
























HCM Signalized Intersection Capacity Analysis

1: Woodruff Road & Roper Mountain Road

Existing AM























7/6/2011

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (vph)	101	323	178	183	232	31	221	693	137	139	729	78	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1719	3255		1719	3438	1538	1719	3438	1538	3335	3438	1538	
Flt Permitted	0.57	1.00		0.25	1.00	1.00	0.35	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	1033	3255		455	3438	1538	626	3438	1538	3335	3438	1538	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	112	359	198	203	258	34	246	770	152	154	810	87	
RTOR Reduction (vph)	0	73	0	0	0	29	0	0	86	0	0	37	
Lane Group Flow (vph)	112	484	0	203	258	5	246	770	66	154	810	50	
Turn Type	pm+pt			pm+pt			Perm	Perm		Perm	Prot		Perm
Protected Phases	7	4		3	8			2			1	6	
Permitted Phases	4			8		8	2		2				6
Actuated Green, G (s)	26.1	15.6		26.7	15.9	15.9	43.2	43.2	43.2	9.4	57.6	57.6	
Effective Green, g (s)	26.1	15.6		26.7	15.9	15.9	43.2	43.2	43.2	9.4	57.6	57.6	
Actuated g/C Ratio	0.26	0.16		0.27	0.16	0.16	0.43	0.43	0.43	0.09	0.58	0.58	
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	6.0	6.0	6.0	5.0	6.0	6.0	
Vehicle Extension (s)	4.3	5.5		4.3	5.5	5.5	4.9	4.9	4.9	4.3	4.9	4.9	
Lane Grp Cap (vph)	342	508		258	547	245	270	1485	664	313	1980	886	
v/s Ratio Prot	0.03	c0.15		c0.08	0.08			0.22		0.05	c0.24		
v/s Ratio Perm	0.05			0.13		0.00	c0.39		0.04			0.03	
v/c Ratio	0.33	0.95		0.79	0.47	0.02	0.91	0.52	0.10	0.49	0.41	0.06	
Uniform Delay, d1	29.2	41.8		31.1	38.2	35.5	26.6	20.8	16.9	43.0	11.8	9.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.77	0.98	1.32	
Incremental Delay, d2	0.9	28.9		15.8	1.6	0.1	36.0	1.3	0.3	1.7	0.6	0.1	
Delay (s)	30.1	70.7		47.0	39.8	35.6	62.6	22.1	17.1	35.0	12.0	12.3	
Level of Service	C	E		D	D	D	E	C	B	C	B	B	
Approach Delay (s)		63.9			42.5			30.0			15.4		
Approach LOS		E			D			C			B		
Intersection Summary													
HCM Average Control Delay			34.0	HCM Level of Service			C						
HCM Volume to Capacity ratio			0.87										
Actuated Cycle Length (s)			100.0	Sum of lost time (s)			22.0						
Intersection Capacity Utilization			75.5%	ICU Level of Service			D						
Analysis Period (min)			15										
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis

2: Woodruff Road & Costco Driveway

Existing AM
7/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	15	624	21	47	467	24	21	1	45	6	1	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.5	6.5		6.5	6.5	6.5	6.5	6.5		6.5	6.5	6.5
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.85		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	3422		1719	3438	1538	1719	1543		1719	1810	1538
Flt Permitted	0.43	1.00		0.38	1.00	1.00	0.76	1.00		0.72	1.00	1.00
Satd. Flow (perm)	774	3422		687	3438	1538	1370	1543		1310	1810	1538
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	17	693	23	52	519	27	23	1	50	7	1	10
RTOR Reduction (vph)	0	1	0	0	0	8	0	46	0	0	0	9
Lane Group Flow (vph)	17	715	0	52	519	19	23	5	0	7	1	1
Turn Type	pm+pt			Perm		Perm	Perm			Perm		pm+ov
Protected Phases	5	2			6			8			4	5
Permitted Phases	2			6		6	8			4		4
Actuated Green, G (s)	96.9	96.9		85.6	85.6	85.6	10.1	10.1		10.1	10.1	14.9
Effective Green, g (s)	96.9	96.9		85.6	85.6	85.6	10.1	10.1		10.1	10.1	14.9
Actuated g/C Ratio	0.81	0.81		0.71	0.71	0.71	0.08	0.08		0.08	0.08	0.12
Clearance Time (s)	6.5	6.5		6.5	6.5	6.5	6.5	6.5		6.5	6.5	6.5
Vehicle Extension (s)	4.3	5.5		5.5	5.5	5.5	5.5	5.5		5.5	5.5	4.3
Lane Grp Cap (vph)	663	2763		490	2452	1097	115	130		110	152	274
v/s Ratio Prot	0.00	c0.21			0.15			0.00			0.00	0.00
v/s Ratio Perm	0.02			0.08		0.01	c0.02			0.01		0.00
v/c Ratio	0.03	0.26		0.11	0.21	0.02	0.20	0.04		0.06	0.01	0.00
Uniform Delay, d1	2.4	2.8		5.3	5.8	5.0	51.2	50.5		50.6	50.4	46.1
Progression Factor	1.00	1.00		0.11	0.12	0.01	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.0	0.2		0.4	0.2	0.0	2.1	0.3		0.6	0.0	0.0
Delay (s)	2.5	3.0		1.0	0.9	0.1	53.3	50.8		51.2	50.4	46.1
Level of Service	A	A		A	A	A	D	D		D	D	D
Approach Delay (s)		3.0			0.9			51.6			48.3	
Approach LOS		A			A			D			D	

Intersection Summary





















HCM Average Control Delay	5.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	57.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

3: Green Heron Road & Woodruff Road

Existing AM





















7/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	3	1	22	1	1	5	7	492	38	46	726	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.0			5.0	5.0	6.3	6.3		6.3	6.3	6.3
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frt		0.88			1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected		0.99			0.98	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)		1592			1765	1538	1719	3401		1719	3438	1538
Flt Permitted		0.97			0.87	1.00	0.35	1.00		0.43	1.00	1.00
Satd. Flow (perm)		1548			1577	1538	628	3401		778	3438	1538
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	3	1	24	1	1	6	8	547	42	51	807	3
RTOR Reduction (vph)	0	22	0	0	0	6	0	3	0	0	0	0
Lane Group Flow (vph)	0	6	0	0	2	0	8	586	0	51	807	3
Turn Type	Perm			Perm			Perm	Perm		Perm		Perm
Protected Phases		8			4			2			6	
Permitted Phases	8			4		4	2			6		6
Actuated Green, G (s)		7.7			7.7	7.7	101.0	101.0		101.0	101.0	101.0
Effective Green, g (s)		7.7			7.7	7.7	101.0	101.0		101.0	101.0	101.0
Actuated g/C Ratio		0.06			0.06	0.06	0.84	0.84		0.84	0.84	0.84
Clearance Time (s)		5.0			5.0	5.0	6.3	6.3		6.3	6.3	6.3
Vehicle Extension (s)		4.3			4.3	4.3	5.5	5.5		5.5	5.5	5.5
Lane Grp Cap (vph)		99			101	99	529	2863		655	2894	1294
v/s Ratio Prot								0.17			c0.23	
v/s Ratio Perm		c0.00			0.00	0.00	0.01			0.07		0.00
v/c Ratio		0.06			0.02	0.00	0.02	0.20		0.08	0.28	0.00
Uniform Delay, d1		52.7			52.6	52.6	1.5	1.8		1.6	2.0	1.5
Progression Factor		1.00			1.00	1.00	0.98	0.98		0.34	0.43	0.27
Incremental Delay, d2		0.4			0.1	0.0	0.1	0.2		0.2	0.2	0.0
Delay (s)		53.1			52.7	52.6	1.5	1.9		0.8	1.1	0.4
Level of Service		D			D	D	A	A		A	A	A
Approach Delay (s)		53.1			52.6			1.9			1.1	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM Average Control Delay		2.7										
HCM Volume to Capacity ratio		0.26										
Actuated Cycle Length (s)		120.0										
Intersection Capacity Utilization		68.8%										
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

4: Woodruff Industrial Lane & Woodruff Road


















Existing AM
7/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	31	4	49	18	4	2	10	437	68	133	742	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	0.86		1.00	0.95		1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	1557		1719	1719		1719	3368		1719	3418	
Flt Permitted	0.61	1.00		0.72	1.00		0.33	1.00		0.39	1.00	
Satd. Flow (perm)	1110	1557		1301	1719		597	3368		700	3418	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	34	4	54	20	4	2	11	486	76	148	824	33
RTOR Reduction (vph)	0	49	0	0	2	0	0	7	0	0	1	0
Lane Group Flow (vph)	34	9	0	20	4	0	11	555	0	148	856	0
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	3	8		7	4		5	2		1	6	
Permitted Phases	8			4			2			6		
Actuated Green, G (s)	17.7	11.8		13.3	9.6		72.9	71.6		86.5	79.2	
Effective Green, g (s)	17.7	11.8		13.3	9.6		72.9	71.6		86.5	79.2	
Actuated g/C Ratio	0.15	0.10		0.11	0.08		0.61	0.60		0.72	0.66	
Clearance Time (s)	6.0	6.0		6.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	4.3	4.3		4.3	4.3		4.3	5.5		4.3	5.5	
Lane Grp Cap (vph)	194	153		157	138		375	2010		580	2256	
v/s Ratio Prot	c0.01	0.01		0.00	0.00		0.00	0.16		c0.02	c0.25	
v/s Ratio Perm	c0.02			0.01			0.02			0.16		
v/c Ratio	0.18	0.06		0.13	0.03		0.03	0.28		0.26	0.38	
Uniform Delay, d1	44.5	49.1		48.0	50.9		9.3	11.7		5.6	9.3	
Progression Factor	1.00	1.00		1.00	1.00		0.58	0.79		0.30	0.34	
Incremental Delay, d2	0.7	0.3		0.6	0.1		0.0	0.3		0.4	0.5	
Delay (s)	45.2	49.3		48.6	51.0		5.5	9.6		2.0	3.6	
Level of Service	D	D		D	D		A	A		A	A	
Approach Delay (s)		47.8			49.1			9.5			3.4	
Approach LOS		D			D			A			A	
Intersection Summary												
HCM Average Control Delay			8.6			HCM Level of Service				A		
HCM Volume to Capacity ratio			0.34									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				18.0		
Intersection Capacity Utilization			59.9%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: I-85 SB Ramps & Woodruff Road












