

Final Traffic Technical Memorandum

Appendices

US 301 (SR 39) and US 98 Bypass (SR 533)

**From CR 54 (Eiland Boulevard)
to US 98 Bypass (SR 533)
Pasco County, Florida**

Prepared For:



**Florida Department of Transportation
11201 North McKinley Drive
Tampa, Florida 33612**

March 2010

Final Traffic Technical Memorandum Appendices

US 301 (SR 39) and US 98 Bypass (SR 533)

**From CR 54 (Eiland Boulevard) to US 98 Bypass (SR 533)
Pasco County, Florida**

Prepared For:



Florida Department of Transportation

Prepared By:

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APPENDICES

Appendix A

Existing year (2008) Signal Timing Plans

WO#: **562**
LOCATIO **US301 (GALL BLVD) & CR54 (E54)**
CONT: 3000 SER#: 6842
MONITOR 12ELRA SER#: 3169925

LAST UPDATE: 5/4/2006

TYPE: SIG REPAIR 1
SOP: 10
POWER PE ACCT: 27441 34578

DEQUAN: 8 DETDELAY:
OTHER1: CYLINK
OTHER2: OPTICOM: YES STREET LIGHTS: No
ENFORCEMENT YES STREET LIGHT
MASTARMS: NO

PHAS	DIRECTION	MI	PAS	YEL	RC	MAX1	MAX2	WALK	PC	PHAS	MIN REC	MAX REC	ME M	ME ON M	CNA	DET SWITCH	FLASH COLOR
1	SB LEFT	5	3	3.5	1	12				1					X	X/6	
2	NB THRU	20	4	4.3	1	32		5		2	X				X	X	Y
3	WB LEFT	5	3	3.5	1	12				3					X	X/8	
4	EB THRU	10	3	4.3	1	22		7	51	4			X				R
5	NB LEFT	5	3	3.5	1	12				5					X	X/2	
6	SB THRU	20	4	4.3	1	32		5		6	X				X	X	Y
7	EB LEFT	5	3	3.5	1	12				7					X	X/4	
8	WB THRU	10	3	4.3	1	22				8			X				R

OVERLAP A
B
C
C
D

FLASH TIMES
FROM:
TO:

SYSTEM
SYS# 10
ID#: 7

JURIS:
VALUE:

FDOT
90,000

NOTE

POLE DATA

CORNER1:
CORNER2:
CORNER3:
CORNER4:

Coordinator Manual Command and Options

Manual Enable Pattern 0

Split Units Percent	OffsetUnits Percent
Interconnect Format . STD	Interconnect Source . TLM
Transition. SMOOTH	Dwell Period. 0
Resync Count. 5	

Actuated Coord Phase X	Actuated Walk Rest
Inhibit Max Timing X	Max 2 Select
Floating Force Off X	Multisync.

			Phase											
Split Demand: Call	Time	Cyc Count	1	2	3	4	5	6	7	8	9	10	11	12
Demand 1	0	0	.	.	.	.	.	.	.	.	.	.	.	.
Demand 2	0	0	.	.	.	.	.	.	.	.	.	.	.	.

	Phase											
	1	2	3	4	5	6	7	8	9	10	11	12
Auto Permissive Min Green .	0	0	0	0	0	0	0	0	0	0	0	0

	A	B	C	D	E	F
Free Alternate Sequence . .	.	.	.	.	.	.

Coordination Patterns

Pattern 1

Cycle Length . . 100 COS 111
 Offset 0
 Vehicle Permissive . . [1] 0 [2] 0
 Vehicle Perm 2 Displacement 0 Phase Reservice. . NO
 Splits: Phase 1- 18 2- 33 3- 19 4- 30
 Phase 5- 18 6- 33 7- 23 8- 26
 Phase 9- 0 10- 0 11- 0 12- 0 Split Sum: 0
 Split Extension/Ring [1] 0 [2] 0
 Split Demand Pattern [1] 0 [2] 0
 XRT Pattern. . . 0
 Phase Number: 1 2 3 4 5 6 7 8 9 10 11 12
 Coord Phases . . . X . . . X
 Veh Recall
 Veh Max Recall
 Ped Recall
 Veh Omit
 Alt Sequence . . A: . B: . C: . D: . E: . F: .

