 6th Ctrl Delay	31.9
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
102: Grinstead Dr & I-64 EB Ramp

08/26/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	121	0	296	0	0	0	0	427	670	234	1107	0
Future Volume (veh/h)	121	0	296	0	0	0	0	427	670	234	1107	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	132	0	0				0	464	0	254	1203	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	168	0					0	2158		723	2674	0
Arrive On Green	0.09	0.00	0.00				0.00	0.61	0.00	0.08	0.75	0.00
Sat Flow, veh/h	1781	0	1585				0	3647	1585	1781	3647	0
Grp Volume(v), veh/h	132	0	0				0	464	0	254	1203	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1777	1585	1781	1777	0
Q Serve(g_s), s	6.5	0.0	0.0				0.0	5.3	0.0	4.4	11.4	0.0
Cycle Q Clear(g_c), s	6.5	0.0	0.0				0.0	5.3	0.0	4.4	11.4	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	168	0					0	2158		723	2674	0
V/C Ratio(X)	0.79	0.00					0.00	0.21		0.35	0.45	0.00
Avail Cap(c_a), veh/h	287	0					0	2158		821	2674	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00				0.00	0.22	0.00	0.48	0.48	0.00
Uniform Delay (d), s/veh	39.9	0.0	0.0				0.0	8.0	0.0	5.0	4.2	0.0
Incr Delay (d2), s/veh	7.9	0.0	0.0				0.0	0.1	0.0	0.1	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	0.0				0.0	1.9	0.0	1.3	3.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.8	0.0	0.0				0.0	8.0	0.0	5.1	4.4	0.0
LnGrp LOS	D	A					A	A		A	A	A
Approach Vol, veh/h		132	A					464	A		1457	
Approach Delay, s/veh		47.8						8.0			4.6	
Approach LOS		D						A			A	

Timer - Assigned Phs	1	2			6		8					
Phs Duration (G+Y+Rc), s	13.1	62.0			75.0		15.0					
Change Period (Y+Rc), s	* 6.3	7.3			7.3		6.5					
Max Green Setting (Gmax), s	* 12	43.7			61.7		14.5					
Max Q Clear Time (g_c+I1), s	6.4	7.3			13.4		8.5					
Green Ext Time (p_c), s	0.3	3.4			12.4		0.3					

Intersection Summary	
HCM 6th Ctrl Delay	8.1
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR, EBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
103: Grinstead Dr & Lexington Rd

08/26/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	174	80	7	328	388	36	0	910	230	118	925	366
Future Volume (veh/h)	174	80	7	328	388	36	0	910	230	118	925	366
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	0	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	187	86	8	353	417	39	0	978	247	127	995	394
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2	0	2	2	2	2	2
Cap, veh/h	228	377	35	731	396	335	0	987	775	140	1087	425
Arrive On Green	0.11	0.11	0.11	0.21	0.21	0.21	0.00	0.28	0.28	0.08	0.44	0.44
Sat Flow, veh/h	1995	3291	302	3456	1870	1585	0	3647	1585	1781	2495	976
Grp Volume(v), veh/h	187	46	48	353	417	39	0	978	247	127	705	684
Grp Sat Flow(s),veh/h/ln	998	1777	1816	1728	1870	1585	0	1777	1585	1781	1777	1695
Q Serve(g_s), s	8.2	2.1	2.2	8.0	18.9	1.8	0.0	24.5	8.4	6.3	33.2	34.1
Cycle Q Clear(g_c), s	8.2	2.1	2.2	8.0	18.9	1.8	0.0	24.5	8.4	6.3	33.2	34.1
Prop In Lane	1.00		0.17	1.00		1.00	0.00		1.00	1.00		0.58
Lane Grp Cap(c), veh/h	228	203	208	731	396	335	0	987	775	140	774	738
V/C Ratio(X)	0.82	0.23	0.23	0.48	1.05	0.12	0.00	0.99	0.32	0.91	0.91	0.93
Avail Cap(c_a), veh/h	243	217	222	731	396	335	0	987	775	140	804	766
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	38.6	36.0	36.0	30.9	35.2	28.5	0.0	32.2	13.8	40.9	23.6	23.9
Incr Delay (d2), s/veh	16.9	0.2	0.2	0.5	60.1	0.2	0.0	26.4	0.1	50.0	13.7	16.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.9	1.0	3.3	15.0	0.7	0.0	13.6	4.4	4.7	16.0	16.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.5	36.2	36.2	31.4	95.3	28.6	0.0	58.6	13.9	90.9	37.3	40.4
LnGrp LOS	E	D	D	C	F	C	A	E	B	F	D	D
Approach Vol, veh/h		281			809			1225			1516	
Approach Delay, s/veh		49.1			64.2			49.6			43.2	
Approach LOS		D			E			D			D	

Timer - Assigned Phs	2	3	4	6	8
Phs Duration (G+Y+Rc), s	17.3	14.1	31.9	26.0	46.0
Change Period (Y+Rc), s	7.1	7.1	7.1	7.1	* 7.1
Max Green Setting (Gmax), s	10.9	7.0	24.8	18.9	* 40
Max Q Clear Time (g_c+I1), s	10.2	8.3	26.5	20.9	36.1
Green Ext Time (p_c), s	0.1	0.0	0.0	0.0	2.6

Intersection Summary	
HCM 6th Ctrl Delay	50.1
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
105: Grinstead Dr & Etley Ave

08/26/2019

Intersection	
Int Delay, s/veh	1.3

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	3	55	151	1166	1150	71
Future Vol, veh/h	3	55	151	1166	1150	71
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	50	0	0	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	3	60	164	1267	1250	77

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2884	664	1327	0	-	0
Stage 1	1289	-	-	-	-	-
Stage 2	1595	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	15	404	518	-	-	-
Stage 1	223	-	-	-	-	-
Stage 2	182	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	10	404	518	-	-	-
Mov Cap-2 Maneuver	80	-	-	-	-	-
Stage 1	152	-	-	-	-	-
Stage 2	182	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	17.4	1.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	EBLn2	SBT	SBR
Capacity (veh/h)	518	-	80	404	-	-
HCM Lane V/C Ratio	0.317	-	0.041	0.148	-	-
HCM Control Delay (s)	15.1	-	51.9	15.5	-	-
HCM Lane LOS	C	-	F	C	-	-
HCM 95th %tile Q(veh)	1.4	-	0.1	0.5	-	-

HCM Signalized Intersection Capacity Analysis
106: Grinstead Dr & Cherokee Pkwy

08/26/2019

Movement	NBL	NBR	NET	NER	SWL	SWT
Lane Configurations						
Traffic Volume (vph)	0	598	733	4	384	837
Future Volume (vph)	0	598	733	4	384	837
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5		5.5	4.0
Lane Util. Factor		1.00	0.95		1.00	1.00
Frt		0.86	1.00		1.00	1.00
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		1611	3536		1770	1863
Flt Permitted		1.00	1.00		1.00	1.00
Satd. Flow (perm)		1611	3536		1863	1863
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	629	772	4	404	881
RTOR Reduction (vph)	0	122	0	0	0	0
Lane Group Flow (vph)	0	507	776	0	404	881
Turn Type		Perm	NA		D.P+P	NA
Protected Phases			2		4	Free
Permitted Phases		4			2	
Actuated Green, G (s)		24.5	44.5		69.0	80.0
Effective Green, g (s)		24.5	44.5		69.0	80.0
Actuated g/C Ratio		0.31	0.56		0.86	1.00
Clearance Time (s)		5.5	5.5		5.5	
Vehicle Extension (s)		3.5	3.5		3.5	
Lane Grp Cap (vph)		493	1966		1578	1863
v/s Ratio Prot			0.22		0.08	0.47
v/s Ratio Perm		c0.31			0.14	
v/c Ratio		1.03	0.39		0.26	0.47
Uniform Delay, d1		27.8	10.1		11.4	0.0
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		47.9	0.6		0.1	0.9
Delay (s)		75.7	10.7		11.5	0.9
Level of Service		E	B		B	A
Approach Delay (s)	75.7		10.7			4.2
Approach LOS	E		B			A

Intersection Summary			
HCM 2000 Control Delay	22.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
107: Payne St & Lexington Rd