Existing AM
7/6/2011

											
Movement	WBL2	WBL	WBR	SEL	SET	SER	NWL	NWT	NWR	NEL	NER
Lane Configurations											
Volume (vph)	291	0	203	0	432	72	402	702	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0		5.0		6.3	6.3	6.5	6.1			
Lane Util. Factor	0.97		0.88		0.95	1.00	1.00	0.95			
Frt	1.00		0.85		1.00	0.85	1.00	1.00			
Flt Protected	0.95		1.00		1.00	1.00	0.95	1.00			
Satd. Flow (prot)	3335		2707		3438	1538	1719	3438			
Flt Permitted	0.95		1.00		1.00	1.00	0.42	1.00			
Satd. Flow (perm)	3335		2707		3438	1538	759	3438			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	323	0	226	0	480	80	447	780	0	0	0
RTOR Reduction (vph)	0	0	192	0	0	36	0	0	0	0	0
Lane Group Flow (vph)	323	0	34	0	480	44	447	780	0	0	0
Turn Type	custom		custom		Perm		pm+pt				
Protected Phases					2		1		6		
Permitted Phases	4		4				2		6		
Actuated Green, G (s)	18.3		18.3		66.6		66.6		90.6		90.6
Effective Green, g (s)	18.3		18.3		66.6		66.6		90.6		90.6
Actuated g/C Ratio	0.15		0.15		0.55		0.55		0.75		0.75
Clearance Time (s)	5.0		5.0		6.3		6.3		6.5		6.1
Vehicle Extension (s)	4.3		4.3		4.3		4.3		4.3		4.3
Lane Grp Cap (vph)	509		413		1908		854		711		2596
v/s Ratio Prot					0.14		c0.09		0.23		
v/s Ratio Perm	c0.10		0.01				0.03		c0.38		
v/c Ratio	0.63		0.08		0.25		0.05		0.63		0.30
Uniform Delay, d1	47.7		43.7		13.8		12.2		5.6		4.7
Progression Factor	1.00		1.00		0.46		0.09		0.78		0.22
Incremental Delay, d2	3.1		0.1		0.3		0.1		1.9		0.3
Delay (s)	50.8		43.8		6.7		1.2		6.3		1.3
Level of Service	D		D		A		A		A		A
Approach Delay (s)	47.9				5.9				3.1		0.0
Approach LOS	D				A				A		A
Intersection Summary											
HCM Average Control Delay			14.3		HCM Level of Service				B		
HCM Volume to Capacity ratio			0.62								
Actuated Cycle Length (s)			120.0		Sum of lost time (s)				11.5		
Intersection Capacity Utilization			69.6%		ICU Level of Service				C		
Analysis Period (min)			15								
c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis

6: I-85 NB Ramps & Woodruff Road

Existing AM
7/6/2011





















						
Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	292	524	590	133	0	812
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	5.6	6.5	6.5		6.5
Lane Util. Factor	0.97	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	3335	1538	3438	1538		3438
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3335	1538	3438	1538		3438
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	324	582	656	148	0	902
RTOR Reduction (vph)	0	152	0	98	0	0
Lane Group Flow (vph)	324	430	656	50	0	902
Turn Type	Perm		Perm			
Protected Phases	3		2			2 4
Permitted Phases		3		2		
Actuated Green, G (s)	51.4	51.4	40.5	40.5		56.5
Effective Green, g (s)	51.4	51.4	40.5	40.5		49.5
Actuated g/C Ratio	0.43	0.43	0.34	0.34		0.41
Clearance Time (s)	5.6	5.6	6.5	6.5		
Vehicle Extension (s)	4.3	4.3	4.3	4.3		
Lane Grp Cap (vph)	1428	659	1160	519		1418
v/s Ratio Prot	0.10		0.19			c0.26
v/s Ratio Perm		c0.28		0.03		
v/c Ratio	0.23	0.65	0.57	0.10		0.64
Uniform Delay, d1	21.7	27.2	32.5	27.2		28.1
Progression Factor	1.00	1.00	0.80	1.66		0.36
Incremental Delay, d2	0.1	2.7	1.9	0.4		1.1
Delay (s)	21.8	29.9	28.0	45.4		11.2
Level of Service	C	C	C	D		B
Approach Delay (s)	27.0		31.2			11.2
Approach LOS	C		C			B
Intersection Summary						
HCM Average Control Delay			22.9	HCM Level of Service		C
HCM Volume to Capacity ratio			0.64			
Actuated Cycle Length (s)			120.0	Sum of lost time (s)		18.6
Intersection Capacity Utilization			58.8%	ICU Level of Service		B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

7: Carolina Point Pkwy & Woodruff Road

Existing AM

7/6/2011

























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	61	36	73	0	0	0	0	973	141	105	751	481
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0					6.5	6.5	6.5	6.5	6.5
Lane Util. Factor	1.00	1.00	1.00					0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85					1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00					1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1810	1538					3438	1538	1719	3438	1538
Flt Permitted	0.95	1.00	1.00					1.00	1.00	0.26	1.00	1.00
Satd. Flow (perm)	1719	1810	1538					3438	1538	461	3438	1538
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	68	40	81	0	0	0	0	1081	157	117	834	534
RTOR Reduction (vph)	0	0	75	0	0	0	0	0	28	0	0	96
Lane Group Flow (vph)	68	40	6	0	0	0	0	1081	129	117	834	438
Turn Type	custom		Perm						Perm	Perm		
Protected Phases	4	4						2 3 6			2 3 6	
Permitted Phases	4		4						2 3 6	2 3 6		2 3 6
Actuated Green, G (s)	9.0	9.0	9.0					98.4	98.4	98.4	98.4	98.4
Effective Green, g (s)	9.0	9.0	9.0					98.4	98.4	98.4	98.4	98.4
Actuated g/C Ratio	0.08	0.08	0.08					0.82	0.82	0.82	0.82	0.82
Clearance Time (s)	7.0	7.0	7.0									
Vehicle Extension (s)	4.3	4.3	4.3									
Lane Grp Cap (vph)	129	136	115					2819	1261	378	2819	1261
v/s Ratio Prot	c0.04	0.02						c0.31			0.24	
v/s Ratio Perm			0.00						0.08	0.25		0.28
v/c Ratio	0.53	0.29	0.05					0.38	0.10	0.31	0.30	0.35
Uniform Delay, d1	53.5	52.5	51.5					2.8	2.1	2.6	2.6	2.7
Progression Factor	1.00	1.00	1.00					0.28	0.00	2.02	1.98	9.63
Incremental Delay, d2	5.7	1.9	0.3					0.1	0.0	0.5	0.1	0.2
Delay (s)	59.1	54.4	51.8					0.9	0.0	5.8	5.2	26.4
Level of Service	E	D	D					A	A	A	A	C
Approach Delay (s)		55.0			0.0			0.8			12.8	
Approach LOS		E			A			A			B	
Intersection Summary												
HCM Average Control Delay			10.5			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				13.5		
Intersection Capacity Utilization			56.1%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

8: Woodruff Road & Market Point Drive

Existing AM

7/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	61	954	31	21	1292	54	16	1	30	24	1	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	5.8	6.1	6.1	5.8	5.8	5.8	6.1	5.8	5.8	5.8
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	0.97	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3335	3438	1538	1719	3438	1538	1719	1810	1538	3335	3438	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3335	3438	1538	1719	3438	1538	1719	1810	1538	3335	3438	1538
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	68	1060	34	23	1436	60	18	1	33	27	1	32
RTOR Reduction (vph)	0	0	17	0	0	18	0	0	23	0	0	30
Lane Group Flow (vph)	68	1060	17	23	1436	42	18	1	10	27	1	2
Turn Type	Prot	pm+ov		Prot	pm+ov		Prot	pm+ov		Prot	Perm	
Protected Phases	5	2	3	1	6	7	3	8	1	7	4	
Permitted Phases			2			6			8			4
Actuated Green, G (s)	8.0	51.4	59.1	30.3	73.7	81.1	7.7	7.1	37.4	7.4	6.8	6.8
Effective Green, g (s)	8.0	51.4	59.1	30.3	73.7	81.1	7.7	7.1	37.4	7.4	6.8	6.8
Actuated g/C Ratio	0.07	0.43	0.49	0.25	0.61	0.68	0.06	0.06	0.31	0.06	0.06	0.06
Clearance Time (s)	6.1	6.1	5.8	6.1	6.1	5.8	5.8	5.8	6.1	5.8	5.8	5.8
Vehicle Extension (s)	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Lane Grp Cap (vph)	222	1473	757	434	2112	1039	110	107	479	206	195	87
v/s Ratio Prot	0.02	c0.31	0.00	0.01	c0.42	0.00	c0.01	0.00	c0.01	0.01	0.00	
v/s Ratio Perm			0.01			0.03			0.00			0.00
v/c Ratio	0.31	0.72	0.02	0.05	0.68	0.04	0.16	0.01	0.02	0.13	0.01	0.02
Uniform Delay, d1	53.4	28.3	15.6	34.0	15.3	6.5	53.1	53.1	28.6	53.3	53.4	53.5
Progression Factor	0.82	0.79	1.16	0.74	0.58	0.77	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	2.9	0.0	0.0	0.9	0.0	1.1	0.1	0.0	0.5	0.0	0.2
Delay (s)	45.0	25.3	18.1	25.1	9.8	5.0	54.2	53.2	28.6	53.7	53.4	53.6
Level of Service	D	C	B	C	A	A	D	D	C	D	D	D
Approach Delay (s)		26.3			9.9			38.0			53.7	
Approach LOS		C			A			D			D	

Intersection Summary






















HCM Average Control Delay	18.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.9
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