Pattern 2

Cycle Length . . 110 COS 212
 Offset 0
 Vehicle Permissive . . [1] 0 [2] 0
 Vehicle Perm 2 Displacement 0 Phase Reservice. . NO
 Splits: Phase 1- 14 2- 40 3- 20 4- 26
 Phase 5- 14 6- 40 7- 23 8- 23
 Phase 9- 0 10- 0 11- 0 12- 0 Split Sum: 0
 Split Extension/Ring [1] 0 [2] 0
 Split Demand Pattern [1] 0 [2] 0
 XRT Pattern. . . 0
 Phase Number: 1 2 3 4 5 6 7 8 9 10 11 12
 Coord Phases . . . X . . . X
 Veh Recall
 Veh Max Recall
 Ped Recall
 Veh Omit
 Alt Sequence . . A: . B: . C: . D: . E: . F: .

Pattern 3

Cycle Length . . 120 COS 313
 Offset 0
 Vehicle Permissive . . [1] 0 [2] 0
 Vehicle Perm 2 Displacement 0 Phase Reservice. . NO
 Splits: Phase 1- 18 2- 36 3- 20 4- 26
 Phase 5- 18 6- 36 7- 25 8- 21
 Phase 9- 0 10- 0 11- 0 12- 0 Split Sum: 0
 Split Extension/Ring [1] 0 [2] 0
 Split Demand Pattern [1] 0 [2] 0
 XRT Pattern. . . 0
 Phase Number: 1 2 3 4 5 6 7 8 9 10 11 12
 Coord Phases . . . X . . . X
 Veh Recall
 Veh Max Recall
 Ped Recall
 Veh Omit
 Alt Sequence . . A: . B: . C: . D: . E: . F: .

NIC Program Steps

Step	Program	Step Begins	Pattern	Override
1	1	0600	1	NO
2	1	0900	2	NO
3	1	1100	3	NO
4	1	1900	0	NO
5	2	1000	3	NO
6	2	1930	0	NO
7	3	1200	2	NO
8	3	1700	0	NO

WO#: **652**
LOCATIO **US301 & DAUGHTERY**

LAST UPDATE: 4/23/2008

CONT: ASC/2S-2100 SER#: 33156 TYPE: SIG REPAIR 5
MONITOR MMU-16E SER#: 060605027 SOP: 7
DETQUAN: 5 DETDELAY: POWER PE ACCT: 64880 01249
OTHER1: ENCOM 5200 RADIO OPTICOM: NO STREET LIGHTS: NO
OTHER2: ENFORCEMENT NO STREET LIGHT QTY:
MASTARMS: NO ILLUMINATED SIGNS: NO
ILLUMINATED SIGNS

PHAS	DIRECTION	MI	PAS	YEL	RC	MAX1	MAX2	WALK	PC	PHAS	MIN REC	MAX REC	ME M	ME ON	M	CNA	DET SWITCH	FLASH COLOR
1	SB LEFT	5	3	3.5	1	15				1							X/6	
2	NB THRU	20	4	4.3	1	40				2	X				X	X		Y
3										3								
4	EB/WB	10	3	3.5	1	20		4	26	4				X				R
5	NB LEFT	5	3	3.5	1	15				5					X		X/2	
6	SB THRU	20	4	4.3	1	40				6	X				X	X		Y
7										7								
8										8								

OVERLAP	A	FLASH TIMES	SYSTEM	JURIS:	FDOT
	B	FROM:	SYS# 10	VALUE:	100,000
	C	TO:	ID#: 8	REIMBURSEME	50%
	C				
	D				

NOTE

TS-2 CABINET. SPECIAL DET ASSIGNMENT. SEE INT LOOP CHART. ** OPTICOM
PROGRAMMED IN CONTROLLER. **

POLE DATA

CORNER1:
CORNER2:
CORNER3:
CORNER4:

[illegible][illegible]

Coordination Patterns

Pattern 1

Cycle Length . . . 100 COS 111

Offset 53

Vehicle Permissive . . [1] 0 [2] 0

Vehicle Perm 2 Displacement 0 Phase Reservice. . . NO

Splits: Phase 1- 25 2- 44 3- 0 4- 31

Phase 5- 25 6- 44 7- 0 8- 31

Phase 9- 0 10- 0 11- 0 12- 0 Split Sum: 0

Split Extension/Ring [1] 0 [2] 0

Split Demand Pattern [1] 0 [2] 0

XRT Pattern. . . 0

Phase Number: 1 2 3 4 5 6 7 8 9 10 11 12

Coord Phases . . . X . . . X

Veh Recall

Veh Max Recall

Ped Recall

Veh Omit

Alt Sequence . . A: . B: . C: . D: . E: . F: .