08/26/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	100	142	5	71	700	1	3	160	43	1	171	212
Future Volume (veh/h)	100	142	5	71	700	1	3	160	43	1	171	212
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	110	156	5	78	769	1	3	176	47	1	188	233
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	269	914	29	722	1041	1	50	411	108	48	220	272
Arrive On Green	0.56	0.56	0.56	0.56	0.56	0.56	0.29	0.29	0.29	0.29	0.29	0.29
Sat Flow, veh/h	310	1640	53	1225	1867	2	6	1421	375	1	761	939
Grp Volume(v), veh/h	110	0	161	78	0	770	226	0	0	422	0	0
Grp Sat Flow(s),veh/h/ln	310	0	1693	1225	0	1870	1802	0	0	1701	0	0
Q Serve(g_s), s	10.5	0.0	3.5	2.5	0.0	23.2	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	33.8	0.0	3.5	6.0	0.0	23.2	7.6	0.0	0.0	17.6	0.0	0.0
Prop In Lane	1.00		0.03	1.00		0.00	0.01		0.21	0.00		0.55
Lane Grp Cap(c), veh/h	269	0	943	722	0	1042	570	0	0	540	0	0
V/C Ratio(X)	0.41	0.00	0.17	0.11	0.00	0.74	0.40	0.00	0.00	0.78	0.00	0.00
Avail Cap(c_a), veh/h	269	0	943	722	0	1042	791	0	0	751	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	25.2	0.0	8.1	9.6	0.0	12.5	21.7	0.0	0.0	25.2	0.0	0.0
Incr Delay (d2), s/veh	4.6	0.0	0.4	0.3	0.0	4.7	0.4	0.0	0.0	3.6	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	1.2	0.7	0.0	9.7	3.1	0.0	0.0	7.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.8	0.0	8.5	9.9	0.0	17.2	22.1	0.0	0.0	28.8	0.0	0.0
LnGrp LOS	C	A	A	A	A	B	C	A	A	C	A	A
Approach Vol, veh/h		271			848			226			422	
Approach Delay, s/veh		17.1			16.5			22.1			28.8	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	47.4	27.6	47.4	27.6
Change Period (Y+Rc), s	5.6	* 5.9	5.6	* 5.9
Max Green Setting (Gmax), s	32.5	* 31	32.5	* 31
Max Q Clear Time (g_c+I1), s	35.8	19.6	25.2	9.6
Green Ext Time (p_c), s	0.0	2.1	3.3	1.3

Intersection Summary	
HCM 6th Ctrl Delay	20.3
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
104: Etley Ave & Lexington Rd

08/26/2019

Intersection	
Int Delay, s/veh	2.3

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↑			↑↑	↰	↱
Traffic Vol, veh/h	183	56	12	720	94	69
Future Vol, veh/h	183	56	12	720	94	69
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	100
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	199	61	13	783	102	75

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	260	0	1039	130
Stage 1	-	-	-	-	230	-
Stage 2	-	-	-	-	809	-
Critical Hdwy	-	-	4.13	-	6.63	6.93
Critical Hdwy Stg 1	-	-	-	-	5.83	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	1303	-	240	896
Stage 1	-	-	-	-	787	-
Stage 2	-	-	-	-	437	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	1303	-	236	896
Mov Cap-2 Maneuver	-	-	-	-	346	-
Stage 1	-	-	-	-	787	-
Stage 2	-	-	-	-	429	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.1	15.3
HCM LOS			C

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	346	896	-	-	1303	-
HCM Lane V/C Ratio	0.295	0.084	-	-	0.01	-
HCM Control Delay (s)	19.7	9.4	-	-	7.8	0
HCM Lane LOS	C	A	-	-	A	A
HCM 95th %tile Q(veh)	1.2	0.3	-	-	0	-

HCM 6th Signalized Intersection Summary
108: Alta Vista Rd & Lexington Rd

08/26/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	382	28	21	742	2	88	3	24	0	5	3
Future Volume (veh/h)	0	382	28	21	742	2	88	3	24	0	5	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	0	449	33	25	873	2	104	4	28	0	6	4
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	0	2104	154	106	2185	5	291	19	45	0	154	103
Arrive On Green	0.00	0.63	0.63	0.63	0.63	0.63	0.15	0.15	0.15	0.00	0.15	0.15
Sat Flow, veh/h	0	3451	246	37	3487	8	1040	129	303	0	1047	698
Grp Volume(v), veh/h	0	237	245	468	0	432	136	0	0	0	0	10
Grp Sat Flow(s),veh/h/ln	0	1777	1826	1831	0	1701	1471	0	0	0	0	1745
Q Serve(g_s), s	0.0	2.6	2.7	0.0	0.0	5.9	3.5	0.0	0.0	0.0	0.0	0.2
Cycle Q Clear(g_c), s	0.0	2.6	2.7	5.7	0.0	5.9	3.9	0.0	0.0	0.0	0.0	0.2
Prop In Lane	0.00		0.13	0.05		0.00	0.76		0.21	0.00		0.40
Lane Grp Cap(c), veh/h	0	1113	1144	1230	0	1066	355	0	0	0	0	257
V/C Ratio(X)	0.00	0.21	0.21	0.38	0.00	0.41	0.38	0.00	0.00	0.00	0.00	0.04
Avail Cap(c_a), veh/h	0	1113	1144	1230	0	1066	797	0	0	0	0	790
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	1.00
Uniform Delay (d), s/veh	0.0	3.7	3.7	4.3	0.0	4.3	18.4	0.0	0.0	0.0	0.0	16.8
Incr Delay (d2), s/veh	0.0	0.4	0.4	0.9	0.0	1.1	0.3	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.6	0.7	1.5	0.0	1.4	1.2	0.0	0.0	0.0	0.0	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	0.0	4.1	4.1	5.2	0.0	5.4	18.6	0.0	0.0	0.0	0.0	16.8
LnGrp LOS	A	A	A	A	A	A	B	A	A	A	A	B
Approach Vol, veh/h		482			900			136			10	
Approach Delay, s/veh		4.1			5.3			18.6			16.8	
Approach LOS		A			A			B			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	34.0	12.0	34.0	12.0
Change Period (Y+Rc), s	*5.2	*5.2	*5.2	*5.2
Max Green Setting (Gmax), s	*29	*21	*29	*21
Max Q Clear Time (g_c+I1), s	4.7	5.9	7.9	2.2
Green Ext Time (p_c), s	4.9	0.4	9.4	0.0

Intersection Summary	
HCM 6th Ctrl Delay	6.2
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
17: Etley Ave & Garage 08/26/2019

Intersection	
Int Delay, s/veh	3.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	32	90	97	158	45	23
Future Vol, veh/h	32	90	97	158	45	23
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	35	98	105	172	49	25

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	314	191	0	0	277	0
Stage 1	191	-	-	-	-	-
Stage 2	123	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	679	851	-	-	1286	-
Stage 1	841	-	-	-	-	-
Stage 2	902	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	653	851	-	-	1286	-
Mov Cap-2 Maneuver	653	-	-	-	-	-
Stage 1	841	-	-	-	-	-
Stage 2	867	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	10.5	0	5.2
HCM LOS	B		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT
Capacity (veh/h)	-	-	788	1286	-
HCM Lane V/C Ratio	-	-	0.168	0.038	-
HCM Control Delay (s)	-	-	10.5	7.9	0
HCM Lane LOS	-	-	B	A	A
HCM 95th %tile Q(veh)	-	-	0.6	0.1	-

HCM 6th Signalized Intersection Summary
3: Grinstead Dr & I-64 WB

08/13/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	681	114	234	129	414	0	0	449	98
Future Volume (veh/h)	0	0	0	681	114	234	129	414	0	0	449	98
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1870	1870	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				740	124	254	140	450	0	0	488	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				2	2	2	2	2	0	0	2	2
Cap, veh/h				962	296	605	315	1348	0	0	977	
Arrive On Green				0.54	0.54	0.54	0.14	0.76	0.00	0.00	0.28	0.00
Sat Flow, veh/h				1781	547	1121	1781	3647	0	0	3647	1585
Grp Volume(v), veh/h				740	0	378	140	450	0	0	488	0
Grp Sat Flow(s),veh/h/ln				1781	0	1669	1781	1777	0	0	1777	1585
Q Serve(g_s), s				52.3	0.0	21.6	9.0	6.5	0.0	0.0	18.5	0.0
Cycle Q Clear(g_c), s				52.3	0.0	21.6	9.0	6.5	0.0	0.0	18.5	0.0
Prop In Lane				1.00		0.67	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				962	0	901	315	1348	0	0	977	
V/C Ratio(X)				0.77	0.00	0.42	0.44	0.33	0.00	0.00	0.50	
Avail Cap(c_a), veh/h				962	0	901	407	1533	0	0	977	
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.98	0.98	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				29.0	0.0	21.9	35.6	12.8	0.0	0.0	48.7	0.0
Incr Delay (d2), s/veh				5.9	0.0	1.4	0.7	0.1	0.0	0.0	1.8	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				23.8	0.0	8.9	3.7	2.3	0.0	0.0	8.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				34.9	0.0	23.3	36.3	12.8	0.0	0.0	50.6	0.0
LnGrp LOS				C	A	C	D	B	A	A	D	
Approach Vol, veh/h					1118			590			488	A
Approach Delay, s/veh					31.0			18.4			50.6	
Approach LOS					C			B			D	

Timer - Assigned Phs	2	4	5	6
Phs Duration (G+Y+Rc), s	66.7	93.3	16.7	50.0
Change Period (Y+Rc), s	6.0	* 6.9	* 5.5	6.0
Max Green Setting (Gmax), s	69.0	* 78	* 20	44.0
Max Q Clear Time (g_c+I1), s	8.5	54.3	11.0	20.5
Green Ext Time (p_c), s	0.3	11.0	0.2	0.4