9: Woodruff Road & Garlington Road

Existing AM

7/6/2011


















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	197	707	104	92	890	416	226	217	59	125	100	251
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.2	6.1		5.2	6.1		5.2	5.2		5.2	5.2	5.2
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.98		1.00	0.95		1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	3372		1719	3274		1719	1751		1719	1810	1538
Flt Permitted	0.07	1.00		0.24	1.00		0.61	1.00		0.19	1.00	1.00
Satd. Flow (perm)	126	3372		434	3274		1111	1751		353	1810	1538
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	219	786	116	102	989	462	251	241	66	139	111	279
RTOR Reduction (vph)	0	9	0	0	46	0	0	8	0	0	0	180
Lane Group Flow (vph)	219	893	0	102	1405	0	251	299	0	139	111	99
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	69.5	57.6		63.3	54.5		32.9	22.1		30.9	21.1	21.1
Effective Green, g (s)	69.5	57.6		63.3	54.5		32.9	22.1		30.9	21.1	21.1
Actuated g/C Ratio	0.58	0.48		0.53	0.45		0.27	0.18		0.26	0.18	0.18
Clearance Time (s)	5.2	6.1		5.2	6.1		5.2	5.2		5.2	5.2	5.2
Vehicle Extension (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	4.3
Lane Grp Cap (vph)	231	1619		323	1487		359	322		202	318	270
v/s Ratio Prot	c0.09	0.26		0.02	0.43		c0.06	c0.17		0.06	0.06	
v/s Ratio Perm	c0.46			0.14			0.13			0.12		0.06
v/c Ratio	0.95	0.55		0.32	0.94		0.70	0.93		0.69	0.35	0.37
Uniform Delay, d1	36.5	22.1		15.1	31.3		37.8	48.2		36.9	43.4	43.6
Progression Factor	2.23	0.08		0.60	0.70		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	41.7	1.2		0.7	11.1		6.6	32.4		10.6	1.1	1.3
Delay (s)	123.2	3.1		9.8	33.1		44.4	80.5		47.5	44.5	44.9
Level of Service	F	A		A	C		D	F		D	D	D
Approach Delay (s)		26.5			31.5			64.3			45.5	
Approach LOS		C			C			E			D	
Intersection Summary												
HCM Average Control Delay			36.9			HCM Level of Service				D		
HCM Volume to Capacity ratio			0.89									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			15.6			
Intersection Capacity Utilization			88.8%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Woodruff Road & I-385 SB Ramps

Existing AM

7/6/2011





















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	758	133	57	955	0	0	0	0	744	0	443
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.6		6.6	6.6					5.7		5.7
Lane Util. Factor		0.95		1.00	0.95					0.97		1.00
Frt		0.98		1.00	1.00					1.00		0.85
Flt Protected		1.00		0.95	1.00					0.95		1.00
Satd. Flow (prot)		3361		1719	3438					3335		1538
Flt Permitted		1.00		0.15	1.00					0.95		1.00
Satd. Flow (perm)		3361		275	3438					3335		1538
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	842	148	63	1061	0	0	0	0	827	0	492
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	0	0	0	40
Lane Group Flow (vph)	0	979	0	63	1061	0	0	0	0	827	0	452
Turn Type				pm+pt						Prot		custom
Protected Phases		2		1	6					4		
Permitted Phases				6								4
Actuated Green, G (s)		51.8		64.9	64.9					42.8		42.8
Effective Green, g (s)		51.8		64.9	64.9					42.8		42.8
Actuated g/C Ratio		0.43		0.54	0.54					0.36		0.36
Clearance Time (s)		6.6		6.6	6.6					5.7		5.7
Vehicle Extension (s)		4.3		4.3	4.3					4.3		4.3
Lane Grp Cap (vph)		1451		227	1859					1189		549
v/s Ratio Prot		c0.29		0.02	c0.31					0.25		
v/s Ratio Perm				0.14								c0.29
v/c Ratio		0.67		0.28	0.57					0.70		0.82
Uniform Delay, d1		27.3		16.8	18.3					33.0		35.2
Progression Factor		0.47		0.25	0.36					1.01		1.01
Incremental Delay, d2		2.0		0.6	0.7					2.0		10.4
Delay (s)		14.9		4.8	7.3					35.5		46.1
Level of Service		B		A	A					D		D
Approach Delay (s)		14.9			7.2			0.0			39.4	
Approach LOS		B			A			A			D	
Intersection Summary												
HCM Average Control Delay			21.8			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				18.9		
Intersection Capacity Utilization			103.8%			ICU Level of Service				G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: Woodruff Road & I-385 NB Ramps

Existing AM

7/6/2011





















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			 							
Volume (vph)	541	961	0	0	544	542	468	0	227	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1			6.1	6.1	5.0		5.0			
Lane Util. Factor	1.00	0.95			0.95	1.00	1.00		1.00			
Frt	1.00	1.00			1.00	0.85	1.00		0.85			
Flt Protected	0.95	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (prot)	1719	3438			3438	1538	1719		1538			
Flt Permitted	0.20	1.00			1.00	1.00	0.95		1.00			
Satd. Flow (perm)	370	3438			3438	1538	1719		1538			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	601	1068	0	0	604	602	520	0	252	0	0	0
RTOR Reduction (vph)	0	0	0	0	0	447	0	0	68	0	0	0
Lane Group Flow (vph)	601	1068	0	0	604	155	520	0	184	0	0	0
Turn Type	pm+pt				Perm		Prot	custom				
Protected Phases	5	2			6		8					
Permitted Phases	2					6			8			
Actuated Green, G (s)	71.2	71.2			30.9	30.9	37.7		37.7			
Effective Green, g (s)	71.2	71.2			30.9	30.9	37.7		37.7			
Actuated g/C Ratio	0.59	0.59			0.26	0.26	0.31		0.31			
Clearance Time (s)	6.1	6.1			6.1	6.1	5.0		5.0			
Vehicle Extension (s)	4.3	4.3			4.3	4.3	4.3		4.3			
Lane Grp Cap (vph)	604	2040			885	396	540		483			
v/s Ratio Prot	c0.28	0.31			0.18		c0.30					
v/s Ratio Perm	c0.31					0.10			0.12			
v/c Ratio	1.00	0.52			0.68	0.39	0.96		0.38			
Uniform Delay, d1	28.6	14.4			40.1	36.8	40.5		32.1			
Progression Factor	0.97	0.59			0.82	1.58	1.00		1.00			
Incremental Delay, d2	30.7	0.7			3.7	2.5	29.6		0.8			
Delay (s)	58.5	9.2			36.5	60.6	70.1		32.9			
Level of Service	E	A			D	E	E		C			
Approach Delay (s)		27.0			48.6			57.9			0.0	
Approach LOS		C			D			E			A	
Intersection Summary												
HCM Average Control Delay			40.7				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			11.1		
Intersection Capacity Utilization			103.8%				ICU Level of Service			G		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

12: Woodruff Road & Commercial Drive

Existing AM

7/6/2011



















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	104	1001	83	19	955	39	76	4	6	70	18	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.5		5.5	5.5		5.3	5.4		5.4	5.4	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.90		1.00	0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3399		1719	3418		1719	1637		1719	1605	
Flt Permitted	0.17	1.00		0.23	1.00		0.50	1.00		0.75	1.00	
Satd. Flow (perm)	313	3399		420	3418		909	1637		1358	1605	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	116	1112	92	21	1061	43	84	4	7	78	20	61
RTOR Reduction (vph)	0	4	0	0	2	0	0	5	0	0	54	0
Lane Group Flow (vph)	116	1200	0	21	1102	0	84	6	0	78	27	0
Turn Type	pm+pt			Perm			pm+pt			Perm		
Protected Phases	5	2			6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	82.8	82.8		68.5	68.5		26.3	26.3		13.2	13.2	
Effective Green, g (s)	82.8	82.8		68.5	68.5		26.3	26.3		13.2	13.2	
Actuated g/C Ratio	0.69	0.69		0.57	0.57		0.22	0.22		0.11	0.11	
Clearance Time (s)	5.3	5.5		5.5	5.5		5.3	5.4		5.4	5.4	
Vehicle Extension (s)	4.3	4.3		4.3	4.3		4.3	4.3		4.3	4.3	
Lane Grp Cap (vph)	321	2345		240	1951		252	359		149	177	
v/s Ratio Prot	0.03	c0.35			c0.32		c0.02	0.00			0.02	
v/s Ratio Perm	0.22			0.05			0.05			c0.06		
v/c Ratio	0.36	0.51		0.09	0.56		0.33	0.02		0.52	0.15	
Uniform Delay, d1	9.5	8.9		11.6	16.3		38.6	36.7		50.4	48.3	
Progression Factor	0.57	0.37		0.35	0.36		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.7		0.7	1.1		1.2	0.0		4.8	0.6	
Delay (s)	6.3	4.0		4.8	7.0		39.8	36.7		55.3	49.0	
Level of Service	A	A		A	A		D	D		E	D	
Approach Delay (s)		4.2			7.0			39.5			52.1	
Approach LOS		A			A			D			D	
Intersection Summary												
HCM Average Control Delay			9.4			HCM Level of Service				A		
HCM Volume to Capacity ratio			0.56									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			21.7			
Intersection Capacity Utilization			68.2%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

13: Woodruff Road & Smith Hines Road

Existing AM




















7/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	925	147	111	945	1	66	1	93	1	1	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.0	6.0			5.0			5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.98		1.00	1.00			0.92			0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1719	3368		1719	3438			1634			1667	
Flt Permitted	0.25	1.00		0.21	1.00			0.86			0.96	
Satd. Flow (perm)	458	3368		387	3438			1441			1618	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	1028	163	123	1050	1	73	1	103	1	1	2
RTOR Reduction (vph)	0	8	0	0	0	0	0	45	0	0	2	0
Lane Group Flow (vph)	6	1183	0	123	1051	0	0	132	0	0	2	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	2			6			8			4		
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	91.6	91.6		91.9	91.9			17.1			17.1	
Effective Green, g (s)	91.6	91.6		91.9	91.9			17.1			17.1	
Actuated g/C Ratio	0.76	0.76		0.77	0.77			0.14			0.14	
Clearance Time (s)	6.3	6.3		6.0	6.0			5.0			5.0	
Vehicle Extension (s)	4.3	4.3		4.3	4.3			4.3			4.3	
Lane Grp Cap (vph)	350	2571		296	2633			205			231	
v/s Ratio Prot	c0.35			0.31								
v/s Ratio Perm	0.01			0.32				c0.09			0.00	
v/c Ratio	0.02	0.46		0.42	0.40			0.64			0.01	
Uniform Delay, d1	3.4	5.2		4.8	4.7			48.6			44.2	
Progression Factor	0.12	0.11		0.29	0.31			1.00			1.00	
Incremental Delay, d2	0.1	0.5		0.4	0.0			7.9			0.0	
Delay (s)	0.5	1.1		1.8	1.5			56.5			44.2	
Level of Service	A	A		A	A			E			D	
Approach Delay (s)	1.1			1.5			56.5			44.2		
Approach LOS	A			A			E			D		
Intersection Summary												
HCM Average Control Delay			5.2		HCM Level of Service				A			
HCM Volume to Capacity ratio			0.49									
Actuated Cycle Length (s)			120.0		Sum of lost time (s)				11.3			
Intersection Capacity Utilization			85.4%		ICU Level of Service				E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