Pattern 2

Cycle Length . . . 110 COS 212

Offset 44

Vehicle Permissive . . [1] 0 [2] 0

Vehicle Perm 2 Displacement 0 Phase Reservice. . . NO

Splits: Phase 1- 22 2- 39 3- 0 4- 39

Phase 5- 22 6- 39 7- 0 8- 39

Phase 9- 0 10- 0 11- 0 12- 0 Split Sum: 0

Split Extension/Ring [1] 0 [2] 0

Split Demand Pattern [1] 0 [2] 0

XRT Pattern. . . 0

Phase Number: 1 2 3 4 5 6 7 8 9 10 11 12

Coord Phases . . . X . . . X

Veh Recall

Veh Max Recall

Ped Recall

Veh Omit

Alt Sequence . . A: . B: . C: . D: . E: . F: .

Pattern 3

Cycle Length . . . 120 COS 313

Offset 54

Vehicle Permissive . . [1] 0 [2] 0

Vehicle Perm 2 Displacement 0 Phase Reservice. . . NO

Splits: Phase 1- 20 2- 50 3- 0 4- 30

Phase 5- 20 6- 50 7- 0 8- 30

Phase 9- 0 10- 0 11- 0 12- 0 Split Sum: 0

Split Extension/Ring [1] 0 [2] 0

Split Demand Pattern [1] 0 [2] 0

XRT Pattern. . . 0

Phase Number: 1 2 3 4 5 6 7 8 9 10 11 12

Coord Phases . . . X . . . X

Veh Recall

Veh Max Recall

Ped Recall

Veh Omit

Alt Sequence . . A: . B: . C: . D: . E: . F: .

Coordinator Manual Command and Options

Manual Enable Pattern 0

Split Units Percent OffsetUnits Percent

Interconnect Format . STD Interconnect Source . TLM

Transition. SMOOTH Dwell Period. 0

Resync Count. 5

Actuated Coord Phase . . . X Actuated Walk Rest

Inhibit Max Timing X Max 2 Select

Floating Force Off X Multisync.

				Phase											
Split Demand:	Call	Time	Cyc Count	1	2	3	4	5	6	7	8	9	10	11	12
Demand 1 . .	0		0	.	.	.	.	.	.	.	.	.	.	.	.
Demand 2 . .	0		0	.	.	.	.	.	.	.	.	.	.	.	.

	Phase											
	1	2	3	4	5	6	7	8	9	10	11	12
Auto Permissive Min Green .	0	0	0	0	0	0	0	0	0	0	0	0

	A	B	C	D	E	F
Free Alternate Sequence . .	.	.	.	.	.	.

NIC Program Steps

Step	Program	Step Begins	Pattern	Override
1	1	0600	1	NO
2	1	0900	2	NO
3	1	1100	3	NO
4	1	1900	0	NO
5	2	1000	3	NO
6	2	1930	0	NO
7	3	1200	2	NO
8	3	1700	0	NO

WO#: **654**
LOCATIO **US301 & TOWNVIEW**

LAST UPDATE: 2/22/2008

CONT: ASC/2S-2100 SER#: 29995 TYPE: SIG REPAIR 6
MONITOR MMU-16E SER#: 060605034 SOP: 7
DETQUAN: 5 DETDELAY: POWER PE ACCT: 000000000000
OTHER1: ENCOM 5200 RADIO OPTICOM: NO STREET LIGHTS: NO
OTHER2: ENFORCEMENT NO STREET LIGHT QTY:
MASTARMS: NO ILLUMINATED SIGNS: NO
ILLUMINATED SIGNS

PHAS	DIRECTION	MI	PAS	YEL	RC	MAX1	MAX2	WALK	PC	PHAS	MIN REC	MAX REC	ME M	ON M	ME M	CNA	DET SWITCH	FLASH COLOR
1	SB LEFT	5	3	3.5	1	15				1				X				R
2	NB THRU	20	4	4.3	1	40		5		2	X				X	X		Y
3										3								
4	WB & EB	10	3	3.5	1	20		5	24	4				X				R
5	NB LEFT	5	3	3.5	1	25				5				X				R
6	SB THRU	20	4	4.3	1	40		5		6	X				X	X		Y
7										7								
8										8								

OVERLAP A
B
C
C
D

FLASH TIMES FROM: 2300 TO: 0600
SYSTEM SYS# 10 ID#: 9
JURIS: VALUE: REIMBURSEME
FDOT 100,000 50%

NOTE

TS-2 CABINET. SPECIAL DET ASSIGNMENT. SEE INT LOOP CHART. ** OPTICOM
PROGRAMMED IN CONTROLLER. **

POLE DATA

CORNER1:
CORNER2:
CORNER3:
CORNER4:

Coordinator Manual Command and Options

Manual Enable Pattern 0

Split Units Percent	OffsetUnits Percent
Interconnect Format . STD	Interconnect Source . TLM
Transition. SMOOTH	Dwell Period. 0
Resync Count. 5	

Actuated Coord Phase X	Actuated Walk Rest
Inhibit Max Timing X	Max 2 Select
Floating Force Off X	Multisync.