Intersection Summary	
HCM 6th Ctrl Delay	31.9
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: Grinstead Dr & I-64 EB

08/19/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	0	193	0	0	0	0	471	835	145	993	0
Future Volume (veh/h)	77	0	193	0	0	0	0	471	835	145	993	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	84	0	210				0	512	0	158	1079	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	260	0	232				0	2503		740	2763	0
Arrive On Green	0.15	0.00	0.15				0.00	1.00	0.00	0.04	0.78	0.00
Sat Flow, veh/h	1781	0	1585				0	3647	1585	1781	3647	0
Grp Volume(v), veh/h	84	0	210				0	512	0	158	1079	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1777	1585	1781	1777	0
Q Serve(g_s), s	6.8	0.0	20.9				0.0	0.0	0.0	4.0	15.5	0.0
Cycle Q Clear(g_c), s	6.8	0.0	20.9				0.0	0.0	0.0	4.0	15.5	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	260	0	232				0	2503		740	2763	0
V/C Ratio(X)	0.32	0.00	0.91				0.00	0.20		0.21	0.39	0.00
Avail Cap(c_a), veh/h	343	0	305				0	2503		843	2763	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.67	1.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.26	0.00	0.66	0.66	0.00
Uniform Delay (d), s/veh	61.2	0.0	67.2				0.0	0.0	0.0	5.8	5.7	0.0
Incr Delay (d2), s/veh	1.0	0.0	26.3				0.0	0.0	0.0	0.1	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	10.2				0.0	0.0	0.0	1.4	5.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.2	0.0	93.5				0.0	0.0	0.0	5.9	6.0	0.0
LnGrp LOS	E	A	F				A	A		A	A	A
Approach Vol, veh/h		294						512	A		1237	
Approach Delay, s/veh		84.6						0.0			5.9	
Approach LOS		F						A			A	

Timer - Assigned Phs	1	2		4		6
Phs Duration (G+Y+Rc), s	11.7	118.7		29.6		130.4
Change Period (Y+Rc), s	* 5.5	6.0		6.2		6.0
Max Green Setting (Gmax), s	* 16	96.0		30.8		117.0
Max Q Clear Time (g_c+I1), s	6.0	2.0		22.9		17.5
Green Ext Time (p_c), s	0.2	0.4		0.5		0.9

Intersection Summary	
HCM 6th Ctrl Delay	15.8
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
1: Grinstead Dr & Lexington Rd

08/13/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	419	545	7	287	168	61	0	850	351	160	870	161
Future Volume (veh/h)	419	545	7	287	168	61	0	850	351	160	870	161
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	0	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	455	592	8	312	183	66	0	924	382	174	946	175
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	0	2	2	2	2	2
Cap, veh/h	466	940	13	430	233	197	0	1241	751	155	1439	266
Arrive On Green	0.26	0.26	0.26	0.12	0.12	0.12	0.00	0.70	0.70	0.09	0.48	0.48
Sat Flow, veh/h	1781	3590	48	3456	1870	1585	0	3647	1585	1781	2994	553
Grp Volume(v), veh/h	455	293	307	312	183	66	0	924	382	174	561	560
Grp Sat Flow(s),veh/h/ln	1781	1777	1862	1728	1870	1585	0	1777	1585	1781	1777	1771
Q Serve(g_s), s	40.5	23.3	23.3	13.9	15.2	6.1	0.0	26.1	18.1	13.9	38.4	38.4
Cycle Q Clear(g_c), s	40.5	23.3	23.3	13.9	15.2	6.1	0.0	26.1	18.1	13.9	38.4	38.4
Prop In Lane	1.00		0.03	1.00		1.00	0.00		1.00	1.00		0.31
Lane Grp Cap(c), veh/h	466	465	488	430	233	197	0	1241	751	155	854	851
V/C Ratio(X)	0.98	0.63	0.63	0.73	0.79	0.33	0.00	0.74	0.51	1.12	0.66	0.66
Avail Cap(c_a), veh/h	466	465	488	689	373	316	0	1241	751	155	854	851
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.91	0.91	0.91
Uniform Delay (d), s/veh	58.5	52.2	52.2	67.4	68.0	64.0	0.0	19.6	12.5	73.1	31.5	31.6
Incr Delay (d2), s/veh	35.3	3.1	3.0	3.3	8.1	1.4	0.0	4.1	2.5	106.3	3.6	3.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	22.7	10.8	11.3	6.3	7.8	0.1	0.0	7.6	5.8	10.9	17.2	17.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	93.8	55.3	55.2	70.7	76.1	65.4	0.0	23.7	14.9	179.4	35.1	35.2
LnGrp LOS	F	E	E	E	E	E	A	C	B	F	D	D
Approach Vol, veh/h		1055			561			1306			1295	
Approach Delay, s/veh		71.9			71.8			21.1			54.5	
Approach LOS		E			E			C			D	

Timer - Assigned Phs	2	3	4	6	8
Phs Duration (G+Y+Rc), s	49.0	21.0	63.0	27.0	84.0
Change Period (Y+Rc), s	7.1	7.1	7.1	7.1	7.1
Max Green Setting (Gmax), s	41.9	13.9	43.9	31.9	64.9
Max Q Clear Time (g_c+I1), s	42.5	15.9	28.1	17.2	40.4
Green Ext Time (p_c), s	0.0	0.0	5.1	2.7	4.3

Intersection Summary	
HCM 6th Ctrl Delay	50.8
HCM 6th LOS	D

HCM 6th TWSC
17: Grinstead Dr & Etley Ave

08/16/2019

Intersection	
Int Delay, s/veh	13

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕↑	↑↕		↾	
Traffic Vol, veh/h	55	1279	1144	17	22	101
Future Vol, veh/h	55	1279	1144	17	22	101
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	60	1390	1243	18	24	110

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1261	0	-	0	2067	631
Stage 1	-	-	-	-	1252	-
Stage 2	-	-	-	-	815	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	547	-	-	-	*47	424
Stage 1	-	-	-	-	*233	-
Stage 2	-	-	-	-	*541	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	547	-	-	-	*24	424
Mov Cap-2 Maneuver	-	-	-	-	*24	-
Stage 1	-	-	-	-	*121	-
Stage 2	-	-	-	-	*541	-

Approach	EB	WB	SB
HCM Control Delay, s	3.1	0	243.3
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	547	-	-	-	107
HCM Lane V/C Ratio	0.109	-	-	-	1.249
HCM Control Delay (s)	12.4	2.7	-	-	243.3
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0.4	-	-	-	8.9

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM Signalized Intersection Capacity Analysis
18: Cherokee Pkwy & Grinstead Dr

08/13/2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱		↰	↑		↱
Traffic Volume (vph)	734	9	618	676	0	490
Future Volume (vph)	734	9	618	676	0	490
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5		5.5	5.5		5.5
Lane Util. Factor	0.95		1.00	1.00		1.00
Frt	1.00		1.00	1.00		0.86
Flt Protected	1.00		0.95	1.00		1.00
Satd. Flow (prot)	3533		1770	1863		1611
Flt Permitted	1.00		0.25	1.00		1.00
Satd. Flow (perm)	3533		467	1863		1611
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	798	10	672	735	0	533
RTOR Reduction (vph)	1	0	0	0	0	59
Lane Group Flow (vph)	807	0	672	735	0	474
Turn Type	NA		pm+pt	NA		Over
Protected Phases	2		1	6		1
Permitted Phases			6			
Actuated Green, G (s)	39.6		74.5	80.0		29.4
Effective Green, g (s)	39.6		74.5	80.0		29.4
Actuated g/C Ratio	0.50		0.93	1.00		0.37
Clearance Time (s)	5.5		5.5	5.5		5.5
Vehicle Extension (s)	3.5		3.5	3.5		3.5
Lane Grp Cap (vph)	1748		913	1863		592
v/s Ratio Prot	0.23		0.27	0.39		c0.29
v/s Ratio Perm			c0.41			
v/c Ratio	0.46		0.74	0.39		0.80
Uniform Delay, d1	13.2		8.9	0.0		22.7
Progression Factor	1.00		2.97	1.00		1.00
Incremental Delay, d2	0.9		2.7	0.5		7.7
Delay (s)	14.1		29.1	0.5		30.3
Level of Service	B		C	A		C
Approach Delay (s)	14.1			14.2	30.3	
Approach LOS	B			B	C	

Intersection Summary			
HCM 2000 Control Delay	17.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	64.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
574: Payne St