14: Woodruff Road & Walmart Driveway

Existing AM
7/6/2011























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	1393	122	12	2907	74	44	2	22	75	1	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		5.0	5.0			5.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.86			0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.96	
Satd. Flow (prot)	1719	3396		1719	3425		1719	1559			1711	
Flt Permitted	0.04	1.00		0.13	1.00		0.77	1.00			0.73	
Satd. Flow (perm)	80	3396		234	3425		1393	1559			1302	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	22	1548	136	13	3230	82	49	2	24	83	1	8
RTOR Reduction (vph)	0	4	0	0	1	0	0	21	0	0	4	0
Lane Group Flow (vph)	22	1680	0	13	3311	0	49	5	0	0	88	0
Turn Type	pm+pt			Perm			Perm			Perm		
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	94.1	94.1		83.8	83.8		14.6	14.6			14.6	
Effective Green, g (s)	94.1	94.1		83.8	83.8		14.6	14.6			14.6	
Actuated g/C Ratio	0.78	0.78		0.70	0.70		0.12	0.12			0.12	
Clearance Time (s)	6.3	6.3		6.3	6.3		5.0	5.0			5.0	
Vehicle Extension (s)	4.3	4.3		4.3	4.3		4.3	4.3			4.3	
Lane Grp Cap (vph)	117	2663		163	2392		169	190			158	
v/s Ratio Prot	0.01	c0.49			c0.97			0.00				
v/s Ratio Perm	0.14			0.06			0.04				c0.07	
v/c Ratio	0.19	0.63		0.08	1.38		0.29	0.03			0.56	
Uniform Delay, d1	34.1	5.5		5.8	18.1		48.0	46.4			49.7	
Progression Factor	1.45	1.16		0.55	0.57		1.00	1.00			1.00	
Incremental Delay, d2	1.2	1.1		0.5	174.4		1.5	0.1			6.0	
Delay (s)	50.7	7.5		3.7	184.8		49.5	46.5			55.7	
Level of Service	D	A		A	F		D	D			E	
Approach Delay (s)		8.1			184.1			48.5			55.7	
Approach LOS		A			F			D			E	
Intersection Summary												
HCM Average Control Delay			122.1			HCM Level of Service				F		
HCM Volume to Capacity ratio			1.26									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			17.6			
Intersection Capacity Utilization			103.4%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

15: Woodruff Road & Verdin Road

Existing AM




















7/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	36	667	18	84	1861	48	301	221	24	42	179	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3		6.3	6.3		5.2	5.0	5.0	5.2	5.2	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3425		1719	3425		1719	1810	1538	1719	1739	
Flt Permitted	0.06	1.00		0.32	1.00		0.18	1.00	1.00	0.61	1.00	
Satd. Flow (perm)	106	3425		576	3425		325	1810	1538	1097	1739	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	40	741	20	93	2068	53	334	246	27	47	199	70
RTOR Reduction (vph)	0	2	0	0	1	0	0	0	18	0	10	0
Lane Group Flow (vph)	40	759	0	93	2120	0	334	246	9	47	259	0
Turn Type	Perm			Perm			pm+pt			Perm	Perm	
Protected Phases	2			6			3		8		4	
Permitted Phases	2			6			8		8		4	
Actuated Green, G (s)	68.6	68.6		68.6	68.6		40.1	40.1	40.1	16.9	16.9	
Effective Green, g (s)	68.6	68.6		68.6	68.6		40.1	40.1	40.1	16.9	16.9	
Actuated g/C Ratio	0.57	0.57		0.57	0.57		0.33	0.33	0.33	0.14	0.14	
Clearance Time (s)	6.3	6.3		6.3	6.3		5.2	5.0	5.0	5.2	5.2	
Vehicle Extension (s)	4.3	4.3		4.3	4.3		4.3	4.3	4.3	4.3	4.3	
Lane Grp Cap (vph)	61	1958		329	1958		315	605	514	154	245	
v/s Ratio Prot		0.22			c0.62		c0.16	0.14			0.15	
v/s Ratio Perm	0.38			0.16			c0.20		0.01	0.04		
v/c Ratio	0.66	0.39		0.28	1.08		1.06	0.41	0.02	0.31	1.06	
Uniform Delay, d1	17.6	14.1		13.1	25.7		34.3	30.8	26.8	46.3	51.5	
Progression Factor	0.84	0.94		0.91	0.85		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	36.3	0.5		1.5	44.3		67.5	0.7	0.0	1.8	73.0	
Delay (s)	51.1	13.7		13.5	66.2		101.9	31.5	26.8	48.1	124.5	
Level of Service	D	B		B	E		F	C	C	D	F	
Approach Delay (s)		15.6			64.0			70.0			113.2	
Approach LOS		B			E			E			F	
Intersection Summary												
HCM Average Control Delay			59.0			HCM Level of Service			E			
HCM Volume to Capacity ratio			1.05									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			11.5			
Intersection Capacity Utilization			113.5%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

16: Woodruff Road & Butler Road

Existing AM
7/6/2011



















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	633	46	477	1693	1	145	25	349	20	26	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.3		6.3	6.3			5.0	6.3	5.0	5.0	
Lane Util. Factor		0.95		1.00	0.95			1.00	1.00	1.00	1.00	
Frt		0.99		1.00	1.00			1.00	0.85	1.00	0.97	
Flt Protected		1.00		0.95	1.00			0.96	1.00	0.95	1.00	
Satd. Flow (prot)		3402		1719	3438			1736	1538	1719	1751	
Flt Permitted		0.94		0.25	1.00			0.73	1.00	0.45	1.00	
Satd. Flow (perm)		3203		445	3438			1324	1538	814	1751	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	4	703	51	530	1881	1	161	28	388	22	29	8
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	52	0	7	0
Lane Group Flow (vph)	0	754	0	530	1882	0	0	189	336	22	30	0
Turn Type	Perm			pm+pt			Perm		pm+ov		Perm	
Protected Phases		2		1	6			8	1		4	
Permitted Phases	2			6			8		8	4		
Actuated Green, G (s)		52.7		86.7	86.7			22.0	49.7	22.0	22.0	
Effective Green, g (s)		52.7		86.7	86.7			22.0	49.7	22.0	22.0	
Actuated g/C Ratio		0.44		0.72	0.72			0.18	0.41	0.18	0.18	
Clearance Time (s)		6.3		6.3	6.3			5.0	6.3	5.0	5.0	
Vehicle Extension (s)		4.3		4.3	4.3			4.3	4.3	4.3	4.3	
Lane Grp Cap (vph)		1407		616	2484			243	637	149	321	
v/s Ratio Prot				c0.20	0.55				0.12		0.02	
v/s Ratio Perm		0.24		c0.42				c0.14	0.10	0.03		
v/c Ratio		0.54		0.86	0.76			0.78	0.53	0.15	0.09	
Uniform Delay, d1		24.7		16.9	10.2			46.7	26.3	41.1	40.7	
Progression Factor		0.75		1.50	0.81			1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.4		3.3	0.5			15.7	1.2	0.7	0.2	
Delay (s)		19.8		28.6	8.8			62.4	27.5	41.9	40.9	
Level of Service		B		C	A			E	C	D	D	
Approach Delay (s)		19.8			13.1			38.9			41.3	
Approach LOS		B			B			D			D	
Intersection Summary												
HCM Average Control Delay			18.8			HCM Level of Service				B		
HCM Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			11.3			
Intersection Capacity Utilization			102.5%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

17: Woodruff Road & Bell Road

Existing AM

7/6/2011
























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	988	80	25	2390	15	124	1	30	12	1	53
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.2	6.2		6.2	6.2			5.4			5.4	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.97			0.89	
Flt Protected	0.95	1.00		0.95	1.00			0.96			0.99	
Satd. Flow (prot)	1719	3399		1719	3435			1695			1598	
Flt Permitted	0.04	1.00		0.22	1.00			0.72			0.95	
Satd. Flow (perm)	78	3399		391	3435			1278			1530	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	24	1098	89	28	2656	17	138	1	33	13	1	59
RTOR Reduction (vph)	0	5	0	0	0	0	0	7	0	0	8	0
Lane Group Flow (vph)	24	1182	0	28	2673	0	0	165	0	0	65	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	2			6			8			4		
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	92.4	92.4		92.4	92.4			16.0			16.0	
Effective Green, g (s)	92.4	92.4		92.4	92.4			16.0			16.0	
Actuated g/C Ratio	0.77	0.77		0.77	0.77			0.13			0.13	
Clearance Time (s)	6.2	6.2		6.2	6.2			5.4			5.4	
Vehicle Extension (s)	4.3	4.3		4.3	4.3			4.3			4.3	
Lane Grp Cap (vph)	60	2617		301	2645			170			204	
v/s Ratio Prot	0.35			c0.78								
v/s Ratio Perm	0.31			0.07				c0.13			0.04	
v/c Ratio	0.40	0.45		0.09	1.01			0.97			0.32	
Uniform Delay, d1	4.6	4.9		3.4	13.8			51.8			47.1	
Progression Factor	1.72	0.92		0.75	0.55			1.00			1.00	
Incremental Delay, d2	16.9	0.5		0.3	15.4			60.5			1.4	
Delay (s)	24.8	5.0		2.9	23.0			112.3			48.5	
Level of Service	C	A		A	C			F			D	
Approach Delay (s)	5.4			22.8				112.3			48.5	
Approach LOS	A			C				F			D	
Intersection Summary												
HCM Average Control Delay			21.9		HCM Level of Service			C				
HCM Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			120.0		Sum of lost time (s)			11.6				
Intersection Capacity Utilization			91.6%		ICU Level of Service			F				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

18: Woodruff Road & SC 14

Existing AM

7/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	535	82	45	1321	178	330	343	118	118	205	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3	5.0	6.3	6.3		5.0	5.0	6.3	5.0	5.0	6.3
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3377		1719	1810	1538	1719	1810	1538
Flt Permitted	0.07	1.00	1.00	0.38	1.00		0.20	1.00	1.00	0.27	1.00	1.00
Satd. Flow (perm)	127	3438	1538	694	3377		362	1810	1538	483	1810	1538
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	150	594	91	50	1468	198	367	381	131	131	228	317
RTOR Reduction (vph)	0	0	34	0	9	0	0	0	89	0	0	21
Lane Group Flow (vph)	150	594	57	50	1657	0	367	381	42	131	228	296
Turn Type	pm+pt		pm+ov	pm+pt			pm+pt		pm+ov	pm+pt		pm+ov
Protected Phases	5	2	3	1	6		3	8	1	7	4	5
Permitted Phases	2		2	6			8		8	4		4
Actuated Green, G (s)	65.6	56.9	74.9	63.2	55.7		38.0	23.1	30.6	24.9	15.0	23.7
Effective Green, g (s)	65.6	56.9	74.9	63.2	55.7		38.0	23.1	30.6	24.9	15.0	23.7
Actuated g/C Ratio	0.55	0.47	0.62	0.53	0.46		0.32	0.19	0.26	0.21	0.12	0.20
Clearance Time (s)	6.3	6.3	5.0	6.3	6.3		5.0	5.0	6.3	5.0	5.0	6.3
Vehicle Extension (s)	4.3	4.3	4.3	4.3	4.3		4.3	4.3	4.3	4.3	4.3	4.3
Lane Grp Cap (vph)	185	1630	960	430	1567		318	348	392	202	226	304
v/s Ratio Prot	0.06	0.17	0.01	0.01	c0.49		c0.17	0.21	0.01	0.05	0.13	c0.07
v/s Ratio Perm	0.38		0.03	0.05			c0.19		0.02	0.08		0.12
v/c Ratio	0.81	0.36	0.06	0.12	1.06		1.15	1.09	0.11	0.65	1.01	0.97
Uniform Delay, d1	30.5	20.1	8.8	14.0	32.1		36.0	48.5	34.2	41.3	52.5	47.8
Progression Factor	1.45	0.65	0.56	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	22.5	0.6	0.0	0.2	39.7		99.0	76.1	0.2	8.2	62.2	44.5
Delay (s)	66.7	13.6	5.0	14.2	71.9		135.1	124.6	34.4	49.6	114.7	92.3
Level of Service	E	B	A	B	E		F	F	C	D	F	F
Approach Delay (s)		22.2			70.2			115.5			91.6	
Approach LOS		C			E			F			F	

Intersection Summary
























HCM Average Control Delay	73.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	17.6
Intersection Capacity Utilization	97.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

19: E Parkins Mill Road & US 276

Existing AM

7/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	96	91	45	124	21	94	89	1302	68	77	1138	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0	6.0	4.0	7.0	7.0	4.0	7.0	7.0
Lane Util. Factor	1.00	0.95		0.97	1.00	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3267		3335	1810	1538	1719	4940	1538	3335	4940	1538
Flt Permitted	0.74	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1343	3267		3335	1810	1538	1719	4940	1538	3335	4940	1538
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	107	101	50	138	23	104	99	1447	76	86	1264	90
RTOR Reduction (vph)	0	44	0	0	0	90	0	0	39	0	0	43
Lane Group Flow (vph)	107	107	0	138	23	14	99	1447	37	86	1264	47
Turn Type	pm+pt			Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	3	8		7	4		1	6		5	2	
Permitted Phases	8					4			6			2
Actuated Green, G (s)	20.4	11.4		10.7	13.1	13.1	11.3	47.8	47.8	8.5	45.0	45.0
Effective Green, g (s)	20.4	11.4		10.7	13.1	13.1	11.3	47.8	47.8	8.5	45.0	45.0
Actuated g/C Ratio	0.21	0.11		0.11	0.13	0.13	0.11	0.48	0.48	0.09	0.45	0.45
Clearance Time (s)	4.0	6.0		4.0	6.0	6.0	4.0	7.0	7.0	4.0	7.0	7.0
Vehicle Extension (s)	4.3	4.9		4.3	4.9	4.9	4.3	4.9	4.9	4.3	4.9	4.9
Lane Grp Cap (vph)	310	375		359	239	203	195	2376	740	285	2236	696
v/s Ratio Prot	0.03	0.03		c0.04	0.01		c0.06	c0.29		0.03	0.26	
v/s Ratio Perm	c0.04					0.01			0.02			0.03
v/c Ratio	0.35	0.28		0.38	0.10	0.07	0.51	0.61	0.05	0.30	0.57	0.07
Uniform Delay, d1	33.5	40.3		41.3	37.9	37.8	41.4	18.9	13.7	42.7	20.0	15.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	0.8		1.1	0.4	0.3	3.3	0.6	0.1	0.9	0.5	0.1
Delay (s)	34.5	41.1		42.4	38.3	38.1	44.7	19.6	13.8	43.6	20.5	15.4
Level of Service	C	D		D	D	D	D	B	B	D	C	B
Approach Delay (s)		38.4			40.3			20.8			21.6	
Approach LOS		D			D			C			C	
Intersection Summary												
HCM Average Control Delay			23.8			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			99.4			Sum of lost time (s)			19.0			
Intersection Capacity Utilization			55.5%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

20: Duvall Drive & US 276

Existing AM
7/6/2011


























Movement	EBL	EBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	318	88	1099	208	95	1141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.3		6.3	6.3
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frt	1.00	0.85	0.98		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1719	1538	4822		1719	4940
Flt Permitted	0.95	1.00	1.00		0.15	1.00
Satd. Flow (perm)	1719	1538	4822		265	4940
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	353	98	1221	231	106	1268
RTOR Reduction (vph)	0	50	43	0	0	0
Lane Group Flow (vph)	353	48	1409	0	106	1268
Turn Type	Perm			Perm		
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	15.0	15.0	36.4		36.4	36.4
Effective Green, g (s)	15.0	15.0	36.4		36.4	36.4
Actuated g/C Ratio	0.24	0.24	0.57		0.57	0.57
Clearance Time (s)	6.0	6.0	6.3		6.3	6.3
Vehicle Extension (s)	4.9	4.9	4.9		4.9	4.9
Lane Grp Cap (vph)	405	362	2755		151	2823
v/s Ratio Prot	c0.21		0.29			0.26
v/s Ratio Perm		0.03			c0.40	
v/c Ratio	0.87	0.13	0.51		0.70	0.45
Uniform Delay, d1	23.4	19.2	8.3		9.8	7.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	19.4	0.3	0.3		16.7	0.2
Delay (s)	42.8	19.5	8.6		26.5	8.1
Level of Service	D	B	A		C	A
Approach Delay (s)	37.8		8.6			9.5
Approach LOS	D		A			A
Intersection Summary						
HCM Average Control Delay			13.0		HCM Level of Service	B
HCM Volume to Capacity ratio			0.75			
Actuated Cycle Length (s)			63.7		Sum of lost time (s)	12.3
Intersection Capacity Utilization			72.3%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

23: US 276 & Millennium Blvd

Existing AM
7/6/2011

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	93	1104	192	22	1542	52	65	68	56	4	13	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.5	6.5	4.5	6.5	6.5	6.0	6.0		6.0	6.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	0.97	0.95		1.00	1.00	0.88
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1538	1719	3438	1538	3335	3206		1719	1810	2707
Flt Permitted	0.06	1.00	1.00	0.19	1.00	1.00	0.95	1.00		0.66	1.00	1.00
Satd. Flow (perm)	112	3438	1538	347	3438	1538	3335	3206		1202	1810	2707
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	103	1227	213	24	1713	58	72	76	62	4	14	39
RTOR Reduction (vph)	0	0	72	0	0	22	0	54	0	0	0	33
Lane Group Flow (vph)	103	1227	141	24	1713	36	72	84	0	4	14	6
Turn Type	pm+pt		Perm	pm+pt		Perm	Prot			pm+pt		pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	2		2	6		6				4		4
Actuated Green, G (s)	95.7	87.5	87.5	85.8	82.1	82.1	8.5	16.7		10.8	9.5	19.1
Effective Green, g (s)	95.7	87.5	87.5	85.8	82.1	82.1	8.5	16.7		10.8	9.5	19.1
Actuated g/C Ratio	0.72	0.66	0.66	0.65	0.62	0.62	0.06	0.13		0.08	0.07	0.14
Clearance Time (s)	4.0	6.5	6.5	4.5	6.5	6.5	6.0	6.0		6.0	6.0	4.0
Vehicle Extension (s)	4.3	4.9	4.9	4.3	4.9	4.9	4.3	6.4		4.3	6.4	4.3
Lane Grp Cap (vph)	198	2276	1018	264	2135	955	214	405		103	130	391
v/s Ratio Prot	c0.04	0.36		0.00	c0.50		c0.02	c0.03		0.00	0.01	0.00
v/s Ratio Perm	0.34		0.09	0.06		0.02				0.00		0.00
v/c Ratio	0.52	0.54	0.14	0.09	0.80	0.04	0.34	0.21		0.04	0.11	0.01
Uniform Delay, d1	19.9	11.7	8.3	8.9	18.9	9.7	59.2	51.8		55.9	57.4	48.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.6	0.4	0.1	0.2	2.6	0.0	1.5	0.8		0.2	1.1	0.0
Delay (s)	23.6	12.2	8.4	9.2	21.5	9.8	60.6	52.6		56.1	58.5	48.5
Level of Service	C	B	A	A	C	A	E	D		E	E	D
Approach Delay (s)		12.4			21.0			55.4			51.5	
Approach LOS		B			C			E			D	





















Intersection Summary

HCM Average Control Delay	19.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	132.2	Sum of lost time (s)	16.5
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