08/13/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	248	715	12	41	178	5	7	190	63	7	179	154
Future Volume (veh/h)	248	715	12	41	178	5	7	190	63	7	179	154
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	270	777	13	45	193	5	8	207	68	8	195	167
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	747	1094	18	303	1083	28	54	336	108	53	232	193
Arrive On Green	0.60	0.60	0.60	0.60	0.60	0.60	0.25	0.25	0.25	0.25	0.25	0.25
Sat Flow, veh/h	1185	1834	31	686	1815	47	18	1349	432	13	932	777
Grp Volume(v), veh/h	270	0	790	45	0	198	283	0	0	370	0	0
Grp Sat Flow(s),veh/h/ln	1185	0	1865	686	0	1862	1799	0	0	1722	0	0
Q Serve(g_s), s	9.9	0.0	22.1	3.7	0.0	3.6	0.0	0.0	0.0	3.2	0.0	0.0
Cycle Q Clear(g_c), s	13.5	0.0	22.1	25.7	0.0	3.6	10.5	0.0	0.0	15.3	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.03	0.03		0.24	0.02		0.45
Lane Grp Cap(c), veh/h	747	0	1113	303	0	1111	497	0	0	478	0	0
V/C Ratio(X)	0.36	0.00	0.71	0.15	0.00	0.18	0.57	0.00	0.00	0.77	0.00	0.00
Avail Cap(c_a), veh/h	747	0	1113	303	0	1111	864	0	0	835	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	9.8	0.0	10.5	19.5	0.0	6.8	24.9	0.0	0.0	26.7	0.0	0.0
Incr Delay (d2), s/veh	1.4	0.0	3.8	1.0	0.0	0.4	1.0	0.0	0.0	2.7	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.5	0.0	8.7	0.6	0.0	1.3	4.5	0.0	0.0	6.4	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.2	0.0	14.4	20.5	0.0	7.1	26.0	0.0	0.0	29.4	0.0	0.0
LnGrp LOS	B	A	B	C	A	A	C	A	A	C	A	A
Approach Vol, veh/h		1060			243			283			370	
Approach Delay, s/veh		13.5			9.6			26.0			29.4	
Approach LOS		B			A			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		24.4		50.0		24.4				
Change Period (Y+Rc), s		5.6		* 5.9		5.6		* 5.9				
Max Green Setting (Gmax), s		44.4		* 34		44.4		* 34				
Max Q Clear Time (g_c+I1), s		15.5		12.5		27.7		17.3				
Green Ext Time (p_c), s		0.2		0.9		0.1		1.3				

Intersection Summary	
HCM 6th Ctrl Delay	17.9
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
15: Etley Ave & Lexington Rd 08/13/2019

Intersection	
Int Delay, s/veh	1.6

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	954	105	4	265	42	17
Future Vol, veh/h	954	105	4	265	42	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1037	114	4	288	46	18

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1151	0	1390	576
Stage 1	-	-	-	-	1094	-
Stage 2	-	-	-	-	296	-
Critical Hdwy	-	-	4.13	-	6.63	6.93
Critical Hdwy Stg 1	-	-	-	-	5.83	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	605	-	145	461
Stage 1	-	-	-	-	283	-
Stage 2	-	-	-	-	754	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	605	-	144	461
Mov Cap-2 Maneuver	-	-	-	-	144	-
Stage 1	-	-	-	-	281	-
Stage 2	-	-	-	-	754	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	35.7
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	180	-	-	605	-
HCM Lane V/C Ratio	0.356	-	-	0.007	-
HCM Control Delay (s)	35.7	-	-	11	0
HCM Lane LOS	E	-	-	B	A
HCM 95th %tile Q(veh)	1.5	-	-	0	-

HCM 6th Signalized Intersection Summary
108: Alta Vista Rd & Lexington Rd

05/19/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↱			↰↑↑↱			↑↱			↑↱	
Traffic Volume (veh/h)	1	1011	77	44	882	2	69	3	44	10	4	8
Future Volume (veh/h)	1	1011	77	44	882	2	69	3	44	10	4	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1	1053	80	46	919	2	72	3	46	10	4	8
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	77	2075	157	131	2080	4	232	27	83	184	79	86
Arrive On Green	0.63	0.63	0.63	0.63	0.63	0.63	0.14	0.14	0.14	0.14	0.14	0.14
Sat Flow, veh/h	0	3278	249	74	3285	7	753	186	576	502	547	599
Grp Volume(v), veh/h	601	0	533	480	0	487	121	0	0	22	0	0
Grp Sat Flow(s),veh/h/ln	1870	0	1657	1665	0	1701	1515	0	0	1647	0	0
Q Serve(g_s), s	0.0	0.0	8.1	0.0	0.0	6.9	2.4	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	8.1	0.0	8.1	5.9	0.0	6.9	3.4	0.0	0.0	0.5	0.0	0.0
Prop In Lane	0.00		0.15	0.10		0.00	0.60		0.38	0.45		0.36
Lane Grp Cap(c), veh/h	1261	0	1049	1139	0	1077	342	0	0	350	0	0
V/C Ratio(X)	0.48	0.00	0.51	0.42	0.00	0.45	0.35	0.00	0.00	0.06	0.00	0.00
Avail Cap(c_a), veh/h	1261	0	1049	1139	0	1077	760	0	0	778	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.6	0.0	4.6	4.2	0.0	4.4	18.5	0.0	0.0	17.3	0.0	0.0
Incr Delay (d2), s/veh	1.3	0.0	1.8	1.1	0.0	1.4	0.2	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.1	0.0	2.0	1.6	0.0	1.7	1.1	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	5.9	0.0	6.4	5.4	0.0	5.8	18.7	0.0	0.0	17.4	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	B	A	A	B	A	A
Approach Vol, veh/h		1134			967			121			22	
Approach Delay, s/veh		6.1			5.6			18.7			17.4	
Approach LOS		A			A			B			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	34.8	12.0	34.8	12.0
Change Period (Y+Rc), s	*5.2	*5.2	*5.2	*5.2
Max Green Setting (Gmax), s	*30	*20	*30	*20
Max Q Clear Time (g_c+I1), s	10.1	5.4	8.9	2.5
Green Ext Time (p_c), s	11.4	0.3	10.5	0.0

Intersection Summary	
HCM 6th Ctrl Delay	6.7
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
3: Grinstead Dr & I-64 WB

08/15/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	723	121	249	137	440	0	0	476	104
Future Volume (veh/h)	0	0	0	723	121	249	137	440	0	0	476	104
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1870	1870	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				786	132	271	149	478	0	0	517	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				2	2	2	2	2	0	0	2	2
Cap, veh/h				955	293	602	310	1362	0	0	977	
Arrive On Green				0.54	0.54	0.54	0.15	0.77	0.00	0.00	0.28	0.00
Sat Flow, veh/h				1781	546	1122	1781	3647	0	0	3647	1585
Grp Volume(v), veh/h				786	0	403	149	478	0	0	517	0
Grp Sat Flow(s),veh/h/ln				1781	0	1668	1781	1777	0	0	1777	1585
Q Serve(g_s), s				58.6	0.0	23.6	9.6	6.9	0.0	0.0	19.7	0.0
Cycle Q Clear(g_c), s				58.6	0.0	23.6	9.6	6.9	0.0	0.0	19.7	0.0
Prop In Lane				1.00		0.67	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				955	0	895	310	1362	0	0	977	
V/C Ratio(X)				0.82	0.00	0.45	0.48	0.35	0.00	0.00	0.53	
Avail Cap(c_a), veh/h				955	0	895	396	1533	0	0	977	
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.98	0.98	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				30.8	0.0	22.7	35.4	12.3	0.0	0.0	49.2	0.0
Incr Delay (d2), s/veh				8.0	0.0	1.6	0.8	0.1	0.0	0.0	2.0	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				27.1	0.0	9.8	3.9	2.3	0.0	0.0	9.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				38.8	0.0	24.3	36.3	12.4	0.0	0.0	51.3	0.0
LnGrp LOS				D	A	C	D	B	A	A	D	
Approach Vol, veh/h					1189			627			517	A
Approach Delay, s/veh					33.9			18.1			51.3	
Approach LOS					C			B			D	

Timer - Assigned Phs	2	4	5	6
Phs Duration (G+Y+Rc), s	67.3	92.7	17.3	50.0
Change Period (Y+Rc), s	6.0	* 6.9	* 5.5	6.0
Max Green Setting (Gmax), s	69.0	* 78	* 20	44.0
Max Q Clear Time (g_c+I1), s	8.9	60.6	11.6	21.7
Green Ext Time (p_c), s	0.4	9.9	0.2	0.4

Intersection Summary	
HCM 6th Ctrl Delay	33.5
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: Grinstead Dr & I-64 EB

08/20/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	82	0	205	0	0	0	0	500	886	154	1054	0
Future Volume (veh/h)	82	0	205	0	0	0	0	500	886	154	1054	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	89	0	223				0	543	0	167	1146	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	275	0	244				0	2466		717	2735	0
Arrive On Green	0.15	0.00	0.15				0.00	1.00	0.00	0.04	0.77	0.00
Sat Flow, veh/h	1781	0	1585				0	3647	1585	1781	3647	0
Grp Volume(v), veh/h	89	0	223				0	543	0	167	1146	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1777	1585	1781	1777	0
Q Serve(g_s), s	7.1	0.0	22.2				0.0	0.0	0.0	4.4	17.5	0.0
Cycle Q Clear(g_c), s	7.1	0.0	22.2				0.0	0.0	0.0	4.4	17.5	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	275	0	244				0	2466		717	2735	0
V/C Ratio(X)	0.32	0.00	0.91				0.00	0.22		0.23	0.42	0.00
Avail Cap(c_a), veh/h	343	0	305				0	2466		816	2735	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.67	1.67	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.13	0.00	0.60	0.60	0.00
Uniform Delay (d), s/veh	60.2	0.0	66.6				0.0	0.0	0.0	6.2	6.3	0.0
Incr Delay (d2), s/veh	1.0	0.0	28.1				0.0	0.0	0.0	0.1	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.0	10.9				0.0	0.0	0.0	1.6	6.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.2	0.0	94.7				0.0	0.0	0.0	6.3	6.6	0.0
LnGrp LOS	E	A	F				A	A		A	A	A
Approach Vol, veh/h		312						543	A		1313	
Approach Delay, s/veh		85.2						0.0			6.5	
Approach LOS		F						A			A	

Timer - Assigned Phs	1	2	4	6
Phs Duration (G+Y+Rc), s	12.1	117.0	30.9	129.1
Change Period (Y+Rc), s	* 5.5	6.0	6.2	6.0
Max Green Setting (Gmax), s	* 16	98.0	30.8	117.0
Max Q Clear Time (g_c+I1), s	6.4	2.0	24.2	19.5
Green Ext Time (p_c), s	0.2	0.4	0.5	1.0

Intersection Summary	
HCM 6th Ctrl Delay	16.2
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
1: Grinstead Dr & Lexington Rd

08/15/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	445	579	7	305	179	64	0	903	372	171	923	171
Future Volume (veh/h)	445	579	7	305	179	64	0	903	372	171	923	171
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	0	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	484	629	8	332	195	70	0	982	404	186	1003	186
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	0	2	2	2	2	2
Cap, veh/h	466	941	12	454	246	208	0	1217	751	155	1418	263
Arrive On Green	0.26	0.26	0.26	0.13	0.13	0.13	0.00	0.68	0.68	0.09	0.47	0.47
Sat Flow, veh/h	1781	3593	46	3456	1870	1585	0	3647	1585	1781	2993	554
Grp Volume(v), veh/h	484	311	326	332	195	70	0	982	404	186	595	594
Grp Sat Flow(s),veh/h/ln	1781	1777	1862	1728	1870	1585	0	1777	1585	1781	1777	1771
Q Serve(g_s), s	41.9	25.1	25.1	14.8	16.2	6.4	0.0	31.1	21.0	13.9	42.4	42.5
Cycle Q Clear(g_c), s	41.9	25.1	25.1	14.8	16.2	6.4	0.0	31.1	21.0	13.9	42.4	42.5
Prop In Lane	1.00		0.02	1.00		1.00	0.00		1.00	1.00		0.31
Lane Grp Cap(c), veh/h	466	465	488	454	246	208	0	1217	751	155	842	839
V/C Ratio(X)	1.04	0.67	0.67	0.73	0.79	0.34	0.00	0.81	0.54	1.20	0.71	0.71
Avail Cap(c_a), veh/h	466	465	488	689	373	316	0	1217	751	155	842	839
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.89	0.89	0.89
Uniform Delay (d), s/veh	59.0	52.8	52.8	66.8	67.4	63.2	0.0	21.5	13.3	73.1	33.3	33.3
Incr Delay (d2), s/veh	51.7	4.1	3.9	3.2	8.8	1.3	0.0	5.8	2.8	133.0	4.4	4.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	25.5	11.7	12.3	6.7	8.3	2.7	0.0	9.5	7.0	12.1	19.2	19.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	110.8	56.9	56.8	70.0	76.2	64.5	0.0	27.3	16.0	206.0	37.7	37.8
LnGrp LOS	F	E	E	E	E	E	A	C	B	F	D	D
Approach Vol, veh/h		1121			597			1386			1375	
Approach Delay, s/veh		80.1			71.4			24.0			60.5	
Approach LOS		F			E			C			E	

Timer - Assigned Phs	2	3	4	6	8
Phs Duration (G+Y+Rc), s	49.0	21.0	61.9	28.1	82.9
Change Period (Y+Rc), s	7.1	7.1	7.1	7.1	7.1
Max Green Setting (Gmax), s	41.9	13.9	43.9	31.9	64.9
Max Q Clear Time (g_c+I1), s	43.9	15.9	33.1	18.2	44.5
Green Ext Time (p_c), s	0.0	0.0	4.5	2.8	4.5

Intersection Summary	
HCM 6th Ctrl Delay	55.6
HCM 6th LOS	E

HCM 6th TWSC
17: Grinstead Dr & Etley Ave

08/15/2019

Intersection	
Int Delay, s/veh	38.1

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↾	
Traffic Vol, veh/h	58	1358	1214	18	23	107
Future Vol, veh/h	58	1358	1214	18	23	107
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	63	1476	1320	20	25	116

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	1340	0	-	0	2194	670
Stage 1	-	-	-	-	1330	-
Stage 2	-	-	-	-	864	-
Critical Hdwy	4.14	-	-	-	6.84	6.94
Critical Hdwy Stg 1	-	-	-	-	5.84	-
Critical Hdwy Stg 2	-	-	-	-	5.84	-
Follow-up Hdwy	2.22	-	-	-	3.52	3.32
Pot Cap-1 Maneuver	510	-	-	-	38	399
Stage 1	-	-	-	-	211	-
Stage 2	-	-	-	-	373	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	510	-	-	-	~ 12	399
Mov Cap-2 Maneuver	-	-	-	-	~ 12	-
Stage 1	-	-	-	-	66	-
Stage 2	-	-	-	-	373	-

Approach	EB	WB	SB
HCM Control Delay, s	4.5	0	$ 765.6
HCM LOS			F

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	510	-	-	-	60
HCM Lane V/C Ratio	0.124	-	-	-	2.355
HCM Control Delay (s)	13.1	4.1	-	-	$ 765.6
HCM Lane LOS	B	A	-	-	F
HCM 95th %tile Q(veh)	0.4	-	-	-	14

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM Signalized Intersection Capacity Analysis
18: Cherokee Pkwy & Grinstead Dr

08/15/2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱		↰	↑		↱
Traffic Volume (vph)	771	9	650	710	0	515
Future Volume (vph)	771	9	650	710	0	515
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5		5.5	5.5		5.5
Lane Util. Factor	0.95		1.00	1.00		1.00
Frt	1.00		1.00	1.00		0.86
Flt Protected	1.00		0.95	1.00		1.00
Satd. Flow (prot)	3533		1770	1863		1611
Flt Permitted	1.00		0.23	1.00		1.00
Satd. Flow (perm)	3533		426	1863		1611
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	838	10	707	772	0	560
RTOR Reduction (vph)	1	0	0	0	0	51
Lane Group Flow (vph)	847	0	707	772	0	509
Turn Type	NA		pm+pt	NA		Over
Protected Phases	2		1	6		1
Permitted Phases			6			
Actuated Green, G (s)	38.3		74.5	80.0		30.7
Effective Green, g (s)	38.3		74.5	80.0		30.7
Actuated g/C Ratio	0.48		0.93	1.00		0.38
Clearance Time (s)	5.5		5.5	5.5		5.5
Vehicle Extension (s)	3.5		3.5	3.5		3.5
Lane Grp Cap (vph)	1691		912	1863		618
v/s Ratio Prot	0.24		0.30	0.41		c0.32
v/s Ratio Perm			c0.42			
v/c Ratio	0.50		0.78	0.41		0.82
Uniform Delay, d1	14.3		10.6	0.0		22.2
Progression Factor	1.00		2.68	1.00		1.00
Incremental Delay, d2	1.1		3.4	0.5		9.0
Delay (s)	15.4		31.8	0.5		31.2
Level of Service	B		C	A		C
Approach Delay (s)	15.4			15.5	31.2	
Approach LOS	B			B	C	

Intersection Summary			
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
574: Payne St