24: Pelham Road & The Parkway

Existing AM
7/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	224	846	880	0	1509	700	0	0	0	250	454	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	5.8	5.8		5.8	5.3				5.3	5.3	5.3
Lane Util. Factor	0.97	0.95	1.00		0.95	1.00				1.00	1.00	1.00
Frt	1.00	1.00	0.85		1.00	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	3335	3438	1538		3438	1538				1719	1810	1538
Flt Permitted	0.95	1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)	3335	3438	1538		3438	1538				1719	1810	1538
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	249	940	978	0	1677	778	0	0	0	278	504	194
RTOR Reduction (vph)	0	0	40	0	0	4	0	0	0	0	0	116
Lane Group Flow (vph)	249	940	938	0	1677	774	0	0	0	278	504	78
Turn Type	Prot		Perm	Perm		custom				Perm		Perm
Protected Phases	5	2			6	4					4	
Permitted Phases			2	6		6				4		4
Actuated Green, G (s)	10.2	78.1	78.1		62.1	97.9				35.8	35.8	35.8
Effective Green, g (s)	10.2	78.1	78.1		62.1	97.9				35.8	35.8	35.8
Actuated g/C Ratio	0.08	0.62	0.62		0.50	0.78				0.29	0.29	0.29
Clearance Time (s)	5.8	5.8	5.8		5.8	5.3				5.3	5.3	5.3
Vehicle Extension (s)	4.3	4.3	4.3		4.3	4.3				4.3	4.3	4.3
Lane Grp Cap (vph)	272	2148	961		1708	1205				492	518	440
v/s Ratio Prot	0.07	0.27			0.49	0.18					c0.28	
v/s Ratio Perm			c0.61			0.32				0.16		0.05
v/c Ratio	0.92	0.44	0.98		0.98	0.64				0.57	0.97	0.18
Uniform Delay, d1	57.0	12.1	22.6		30.9	5.9				38.0	44.1	33.5
Progression Factor	1.00	1.00	1.00		0.80	0.86				1.00	1.00	1.00
Incremental Delay, d2	33.6	0.7	23.8		11.2	0.7				2.0	32.6	0.3
Delay (s)	90.6	12.8	46.4		35.8	5.7				40.0	76.8	33.8
Level of Service	F	B	D		D	A				D	E	C
Approach Delay (s)		36.9			26.3			0.0			57.8	
Approach LOS		D			C			A			E	
Intersection Summary												
HCM Average Control Delay			35.9				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			125.0				Sum of lost time (s)			11.1		
Intersection Capacity Utilization			134.2%				ICU Level of Service			H		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

25: Pelham Road & I-85 SB off ramp

Existing AM
7/6/2011









Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑		↑	↑↑
Volume (vph)	0	1096	1144	0	562	1065
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6	5.6		5.3	5.3
Lane Util. Factor		0.95	0.95		1.00	0.88
Frt		1.00	1.00		1.00	0.85
Flt Protected		1.00	1.00		0.95	1.00
Satd. Flow (prot)		3438	3438		1719	2707
Flt Permitted		1.00	1.00		0.95	1.00
Satd. Flow (perm)		3438	3438		1719	2707
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1218	1271	0	624	1183
RTOR Reduction (vph)	0	0	0	0	0	19
Lane Group Flow (vph)	0	1218	1271	0	624	1164
Turn Type					Perm	
Protected Phases		2	6		4	
Permitted Phases						4
Actuated Green, G (s)		54.9	54.9		59.2	59.2
Effective Green, g (s)		54.9	54.9		59.2	59.2
Actuated g/C Ratio		0.44	0.44		0.47	0.47
Clearance Time (s)		5.6	5.6		5.3	5.3
Vehicle Extension (s)		4.3	4.3		4.3	4.3
Lane Grp Cap (vph)		1510	1510		814	1282
v/s Ratio Prot		0.35	c0.37		0.36	
v/s Ratio Perm						c0.43
v/c Ratio		0.81	0.84		0.77	0.91
Uniform Delay, d1		30.4	31.2		27.2	30.4
Progression Factor		0.98	0.84		1.00	1.00
Incremental Delay, d2		4.3	5.1		4.8	9.8
Delay (s)		34.2	31.3		32.0	40.2
Level of Service		C	C		C	D
Approach Delay (s)		34.2	31.3		37.3	
Approach LOS		C	C		D	
Intersection Summary						
HCM Average Control Delay			34.7		HCM Level of Service	C
HCM Volume to Capacity ratio			0.88			
Actuated Cycle Length (s)			125.0		Sum of lost time (s)	10.9
Intersection Capacity Utilization			111.6%		ICU Level of Service	H
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

26: Pelham Road & I-85 NB off ramp




















Existing AM
7/6/2011

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↔	↔
Volume (vph)	1002	0	0	613	839	869
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8			5.8	5.0	5.0
Lane Util. Factor	0.95			0.95	0.97	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3438			3438	3335	1538
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3438			3438	3335	1538
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	1113	0	0	681	932	966
RTOR Reduction (vph)	0	0	0	0	0	5
Lane Group Flow (vph)	1113	0	0	681	932	961
Turn Type					Perm	
Protected Phases	2			6	8	
Permitted Phases						8
Actuated Green, G (s)	42.2			42.2	72.0	72.0
Effective Green, g (s)	42.2			42.2	72.0	72.0
Actuated g/C Ratio	0.34			0.34	0.58	0.58
Clearance Time (s)	5.8			5.8	5.0	5.0
Vehicle Extension (s)	4.3			4.3	4.3	4.3
Lane Grp Cap (vph)	1161			1161	1921	886
v/s Ratio Prot	c0.32			0.20	0.28	
v/s Ratio Perm						c0.62
v/c Ratio	0.96			0.59	0.49	1.08
Uniform Delay, d1	40.5			34.2	15.6	26.5
Progression Factor	0.70			0.94	1.00	1.00
Incremental Delay, d2	12.6			1.8	0.3	55.8
Delay (s)	40.9			33.9	15.9	82.3
Level of Service	D			C	B	F
Approach Delay (s)	40.9			33.9	49.7	
Approach LOS	D			C	D	
Intersection Summary						
HCM Average Control Delay			44.1		HCM Level of Service	D
HCM Volume to Capacity ratio			1.04			
Actuated Cycle Length (s)			125.0		Sum of lost time (s)	10.8
Intersection Capacity Utilization			123.7%		ICU Level of Service	H
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

27: Pelham Road & Boland Court






















Existing AM
7/6/2011

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	1299	542	137	790	7	272	2	144	24	2	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.7	6.7		6.7	6.7			6.3	6.3		6.3	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00	1.00		1.00	
Frt	1.00	0.96		1.00	1.00			1.00	0.85		0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.95	1.00		0.97	
Satd. Flow (prot)	1719	3286		1719	3433			1724	1538		1683	
Flt Permitted	0.32	1.00		0.05	1.00			0.70	1.00		0.53	
Satd. Flow (perm)	581	3286		95	3433			1262	1538		929	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	33	1443	602	152	878	8	302	2	160	27	2	12
RTOR Reduction (vph)	0	37	0	0	1	0	0	0	114	0	9	0
Lane Group Flow (vph)	33	2008	0	152	885	0	0	304	46	0	32	0
Turn Type	Perm			pm+pt			Perm			Perm	Perm	
Protected Phases	2			1		6	8			8		4
Permitted Phases	2			6			8			8	4	
Actuated Green, G (s)	69.3	69.3		84.3	84.3			27.7	27.7		27.7	
Effective Green, g (s)	69.3	69.3		84.3	84.3			27.7	27.7		27.7	
Actuated g/C Ratio	0.55	0.55		0.67	0.67			0.22	0.22		0.22	
Clearance Time (s)	6.7	6.7		6.7	6.7			6.3	6.3		6.3	
Vehicle Extension (s)	4.9	4.9		4.3	4.9			4.3	4.3		4.3	
Lane Grp Cap (vph)	322	1822		172	2315			280	341		206	
v/s Ratio Prot	c0.61			c0.06		0.26						
v/s Ratio Perm	0.06			0.54			c0.24		0.03		0.03	
v/c Ratio	0.10	1.10		0.88		0.38	1.09		0.14		0.15	
Uniform Delay, d1	13.2	27.9		40.1		8.9	48.6		39.0		39.2	
Progression Factor	0.67	0.55		1.00		1.00	1.00		1.00		1.00	
Incremental Delay, d2	0.1	47.0		38.7		0.5	78.6		0.3		0.6	
Delay (s)	8.8	62.3		78.8		9.4	127.2		39.3		39.8	
Level of Service	A	E		E		A	F		D		D	
Approach Delay (s)	61.5			19.6			96.9			39.8		
Approach LOS	E			B			F			D		
Intersection Summary												
HCM Average Control Delay			53.7		HCM Level of Service			D				
HCM Volume to Capacity ratio			1.08									
Actuated Cycle Length (s)			125.0		Sum of lost time (s)			19.7				
Intersection Capacity Utilization			98.4%		ICU Level of Service			F				
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

28: Forsythia Dr & E Butler Road

Existing AM
7/6/2011


















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	0	14	14	0	106	2	879	10	37	793	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frt		1.00	0.85		0.88		1.00	1.00		1.00	1.00	
Flt Protected		0.95	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1719	1538		1585		1719	3432		1719	3432	
Flt Permitted		0.89	1.00		0.95		0.29	1.00		0.21	1.00	
Satd. Flow (perm)		1611	1538		1521		521	3432		379	3432	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	19	0	16	16	0	118	2	977	11	41	881	10
RTOR Reduction (vph)	0	0	14	0	100	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	19	2	0	34	0	2	987	0	41	890	0
Turn Type	Perm		Perm	Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)		7.3	7.3		7.3		21.6	20.9		23.8	22.0	
Effective Green, g (s)		7.3	7.3		7.3		21.6	20.9		23.8	22.0	
Actuated g/C Ratio		0.15	0.15		0.15		0.45	0.44		0.50	0.46	
Clearance Time (s)		6.0	6.0		6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		245	234		231		252	1494		238	1573	
v/s Ratio Prot							0.00	c0.29		c0.01	0.26	
v/s Ratio Perm		0.01	0.00		c0.02		0.00			0.08		
v/c Ratio		0.08	0.01		0.15		0.01	0.66		0.17	0.57	
Uniform Delay, d1		17.5	17.3		17.6		7.3	10.7		6.7	9.5	
Progression Factor		1.00	1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1	0.0		0.3		0.0	1.1		0.3	0.5	
Delay (s)		17.6	17.3		17.9		7.3	11.9		7.0	10.0	
Level of Service		B	B		B		A	B		A	A	
Approach Delay (s)		17.5			17.9			11.8			9.8	
Approach LOS		B			B			B			A	
Intersection Summary												
HCM Average Control Delay		11.4					HCM Level of Service			B		
HCM Volume to Capacity ratio		0.51										
Actuated Cycle Length (s)		48.0					Sum of lost time (s)		18.0			
Intersection Capacity Utilization		54.7%					ICU Level of Service		A			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