08/15/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	258	744	12	43	185	5	7	198	66	7	186	160
Future Volume (veh/h)	258	744	12	43	185	5	7	198	66	7	186	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	280	809	13	47	201	5	8	215	72	8	202	174
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	730	1084	17	274	1073	27	54	345	113	52	238	200
Arrive On Green	0.59	0.59	0.59	0.59	0.59	0.59	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	1176	1836	29	666	1817	45	17	1342	439	12	929	780
Grp Volume(v), veh/h	280	0	822	47	0	206	295	0	0	384	0	0
Grp Sat Flow(s),veh/h/ln	1176	0	1865	666	0	1862	1798	0	0	1721	0	0
Q Serve(g_s), s	10.8	0.0	24.3	4.2	0.0	3.8	0.0	0.0	0.0	3.4	0.0	0.0
Cycle Q Clear(g_c), s	14.7	0.0	24.3	28.5	0.0	3.8	11.0	0.0	0.0	16.0	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.02	0.03		0.24	0.02		0.45
Lane Grp Cap(c), veh/h	730	0	1101	274	0	1099	511	0	0	491	0	0
V/C Ratio(X)	0.38	0.00	0.75	0.17	0.00	0.19	0.58	0.00	0.00	0.78	0.00	0.00
Avail Cap(c_a), veh/h	730	0	1101	274	0	1099	856	0	0	826	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	10.5	0.0	11.3	21.7	0.0	7.1	24.9	0.0	0.0	26.7	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	4.6	1.4	0.0	0.4	1.0	0.0	0.0	2.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.8	0.0	9.8	0.7	0.0	1.4	4.7	0.0	0.0	6.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.0	0.0	15.9	23.1	0.0	7.5	25.9	0.0	0.0	29.5	0.0	0.0
LnGrp LOS	B	A	B	C	A	A	C	A	A	C	A	A
Approach Vol, veh/h		1102			253			295			384	
Approach Delay, s/veh		14.9			10.4			25.9			29.5	
Approach LOS		B			B			C			C	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	50.0	25.2	50.0	25.2
Change Period (Y+Rc), s	5.6	* 5.9	5.6	* 5.9
Max Green Setting (Gmax), s	44.4	* 34	44.4	* 34
Max Q Clear Time (g_c+I1), s	16.7	13.0	30.5	18.0
Green Ext Time (p_c), s	0.2	1.0	0.1	1.3

Intersection Summary	
HCM 6th Ctrl Delay	18.7
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
15: Etley Ave & Lexington Rd

08/15/2019

Intersection	
Int Delay, s/veh	1.9

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑	↑	
Traffic Vol, veh/h	1013	111	4	282	45	18
Future Vol, veh/h	1013	111	4	282	45	18
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1101	121	4	307	49	20

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1222	0	1477	611
Stage 1	-	-	-	-	1162	-
Stage 2	-	-	-	-	315	-
Critical Hdwy	-	-	4.13	-	6.63	6.93
Critical Hdwy Stg 1	-	-	-	-	5.83	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	568	-	127	438
Stage 1	-	-	-	-	261	-
Stage 2	-	-	-	-	739	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	568	-	126	438
Mov Cap-2 Maneuver	-	-	-	-	126	-
Stage 1	-	-	-	-	259	-
Stage 2	-	-	-	-	739	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.2	44.2
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	EBT	EBR	WBL	WBT
Capacity (veh/h)	158	-	-	568	-
HCM Lane V/C Ratio	0.433	-	-	0.008	-
HCM Control Delay (s)	44.2	-	-	11.4	0
HCM Lane LOS	E	-	-	B	A
HCM 95th %tile Q(veh)	2	-	-	0	-

HCM 6th Signalized Intersection Summary
108: Alta Vista Rd & Lexington Rd

05/19/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↱			↰↑↑↱			↕			↕	
Traffic Volume (veh/h)	1	1084	83	47	946	2	74	3	47	10	4	8
Future Volume (veh/h)	1	1084	83	47	946	2	74	3	47	10	4	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1	1129	86	49	985	2	77	3	49	10	4	8
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	77	2069	157	131	2059	4	235	25	84	186	80	88
Arrive On Green	0.63	0.63	0.63	0.63	0.63	0.63	0.15	0.15	0.15	0.15	0.15	0.15
Sat Flow, veh/h	0	3277	249	75	3260	6	765	173	574	509	545	602
Grp Volume(v), veh/h	644	0	572	511	0	525	129	0	0	22	0	0
Grp Sat Flow(s),veh/h/ln	1870	0	1657	1641	0	1701	1512	0	0	1656	0	0
Q Serve(g_s), s	0.0	0.0	9.1	0.0	0.0	7.7	2.7	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.1	0.0	9.1	6.5	0.0	7.7	3.6	0.0	0.0	0.5	0.0	0.0
Prop In Lane	0.00		0.15	0.10		0.00	0.60		0.38	0.45		0.36
Lane Grp Cap(c), veh/h	1257	0	1046	1120	0	1074	344	0	0	355	0	0
V/C Ratio(X)	0.51	0.00	0.55	0.46	0.00	0.49	0.37	0.00	0.00	0.06	0.00	0.00
Avail Cap(c_a), veh/h	1257	0	1046	1120	0	1074	757	0	0	777	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	4.9	0.0	4.9	4.4	0.0	4.6	18.6	0.0	0.0	17.3	0.0	0.0
Incr Delay (d2), s/veh	1.5	0.0	2.1	1.3	0.0	1.6	0.3	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	2.3	1.8	0.0	1.9	1.2	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.4	0.0	6.9	5.7	0.0	6.2	18.8	0.0	0.0	17.3	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	B	A	A	B	A	A
Approach Vol, veh/h		1216			1036			129			22	
Approach Delay, s/veh		6.6			6.0			18.8			17.3	
Approach LOS		A			A			B			B	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		34.8		12.1		34.8		12.1				
Change Period (Y+Rc), s		* 5.2		* 5.2		* 5.2		* 5.2				
Max Green Setting (Gmax), s		* 30		* 20		* 30		* 20				
Max Q Clear Time (g_c+I1), s		11.1		5.6		9.7		2.5				
Green Ext Time (p_c), s		11.8		0.3		11.0		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	7.1
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
3: Grinstead Dr & I-64 WB

08/26/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	732	121	249	158	454	0	0	483	104
Future Volume (veh/h)	0	0	0	732	121	249	158	454	0	0	483	104
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach					No			No			No	
Adj Sat Flow, veh/h/ln				1870	1870	1870	1870	1870	0	0	1870	1870
Adj Flow Rate, veh/h				796	132	271	172	493	0	0	525	0
Peak Hour Factor				0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %				2	2	2	2	2	0	0	2	2
Cap, veh/h				938	288	591	325	1396	0	0	977	
Arrive On Green				0.53	0.53	0.53	0.17	0.79	0.00	0.00	0.28	0.00
Sat Flow, veh/h				1781	546	1122	1781	3647	0	0	3647	1585
Grp Volume(v), veh/h				796	0	403	172	493	0	0	525	0
Grp Sat Flow(s),veh/h/ln				1781	0	1668	1781	1777	0	0	1777	1585
Q Serve(g_s), s				61.2	0.0	24.1	11.2	6.6	0.0	0.0	20.1	0.0
Cycle Q Clear(g_c), s				61.2	0.0	24.1	11.2	6.6	0.0	0.0	20.1	0.0
Prop In Lane				1.00		0.67	1.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				938	0	878	325	1396	0	0	977	
V/C Ratio(X)				0.85	0.00	0.46	0.53	0.35	0.00	0.00	0.54	
Avail Cap(c_a), veh/h				938	0	878	393	1533	0	0	977	
HCM Platoon Ratio				1.00	1.00	1.00	2.00	2.00	1.00	1.00	1.00	1.00
Upstream Filter(I)				1.00	0.00	1.00	0.98	0.98	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				32.4	0.0	23.6	34.6	11.1	0.0	0.0	49.3	0.0
Incr Delay (d2), s/veh				9.5	0.0	1.7	1.0	0.1	0.0	0.0	2.1	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				28.6	0.0	10.1	4.4	2.2	0.0	0.0	9.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				41.9	0.0	25.4	35.6	11.2	0.0	0.0	51.5	0.0
LnGrp LOS				D	A	C	D	B	A	A	D	
Approach Vol, veh/h					1199			665			525	A
Approach Delay, s/veh					36.3			17.5			51.5	
Approach LOS					D			B			D	

Timer - Assigned Phs	2	4	5	6
Phs Duration (G+Y+Rc), s	68.9	91.1	18.9	50.0
Change Period (Y+Rc), s	6.0	* 6.9	* 5.5	6.0
Max Green Setting (Gmax), s	69.0	* 78	* 20	44.0
Max Q Clear Time (g_c+I1), s	8.6	63.2	13.2	22.1
Green Ext Time (p_c), s	0.4	8.9	0.2	0.4

Intersection Summary	
HCM 6th Ctrl Delay	34.4
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
2: Grinstead Dr & I-64 EB

08/26/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	82	0	214	0	0	0	0	535	907	154	1070	0
Future Volume (veh/h)	82	0	214	0	0	0	0	535	907	154	1070	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870				0	1870	1870	1870	1870	0
Adj Flow Rate, veh/h	89	0	233				0	582	0	167	1163	0
Peak Hour Factor	0.92	0.92	0.92				0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2				0	2	2	2	2	0
Cap, veh/h	284	0	253				0	2486		651	2753	0
Arrive On Green	0.16	0.00	0.16				0.00	0.70	0.00	0.04	0.77	0.00
Sat Flow, veh/h	1781	0	1585				0	3647	1585	1781	3647	0
Grp Volume(v), veh/h	89	0	233				0	582	0	167	1163	0
Grp Sat Flow(s),veh/h/ln	1781	0	1585				0	1777	1585	1781	1777	0
Q Serve(g_s), s	7.1	0.0	23.2				0.0	9.4	0.0	4.3	17.5	0.0
Cycle Q Clear(g_c), s	7.1	0.0	23.2				0.0	9.4	0.0	4.3	17.5	0.0
Prop In Lane	1.00		1.00				0.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	284	0	253				0	2486		651	2753	0
V/C Ratio(X)	0.31	0.00	0.92				0.00	0.23		0.26	0.42	0.00
Avail Cap(c_a), veh/h	362	0	322				0	2486		751	2753	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	0.12	0.00	0.58	0.58	0.00
Uniform Delay (d), s/veh	59.5	0.0	66.2				0.0	8.6	0.0	6.3	6.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	26.7				0.0	0.0	0.0	0.1	0.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.3	0.0	11.3				0.0	3.6	0.0	1.6	6.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.1	0.0	93.0				0.0	8.7	0.0	6.4	6.3	0.0
LnGrp LOS	E	A	F				A	A		A	A	A
Approach Vol, veh/h		322						582	A		1330	
Approach Delay, s/veh		83.9						8.7			6.3	
Approach LOS		F						A			A	

Timer - Assigned Phs	1	2	4	6
Phs Duration (G+Y+Rc), s	12.0	117.9	30.0	130.0
Change Period (Y+Rc), s	* 5.5	6.0	4.5	6.0
Max Green Setting (Gmax), s	* 16	96.0	32.5	117.0
Max Q Clear Time (g_c+I1), s	6.3	11.4	25.2	19.5
Green Ext Time (p_c), s	0.2	0.5	0.4	1.0

Intersection Summary	
HCM 6th Ctrl Delay	18.1
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
1: Grinstead Dr & Lexington Rd

08/26/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	501	593	7	312	179	64	0	903	372	171	945	174
Future Volume (veh/h)	501	593	7	312	179	64	0	903	372	171	945	174
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	0	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	545	645	8	339	195	70	0	982	404	186	1027	189
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	0	2	2	2	2	2
Cap, veh/h	522	941	12	454	246	208	0	1216	751	155	1419	261
Arrive On Green	0.26	0.26	0.26	0.13	0.13	0.13	0.00	0.34	0.34	0.09	0.47	0.47
Sat Flow, veh/h	1995	3595	45	3456	1870	1585	0	3647	1585	1781	2998	551
Grp Volume(v), veh/h	545	319	334	339	195	70	0	982	404	186	608	608
Grp Sat Flow(s),veh/h/ln	998	1777	1862	1728	1870	1585	0	1777	1585	1781	1777	1771
Q Serve(g_s), s	41.9	25.8	25.8	15.1	16.2	6.4	0.0	40.2	28.8	13.9	43.8	44.0
Cycle Q Clear(g_c), s	41.9	25.8	25.8	15.1	16.2	6.4	0.0	40.2	28.8	13.9	43.8	44.0
Prop In Lane	1.00		0.02	1.00		1.00	0.00		1.00	1.00		0.31
Lane Grp Cap(c), veh/h	522	465	488	454	246	208	0	1216	751	155	841	839
V/C Ratio(X)	1.04	0.69	0.69	0.75	0.79	0.34	0.00	0.81	0.54	1.20	0.72	0.72
Avail Cap(c_a), veh/h	522	465	488	889	373	316	0	1216	751	155	841	839
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	0.00	1.00	1.00	0.88	0.88	0.88
Uniform Delay (d), s/veh	59.0	53.1	53.1	66.9	67.4	63.1	0.0	47.8	29.7	73.1	33.7	33.8
Incr Delay (d2), s/veh	51.1	4.6	4.4	3.5	8.7	1.3	0.0	5.8	2.8	132.6	4.7	4.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.2	12.1	12.7	6.9	8.3	2.7	0.0	18.7	14.7	12.0	19.9	19.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	110.1	57.7	57.5	70.4	76.1	64.5	0.0	53.6	32.5	205.7	38.4	38.6
LnGrp LOS	F	E	E	E	E	E	A	D	C	F	D	D
Approach Vol, veh/h		1198			604			1386			1402	
Approach Delay, s/veh		81.5			71.5			47.5			60.7	
Approach LOS		F			E			D			E	

Timer - Assigned Phs	2	3	4	6	8
Phs Duration (G+Y+Rc), s	49.0	21.0	61.9	28.1	82.9
Change Period (Y+Rc), s	7.1	7.1	7.1	7.1	7.1
Max Green Setting (Gmax), s	41.9	13.9	43.9	31.9	64.9
Max Q Clear Time (g_c+I1), s	43.9	15.9	42.2	18.2	46.0
Green Ext Time (p_c), s	0.0	0.0	1.1	2.9	4.6

Intersection Summary	
HCM 6th Ctrl Delay	63.6
HCM 6th LOS	E

HCM 6th TWSC
17: Grinstead Dr & Etley Ave

08/26/2019

Intersection	
Int Delay, s/veh	2.1

Movement	SBL	SBR	NEL	NET	SWT	SWR
Lane Configurations						
Traffic Vol, veh/h	23	145	107	1198	1184	41
Future Vol, veh/h	23	145	107	1198	1184	41
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	75	0	0	-	-	-
Veh in Median Storage, #	1	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	25	158	116	1302	1287	45

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	2844	666	1332	0	-	0
Stage 1	1310	-	-	-	-	-
Stage 2	1534	-	-	-	-	-
Critical Hdwy	6.63	6.93	4.13	-	-	-
Critical Hdwy Stg 1	5.83	-	-	-	-	-
Critical Hdwy Stg 2	5.43	-	-	-	-	-
Follow-up Hdwy	3.519	3.319	2.219	-	-	-
Pot Cap-1 Maneuver	~ 16	403	516	-	-	-
Stage 1	217	-	-	-	-	-
Stage 2	195	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	~ 12	403	516	-	-	-
Mov Cap-2 Maneuver	88	-	-	-	-	-
Stage 1	168	-	-	-	-	-
Stage 2	195	-	-	-	-	-

Approach	SB	NE	SW
HCM Control Delay, s	25.3	1.1	0
HCM LOS	D		

Minor Lane/Major Mvmt	NEL	NET	SBLn1	SBLn2	SWT	SWR
Capacity (veh/h)	516	-	88	403	-	-
HCM Lane V/C Ratio	0.225	-	0.284	0.391	-	-
HCM Control Delay (s)	14	-	61.4	19.6	-	-
HCM Lane LOS	B	-	F	C	-	-
HCM 95th %tile Q(veh)	0.9	-	1.1	1.8	-	-

Notes			
~: Volume exceeds capacity	$: Delay exceeds 300s	+: Computation Not Defined	*: All major volume in platoon

HCM Signalized Intersection Capacity Analysis
18: Cherokee Pkwy & Grinstead Dr

08/26/2019

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↱	↰	↑		↱
Traffic Volume (vph)	783	9	663	738	0	522
Future Volume (vph)	783	9	663	738	0	522
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5	5.5	5.5		5.5
Lane Util. Factor	1.00	1.00	1.00	1.00		1.00
Frt	1.00	0.85	1.00	1.00		0.86
Flt Protected	1.00	1.00	0.95	1.00		1.00
Satd. Flow (prot)	1863	1583	1770	1863		1611
Flt Permitted	1.00	1.00	0.09	1.00		1.00
Satd. Flow (perm)	1863	1583	174	1863		1611
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	851	10	721	802	0	567
RTOR Reduction (vph)	0	5	0	0	0	48
Lane Group Flow (vph)	851	5	721	802	0	519
Turn Type	NA	Perm	pm+pt	NA		Over
Protected Phases	2		1	6		1
Permitted Phases		2	6			
Actuated Green, G (s)	37.2	37.2	74.5	80.0		31.8
Effective Green, g (s)	37.2	37.2	74.5	80.0		31.8
Actuated g/C Ratio	0.47	0.47	0.93	1.00		0.40
Clearance Time (s)	5.5	5.5	5.5	5.5		5.5
Vehicle Extension (s)	3.5	3.5	3.5	3.5		3.5
Lane Grp Cap (vph)	866	736	796	1863		640
v/s Ratio Prot	c0.46		c0.36	0.43		0.32
v/s Ratio Perm		0.00	0.48			
v/c Ratio	0.98	0.01	0.91	0.43		0.81
Uniform Delay, d1	21.1	11.5	19.7	0.0		21.4
Progression Factor	1.00	1.00	1.97	1.00		1.00
Incremental Delay, d2	26.7	0.0	12.1	0.6		7.9
Delay (s)	47.8	11.5	50.9	0.6		29.4
Level of Service	D	B	D	A		C
Approach Delay (s)	47.3			24.4	29.4	
Approach LOS	D			C	C	

Intersection Summary				
HCM 2000 Control Delay	32.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM 6th Signalized Intersection Summary
574: Payne St