30: E Butler Road & I-385 SB Ramps

Existing AM

7/6/2011





















												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (vph)	0	945	58	161	642	0	501	0	220	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.6		5.6	5.6			5.7	5.7			
Lane Util. Factor		0.95		1.00	0.95			1.00	1.00			
Frt		0.99		1.00	1.00			1.00	0.85			
Flt Protected		1.00		0.95	1.00			0.95	1.00			
Satd. Flow (prot)		3408		1719	3438			1719	1538			
Flt Permitted		1.00		0.09	1.00			0.95	1.00			
Satd. Flow (perm)		3408		155	3438			1719	1538			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	1050	64	179	713	0	557	0	244	0	0	0
RTOR Reduction (vph)	0	3	0	0	0	0	0	0	116	0	0	0
Lane Group Flow (vph)	0	1111	0	179	713	0	0	557	128	0	0	0
Turn Type				pm+pt			Perm		Perm			
Protected Phases		2		1	6			4				
Permitted Phases				6			4		4			
Actuated Green, G (s)		41.1		58.2	58.2			41.0	41.0			
Effective Green, g (s)		41.1		58.2	58.2			41.0	41.0			
Actuated g/C Ratio		0.37		0.53	0.53			0.37	0.37			
Clearance Time (s)		5.6		5.6	5.6			5.7	5.7			
Vehicle Extension (s)		2.5		2.5	2.0			2.8	2.8			
Lane Grp Cap (vph)		1268		244	1811			638	571			
v/s Ratio Prot		c0.33		c0.08	0.21							
v/s Ratio Perm				0.31				0.32	0.08			
v/c Ratio		0.88		0.73	0.39			0.87	0.22			
Uniform Delay, d1		32.3		24.6	15.6			32.3	23.8			
Progression Factor		1.00		1.00	1.00			1.00	1.00			
Incremental Delay, d2		7.0		10.3	0.1			12.6	0.2			
Delay (s)		39.3		34.9	15.7			44.9	24.0			
Level of Service		D		C	B			D	C			
Approach Delay (s)		39.3			19.5			38.5			0.0	
Approach LOS		D			B			D			A	
Intersection Summary												
HCM Average Control Delay			32.8			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			110.5			Sum of lost time (s)			16.9			
Intersection Capacity Utilization			78.7%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

31: E Butler Road & I-385 NB Ramps

Existing AM
























7/6/2011

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		 			 							
Volume (vph)	371	1075	0	0	787	460	0	0	0	16	0	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3			5.3	5.3				5.3		5.3
Lane Util. Factor	1.00	0.95			0.95	1.00				1.00		1.00
Frt	1.00	1.00			1.00	0.85				1.00		0.85
Flt Protected	0.95	1.00			1.00	1.00				0.95		1.00
Satd. Flow (prot)	1719	3438			3438	1538				1719		1538
Flt Permitted	0.15	1.00			1.00	1.00				0.95		1.00
Satd. Flow (perm)	264	3438			3438	1538				1719		1538
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	412	1194	0	0	874	511	0	0	0	18	0	303
RTOR Reduction (vph)	0	0	0	0	0	333	0	0	0	0	0	84
Lane Group Flow (vph)	412	1194	0	0	874	178	0	0	0	18	0	219
Turn Type	pm+pt				Perm				custom			custom
Protected Phases	5	2			6					3		3
Permitted Phases	2					6				8		
Actuated Green, G (s)	64.6	64.6			32.7	32.7				18.5		18.5
Effective Green, g (s)	64.6	64.6			32.7	32.7				18.5		18.5
Actuated g/C Ratio	0.69	0.69			0.35	0.35				0.20		0.20
Clearance Time (s)	5.3	5.3			5.3	5.3				5.3		5.3
Vehicle Extension (s)	2.0	3.0			3.0	3.0				3.0		3.0
Lane Grp Cap (vph)	595	2370			1200	537				339		304
v/s Ratio Prot	c0.20	0.35			0.25					0.01		c0.14
v/s Ratio Perm	c0.28					0.12						
v/c Ratio	0.69	0.50			0.73	0.33				0.05		0.72
Uniform Delay, d1	17.3	6.9			26.6	22.5				30.5		35.2
Progression Factor	1.00	1.00			1.00	1.00				1.00		1.00
Incremental Delay, d2	2.8	0.2			2.2	0.4				0.1		7.9
Delay (s)	20.1	7.1			28.9	22.8				30.6		43.1
Level of Service	C	A			C	C				C		D
Approach Delay (s)		10.4			26.6			0.0			42.4	
Approach LOS		B			C			A			D	
Intersection Summary												
HCM Average Control Delay			20.3		HCM Level of Service					C		
HCM Volume to Capacity ratio			0.68									
Actuated Cycle Length (s)			93.7		Sum of lost time (s)					10.6		
Intersection Capacity Utilization			78.7%		ICU Level of Service					D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

34: Frontage Road & Roper Mountain Road

Existing AM
7/6/2011




















												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	52	80	58	12	9	446	649	548	52	921	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	1645		1633	1664	1538	1719	3438	1538	1719	3428	
Flt Permitted	0.95	1.00		0.95	0.97	1.00	0.10	1.00	1.00	0.38	1.00	
Satd. Flow (perm)	1719	1645		1633	1664	1538	174	3438	1538	683	3428	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	2	58	89	64	13	10	496	721	609	58	1023	21
RTOR Reduction (vph)	0	56	0	0	0	10	0	0	192	0	1	0
Lane Group Flow (vph)	2	91	0	38	39	0	496	721	417	58	1043	0
Turn Type	Split			Split		Perm	pm+pt		Perm	Perm		
Protected Phases	4	4		8	8		5	2			6	
Permitted Phases						8	2		2	6		
Actuated Green, G (s)	8.8	8.8		4.7	4.7	4.7	68.5	68.5	68.5	35.5	35.5	
Effective Green, g (s)	8.8	8.8		4.7	4.7	4.7	68.5	68.5	68.5	35.5	35.5	
Actuated g/C Ratio	0.09	0.09		0.05	0.05	0.05	0.68	0.68	0.68	0.36	0.36	
Clearance Time (s)	6.0	6.0		6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	4.9	4.9		4.9	4.9	4.9	4.3	4.9	4.9	4.9	4.9	
Lane Grp Cap (vph)	151	145		77	78	72	536	2355	1054	242	1217	
v/s Ratio Prot	0.00	c0.06		0.02	c0.02		c0.25	0.21			0.30	
v/s Ratio Perm						0.00	c0.38		0.27	0.08		
v/c Ratio	0.01	0.63		0.49	0.50	0.01	0.93	0.31	0.40	0.24	0.86	
Uniform Delay, d1	41.6	44.0		46.5	46.5	45.4	28.0	6.3	6.8	22.7	29.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.94	1.09	3.51	1.00	1.00	
Incremental Delay, d2	0.1	11.5		9.7	9.8	0.1	18.2	0.3	0.8	2.3	7.9	
Delay (s)	41.7	55.6		56.2	56.3	45.5	44.4	7.1	24.8	25.1	37.8	
Level of Service	D	E		E	E	D	D	A	C	C	D	
Approach Delay (s)		55.4			55.0			23.1			37.1	
Approach LOS		E			E			C			D	
Intersection Summary												
HCM Average Control Delay			30.4			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.83									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			81.7%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

35: I-385 NB Ramps & Roper Mountain Road

Existing AM

7/6/2011
























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	558	0	792	139	851	0	0	816	243
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Lane Util. Factor				0.95	0.95	0.88	0.97	0.95			0.95	1.00
Frt				1.00	1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)				1633	1633	2707	3335	3438			3438	1538
Flt Permitted				0.95	0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)				1633	1633	2707	3335	3438			3438	1538
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	0	0	620	0	880	154	946	0	0	907	270
RTOR Reduction (vph)	0	0	0	0	0	99	0	0	0	0	0	170
Lane Group Flow (vph)	0	0	0	310	310	781	154	946	0	0	907	100
Turn Type				Perm		Perm	Prot					Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8						6
Actuated Green, G (s)				36.3	36.3	36.3	8.8	51.7			36.9	36.9
Effective Green, g (s)				36.3	36.3	36.3	8.8	51.7			36.9	36.9
Actuated g/C Ratio				0.36	0.36	0.36	0.09	0.52			0.37	0.37
Clearance Time (s)				6.0	6.0	6.0	6.0	6.0			6.0	6.0
Vehicle Extension (s)				4.9	4.9	4.9	4.3	4.9			4.9	4.9
Lane Grp Cap (vph)				593	593	983	293	1777			1269	568
v/s Ratio Prot							0.05	c0.28			c0.26	
v/s Ratio Perm				0.19	0.19	c0.29						0.06
v/c Ratio				0.52	0.52	0.79	0.53	0.53			0.71	0.18
Uniform Delay, d1				25.0	25.0	28.5	43.6	16.1			27.0	21.3
Progression Factor				1.00	1.00	1.00	1.36	0.51			0.64	0.99
Incremental Delay, d2				1.5	1.5	5.1	2.3	1.0			1.9	0.4
Delay (s)				26.6	26.6	33.7	61.5	9.3			19.1	21.5
Level of Service				C	C	C	E	A			B	C
Approach Delay (s)		0.0			30.7			16.6			19.6	
Approach LOS		A			C			B			B	
Intersection Summary												
HCM Average Control Delay			23.2			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			18.0			
Intersection Capacity Utilization			80.7%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

36: Roper Mountain Road & I-385 SB Ramps

Existing AM

7/6/2011

























												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		  			 				 			
Volume (vph)	0	560	200	515	859	0	430	0	241	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.4	6.4	5.8	6.4		6.1	6.1	6.1			
Lane Util. Factor		0.91	1.00	1.00	0.95		0.95	0.95	0.88			
Frt		1.00	0.85	1.00	1.00		1.00	1.00	0.85			
Flt Protected		1.00	1.00	0.95	1.00		0.95	0.95	1.00			
Satd. Flow (prot)		4940	1538	1719	3438		1633	1633	2707			
Flt Permitted		1.00	1.00	0.39	1.00		0.95	0.95	1.00			
Satd. Flow (perm)		4940	1538	705	3438		1633	1633	2707			
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	622	222	572	954	0	478	0	268	0	0	0
RTOR Reduction (vph)	0	0	127	0	0	0	0	0	214	0	0	0
Lane Group Flow (vph)	0	622	95	572	954	0	239	239	54	0	0	0
Turn Type		Perm		pm+pt			Perm		Perm			
Protected Phases		2		1	6			4				
Permitted Phases			2	6			4		4			
Actuated Green, G (s)		43.0	43.0	68.1	67.5		20.0	20.0	20.0			
Effective Green, g (s)		43.0	43.0	68.1	67.5		20.0	20.0	20.0			
Actuated g/C Ratio		0.43	0.43	0.68	0.68		0.20	0.20	0.20			
Clearance Time (s)		6.4	6.4	5.8	6.4		6.1	6.1	6.1			
Vehicle Extension (s)		4.9	4.9	4.3	4.9		4.9	4.9	4.9			
Lane Grp Cap (vph)		2124	661	670	2321		327	327	541			
v/s Ratio Prot		0.13		c0.16	0.28							
v/s Ratio Perm			0.06	c0.42			c0.15	0.15	0.02			
v/c Ratio		0.29	0.14	0.85	0.41		0.73	0.73	0.10			
Uniform Delay, d1		18.6	17.3	15.0	7.3		37.5	37.5	32.6			
Progression Factor		0.26	0.24	0.54	0.24		1.00	1.00	1.00			
Incremental Delay, d2		0.3	0.4	8.7	0.4		9.7	9.7	0.2			
Delay (s)		5.2	4.7	16.8	2.2		47.2	47.2	32.8			
Level of Service		A	A	B	A		D	D	C			
Approach Delay (s)		5.1			7.7			42.0			0.0	
Approach LOS		A			A			D			A	
Intersection Summary												
HCM Average Control Delay			15.2			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			100.0			Sum of lost time (s)			11.9			
Intersection Capacity Utilization			80.7%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