08/26/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	258	754	12	47	209	6	7	198	69	7	186	160
Future Volume (veh/h)	258	754	12	47	209	6	7	198	69	7	186	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	280	820	13	51	227	7	8	215	75	8	202	174
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	705	1084	17	267	1065	33	53	341	116	52	238	200
Arrive On Green	0.59	0.59	0.59	0.59	0.59	0.59	0.26	0.26	0.26	0.26	0.26	0.26
Sat Flow, veh/h	1146	1836	29	659	1805	56	17	1328	452	12	929	780
Grp Volume(v), veh/h	280	0	833	51	0	234	298	0	0	384	0	0
Grp Sat Flow(s),veh/h/ln	1146	0	1865	659	0	1860	1797	0	0	1721	0	0
Q Serve(g_s), s	11.4	0.0	24.9	4.7	0.0	4.4	0.0	0.0	0.0	3.4	0.0	0.0
Cycle Q Clear(g_c), s	15.8	0.0	24.9	29.5	0.0	4.4	11.2	0.0	0.0	16.0	0.0	0.0
Prop In Lane	1.00		0.02	1.00		0.03	0.03		0.25	0.02		0.45
Lane Grp Cap(c), veh/h	705	0	1101	267	0	1098	510	0	0	491	0	0
V/C Ratio(X)	0.40	0.00	0.76	0.19	0.00	0.21	0.58	0.00	0.00	0.78	0.00	0.00
Avail Cap(c_a), veh/h	705	0	1101	267	0	1098	855	0	0	826	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	10.9	0.0	11.4	22.3	0.0	7.2	24.9	0.0	0.0	26.7	0.0	0.0
Incr Delay (d2), s/veh	1.7	0.0	4.9	1.6	0.0	0.4	1.1	0.0	0.0	2.8	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.9	0.0	10.0	0.8	0.0	1.7	4.7	0.0	0.0	6.7	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.6	0.0	16.3	23.9	0.0	7.7	26.0	0.0	0.0	29.5	0.0	0.0
LnGrp LOS	B	A	B	C	A	A	C	A	A	C	A	A
Approach Vol, veh/h		1113			285			298			384	
Approach Delay, s/veh		15.3			10.6			26.0			29.5	
Approach LOS		B			B			C			C	

Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		50.0		25.2		50.0		25.2				
Change Period (Y+Rc), s		5.6		* 5.9		5.6		* 5.9				
Max Green Setting (Gmax), s		44.4		* 34		44.4		* 34				
Max Q Clear Time (g_c+I1), s		17.8		13.2		31.5		18.0				
Green Ext Time (p_c), s		0.3		1.0		0.1		1.3				

Intersection Summary	
HCM 6th Ctrl Delay	18.8
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
15: Etley Ave & Lexington Rd

08/26/2019

Intersection						
Int Delay, s/veh	6.6					

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑↱			↰↑	↰↑	↱
Traffic Vol, veh/h	1019	118	11	269	87	129
Future Vol, veh/h	1019	118	11	269	87	129
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	100	0
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	1108	128	12	292	95	140

Major/Minor	Major1		Major2		Minor1	
Conflicting Flow All	0	0	1236	0	1488	618
Stage 1	-	-	-	-	1172	-
Stage 2	-	-	-	-	316	-
Critical Hdwy	-	-	4.13	-	6.63	6.93
Critical Hdwy Stg 1	-	-	-	-	5.83	-
Critical Hdwy Stg 2	-	-	-	-	5.43	-
Follow-up Hdwy	-	-	2.219	-	3.519	3.319
Pot Cap-1 Maneuver	-	-	561	-	125	433
Stage 1	-	-	-	-	258	-
Stage 2	-	-	-	-	738	-
Platoon blocked, %	-	-		-		
Mov Cap-1 Maneuver	-	-	561	-	122	433
Mov Cap-2 Maneuver	-	-	-	-	122	-
Stage 1	-	-	-	-	258	-
Stage 2	-	-	-	-	719	-

Approach	EB	WB	NB
HCM Control Delay, s	0	0.5	49.5
HCM LOS			E

Minor Lane/Major Mvmt	NBLn1	NBLn2	EBT	EBR	WBL	WBT
Capacity (veh/h)	122	433	-	-	561	-
HCM Lane V/C Ratio	0.775	0.324	-	-	0.021	-
HCM Control Delay (s)	97.3	17.2	-	-	11.6	0
HCM Lane LOS	F	C	-	-	B	A
HCM 95th %tile Q(veh)	4.5	1.4	-	-	0.1	-

HCM 6th Signalized Intersection Summary
108: Alta Vista Rd & Lexington Rd

07/19/2019

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↰↑↑↱			↰↑↑↱			↑↱			↑↱	
Traffic Volume (veh/h)	1	1097	84	47	952	2	75	3	47	10	4	8
Future Volume (veh/h)	1	1097	84	47	952	2	75	3	47	10	4	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870	1870
Adj Flow Rate, veh/h	1	1143	88	49	992	2	78	3	49	10	4	8
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	2	2	2	2	2	2	2	2	2	2	2	2
Cap, veh/h	78	2048	157	132	2039	4	239	26	85	189	81	90
Arrive On Green	0.63	0.63	0.63	0.63	0.63	0.63	0.15	0.15	0.15	0.15	0.15	0.15
Sat Flow, veh/h	0	3274	252	74	3260	6	768	174	570	508	545	602
Grp Volume(v), veh/h	653	0	579	514	0	529	130	0	0	22	0	0
Grp Sat Flow(s),veh/h/ln	1870	0	1657	1639	0	1701	1511	0	0	1655	0	0
Q Serve(g_s), s	0.0	0.0	9.3	0.0	0.0	7.8	2.7	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	9.2	0.0	9.3	6.5	0.0	7.8	3.6	0.0	0.0	0.5	0.0	0.0
Prop In Lane	0.00		0.15	0.10		0.00	0.60		0.38	0.45		0.36
Lane Grp Cap(c), veh/h	1247	0	1036	1111	0	1064	350	0	0	360	0	0
V/C Ratio(X)	0.52	0.00	0.56	0.46	0.00	0.50	0.37	0.00	0.00	0.06	0.00	0.00
Avail Cap(c_a), veh/h	1247	0	1036	1111	0	1064	797	0	0	817	0	0
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00
Uniform Delay (d), s/veh	5.0	0.0	5.0	4.5	0.0	4.7	18.2	0.0	0.0	16.9	0.0	0.0
Incr Delay (d2), s/veh	1.6	0.0	2.2	1.4	0.0	1.7	0.2	0.0	0.0	0.0	0.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.4	0.0	2.3	1.8	0.0	2.0	1.2	0.0	0.0	0.2	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	6.5	0.0	7.2	5.8	0.0	6.4	18.4	0.0	0.0	16.9	0.0	0.0
LnGrp LOS	A	A	A	A	A	A	B	A	A	B	A	A
Approach Vol, veh/h		1232			1043			130			22	
Approach Delay, s/veh		6.8			6.1			18.4			16.9	
Approach LOS		A			A			B			B	

Timer - Assigned Phs	2	4	6	8
Phs Duration (G+Y+Rc), s	34.0	12.1	34.0	12.1
Change Period (Y+Rc), s	* 5.2	* 5.2	* 5.2	* 5.2
Max Green Setting (Gmax), s	* 29	* 21	* 29	* 21
Max Q Clear Time (g_c+I1), s	11.3	5.6	9.8	2.5
Green Ext Time (p_c), s	11.5	0.4	10.8	0.0

Intersection Summary	
HCM 6th Ctrl Delay	7.2
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
50: Etley Ave & Garage

08/26/2019

Intersection	
Int Delay, s/veh	4.5

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	43	159	72	76	19	110
Future Vol, veh/h	43	159	72	76	19	110
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	0	-	-	-	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	47	173	78	83	21	120

Major/Minor	Minor1		Major1		Major2	
Conflicting Flow All	282	120	0	0	161	0
Stage 1	120	-	-	-	-	-
Stage 2	162	-	-	-	-	-
Critical Hdwy	6.42	6.22	-	-	4.12	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	-	-	2.218	-
Pot Cap-1 Maneuver	708	931	-	-	1418	-
Stage 1	905	-	-	-	-	-
Stage 2	867	-	-	-	-	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	697	931	-	-	1418	-
Mov Cap-2 Maneuver	697	-	-	-	-	-
Stage 1	905	-	-	-	-	-
Stage 2	853	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay, s	9.9	0	1.1
HCM LOS	A		

Minor Lane/Major Mvmt	NBT	NBR	WBLn1	WBLn2	SBL	SBT
Capacity (veh/h)	-	-	697	931	1418	-
HCM Lane V/C Ratio	-	-	0.067	0.186	0.015	-
HCM Control Delay (s)	-	-	10.5	9.7	7.6	0
HCM Lane LOS	-	-	B	A	A	A
HCM 95th %tile Q(veh)	-	-	0.2	0.7	0	-