37: Roper Mountain Road & Congaree Road

Existing AM











7/6/2011

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations		  			 						 	
Volume (vph)	231	593	1	3	774	323	166	2	171	1	2	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.8	6.4			6.4	6.4	6.1	6.1			6.1	6.1
Lane Util. Factor	1.00	0.91			0.95	1.00	1.00	1.00			1.00	1.00
Frt	1.00	1.00			1.00	0.85	1.00	0.85			1.00	0.85
Flt Protected	0.95	1.00			1.00	1.00	0.95	1.00			0.98	1.00
Satd. Flow (prot)	1719	4939			3437	1538	1719	1541			1780	1538
Flt Permitted	0.24	1.00			0.95	1.00	0.76	1.00			0.93	1.00
Satd. Flow (perm)	425	4939			3277	1538	1368	1541			1676	1538
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	257	659	1	3	860	359	184	2	190	1	2	1
RTOR Reduction (vph)	0	0	0	0	0	177	0	153	0	0	0	1
Lane Group Flow (vph)	257	660	0	0	863	182	184	39	0	0	3	0
Turn Type	pm+pt			Perm		Perm	Perm			Perm		Perm
Protected Phases	5	2			6			4			8	
Permitted Phases	2			6		6	4			8		8
Actuated Green, G (s)	67.9	67.9			50.7	50.7	19.6	19.6			19.6	19.6
Effective Green, g (s)	67.9	67.9			50.7	50.7	19.6	19.6			19.6	19.6
Actuated g/C Ratio	0.68	0.68			0.51	0.51	0.20	0.20			0.20	0.20
Clearance Time (s)	5.8	6.4			6.4	6.4	6.1	6.1			6.1	6.1
Vehicle Extension (s)	4.3	4.9			4.9	4.9	4.9	4.9			4.9	4.9
Lane Grp Cap (vph)	436	3354			1661	780	268	302			328	301
v/s Ratio Prot	c0.07	0.13						0.03				
v/s Ratio Perm	c0.33				0.26	0.12	c0.13				0.00	0.00
v/c Ratio	0.59	0.20			0.52	0.23	0.69	0.13			0.01	0.00
Uniform Delay, d1	8.3	5.9			16.5	13.8	37.3	33.2			32.4	32.3
Progression Factor	2.21	1.96			0.54	0.54	1.00	1.00			1.00	1.00
Incremental Delay, d2	2.4	0.1			1.1	0.7	8.9	0.4			0.0	0.0
Delay (s)	20.8	11.8			10.0	8.0	46.3	33.6			32.4	32.3
Level of Service	C	B			B	A	D	C			C	C
Approach Delay (s)		14.3			9.4			39.8			32.4	
Approach LOS		B			A			D			C	
Intersection Summary												
HCM Average Control Delay			15.8				HCM Level of Service				B	
HCM Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			11.9		
Intersection Capacity Utilization			81.6%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

21: Frontage Rd & US 276










Existing AM
7/6/2011

						
Movement	WBL	WBR	SEL	SET	NWT	NWR
Lane Configurations						
Volume (veh/h)	115	18	67	1419	1744	67
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	128	20	74	1577	1938	74
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					1009	
pX, platoon unblocked	0.63	0.63	0.63			
vC, conflicting volume	2912	1006	2012			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2861	0	1435			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	0	97	74			
cM capacity (veh/h)	6	678	287			
Direction, Lane #	WB 1	SE 1	SE 2	SE 3	NW 1	NW 2
Volume Total	148	74	788	788	1292	720
Volume Left	128	74	0	0	0	0
Volume Right	20	0	0	0	0	74
cSH	7	287	1700	1700	1700	1700
Volume to Capacity	21.67	0.26	0.46	0.46	0.76	0.42
Queue Length 95th (ft)	Err	25	0	0	0	0
Control Delay (s)	Err	21.9	0.0	0.0	0.0	0.0
Lane LOS	F	C				
Approach Delay (s)	Err	1.0			0.0	
Approach LOS	F					
Intersection Summary						
Average Delay		388.1				
Intersection Capacity Utilization		69.8%		ICU Level of Service		C
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

22: US 276 & St Josephs Dr

Existing AM
7/6/2011

						
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Volume (veh/h)	1297	237	245	1397	414	92
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	1441	263	272	1552	460	102
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)				854		
pX, platoon unblocked					0.59	
vC, conflicting volume			1704		2893	852
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1704		2818	852
tC, single (s)			4.2		6.9	7.0
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			24		0	66
cM capacity (veh/h)			356		2	297
Direction, Lane #	SE 1	SE 2	NW 1	NW 2	NE 1	
Volume Total	961	744	790	1035	562	
Volume Left	0	0	272	0	460	
Volume Right	0	263	0	0	102	
cSH	1700	1700	356	1700	2	
Volume to Capacity	0.57	0.44	0.76	0.61	246.23	
Queue Length 95th (ft)	0	0	154	0	Err	
Control Delay (s)	0.0	0.0	41.4	0.0	Err	
Lane LOS			E		F	
Approach Delay (s)	0.0		17.9		Err	
Approach LOS					F	
Intersection Summary						
Average Delay			1382.1			
Intersection Capacity Utilization			127.7%		ICU Level of Service	H
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

29: Rothwell Dr & E Butler Road

Existing AM
7/6/2011















Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	5	1	4	998	838	24
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	1	4	1109	931	27
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)		5				
Median type				TWLTL	TWLTL	
Median storage (veh)				2	2	
Upstream signal (ft)				1176	378	
pX, platoon unblocked	0.86	0.88	0.88			
vC, conflicting volume	1508	479	958			
vC1, stage 1 conf vol	944					
vC2, stage 2 conf vol	563					
vCu, unblocked vol	619	130	675			
tC, single (s)	6.9	7.0	4.2			
tC, 2 stage (s)	5.9					
tF (s)	3.5	3.3	2.2			
p0 queue free %	99	100	99			
cM capacity (veh/h)	400	779	784			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	7	4	554	554	621	337
Volume Left	6	4	0	0	0	0
Volume Right	1	0	0	0	0	27
cSH	480	784	1700	1700	1700	1700
Volume to Capacity	0.01	0.01	0.33	0.33	0.37	0.20
Queue Length 95th (ft)	1	0	0	0	0	0
Control Delay (s)	13.4	9.6	0.0	0.0	0.0	0.0
Lane LOS	B	A				
Approach Delay (s)	13.4	0.0			0.0	
Approach LOS	B					
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			37.6%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

32: New Commerce Ct & E Butler Road

Existing AM
7/6/2011




















						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Volume (veh/h)	48	52	1329	19	32	1199
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	53	58	1477	21	36	1332
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)			371			
pX, platoon unblocked	0.83	0.83			0.83	
vC, conflicting volume	2224	749			1498	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2067	291			1192	
tC, single (s)	6.9	7.0			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	90			92	
cM capacity (veh/h)	35	579			469	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	111	984	513	36	666	666
Volume Left	53	0	0	36	0	0
Volume Right	58	0	21	0	0	0
cSH	68	1700	1700	469	1700	1700
Volume to Capacity	1.63	0.58	0.30	0.08	0.39	0.39
Queue Length 95th (ft)	242	0	0	6	0	0
Control Delay (s)	444.4	0.0	0.0	13.3	0.0	0.0
Lane LOS	F			B		
Approach Delay (s)	444.4	0.0		0.3		
Approach LOS	F					
Intersection Summary						
Average Delay		16.7				
Intersection Capacity Utilization		49.9%		ICU Level of Service		A
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis

33: E Butler Road & Brookfield Pkwy

Existing AM

7/6/2011

												
Movement	NBL	NBT	NBR	SBL	SBT	SBR	SEL	SET	SER	NWL	NWT	NWR
Lane Configurations												
Volume (veh/h)	86	1276	19	15	1201	16	1	0	12	18	0	9
Sign Control	Free				Free				Stop			
Grade	0%				0%				0%			
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	96	1418	21	17	1334	18	1	0	13	20	0	10
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None				None							
Median storage (veh)												
Upstream signal (ft)	939											
pX, platoon unblocked				0.85			0.85			0.85		
vC, conflicting volume	1352			1439			2287			3007		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1352			1159			2159			3008		
tC, single (s)	4.2			4.2			7.6			6.6		
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5			4.0		
p0 queue free %	80			97			94			100		
cM capacity (veh/h)	489			493			18			8		
Direction, Lane #	NB 1	NB 2	NB 3	SB 1	SB 2	SE 1	SE 2	NW 1	NW 2			
Volume Total	96	945	494	684	685	1	13	20	10			
Volume Left	96	0	0	17	0	1	0	20	0			
Volume Right	0	0	21	0	18	0	13	0	10			
cSH	489	1700	1700	493	1700	18	389	16	574			
Volume to Capacity	0.20	0.56	0.29	0.03	0.40	0.06	0.03	1.26	0.02			
Queue Length 95th (ft)	18	0	0	3	0	5	3	75	1			
Control Delay (s)	14.1	0.0	0.0	1.0	0.0	221.0	14.6	657.2	11.4			
Lane LOS	B			A		F	B	F	B			
Approach Delay (s)	0.9			0.5			30.5			441.9		
Approach LOS							D			F		
Intersection Summary												
Average Delay	5.3											
Intersection Capacity Utilization	85.8%			ICU Level of Service					E			
Analysis Period (min)	15											