				Phase											
Split Demand: Call	Time	Cyc	Count	1	2	3	4	5	6	7	8	9	10	11	12
Demand 1	0		0	.	.	.	.	.	.	.	.	.	.	.	.
Demand 2	0		0	.	.	.	.	.	.	.	.	.	.	.	.

				Phase											
	1	2	3	4	5	6	7	8	9	10	11	12			
Auto Permissive Min Green .	0	0	0	0	0	0	0	0	0	0	0	0			

	A	B	C	D	E	F
Free Alternate Sequence . .	.	.	.	.	.	.

Coordination Patterns

Pattern 1

Cycle Length . . 100 COS 111
 Offset 19
 Vehicle Permissive . . [1] 0 [2] 0
 Vehicle Perm 2 Displacement 0 Phase Reservice. . NO
 Splits: Phase 1- 25 2- 44 3- 0 4- 31
 Phase 5- 31 6- 38 7- 0 8- 31
 Phase 9- 0 10- 0 11- 0 12- 0 Split Sum: 0
 Split Extension/Ring [1] 0 [2] 0
 Split Demand Pattern [1] 0 [2] 0
 XRT Pattern. . . 0
 Phase Number: 1 2 3 4 5 6 7 8 9 10 11 12
 Coord Phases . . . X . . . X
 Veh Recall
 Veh Max Recall
 Ped Recall
 Veh Omit
 Alt Sequence . . A: . B: . C: . D: . E: . F: .

Pattern 2

Cycle Length . . 110 COS 212
 Offset 22
 Vehicle Permissive . . [1] 0 [2] 0
 Vehicle Perm 2 Displacement 0 Phase Reservice. . NO
 Splits: Phase 1- 17 2- 50 3- 0 4- 33
 Phase 5- 28 6- 39 7- 0 8- 33
 Phase 9- 0 10- 0 11- 0 12- 0 Split Sum: 0
 Split Extension/Ring [1] 0 [2] 0
 Split Demand Pattern [1] 0 [2] 0
 XRT Pattern. . . 0
 Phase Number: 1 2 3 4 5 6 7 8 9 10 11 12
 Coord Phases . . . X . . . X
 Veh Recall
 Veh Max Recall
 Ped Recall
 Veh Omit
 Alt Sequence . . A: . B: . C: . D: . E: . F: .

Pattern 3

Cycle Length . . 120 COS 313
 Offset 18
 Vehicle Permissive . . [1] 0 [2] 0
 Vehicle Perm 2 Displacement 0 Phase Reservice. . NO
 Splits: Phase 1- 15 2- 53 3- 0 4- 32
 Phase 5- 27 6- 41 7- 0 8- 32
 Phase 9- 0 10- 0 11- 0 12- 0 Split Sum: 0
 Split Extension/Ring [1] 0 [2] 0
 Split Demand Pattern [1] 0 [2] 0
 XRT Pattern. . . 0
 Phase Number: 1 2 3 4 5 6 7 8 9 10 11 12
 Coord Phases . . . X . . . X
 Veh Recall
 Veh Max Recall
 Ped Recall
 Veh Omit
 Alt Sequence . . A: . B: . C: . D: . E: . F: .

[illegible][illegible]

NIC Program Steps

Step	Program	Step Begins	Pattern	Override
1	1	0600	1	NO
2	1	0900	2	NO
3	1	1100	3	NO
4	1	1900	0	NO
5	2	1000	3	NO
6	2	1930	0	NO
7	3	1200	2	NO
8	3	1700	0	NO

WO#: **774**
LOCATIO **US301 & KOSSICK**

LAST UPDATE: 3/28/2008

CONT: ASC/2S-2100 SER#: 33155 TYPE: SIG REPAIR 5
MONITOR MMU-16E SER#: 070916646 SOP: 12
DETQUAN: 4 DETDELAY: POWER PE ACCT: 47942 90103
OTHER1: ENCOM 5200 RADIO OPTICOM: YES STREET LIGHTS: NO
OTHER2: ENFORCEMENT NO STREET LIGHT QTY:
MASTARMS: NO ILLUMINATED SIGNS: NO
ILLUMINATED SIGNS

PHAS	DIRECTION	MI	PAS	YEL	RC	MAX1	MAX2	WALK	PC	PHAS	MIN REC	MAX REC	ME M	ME ON	M	CNA	DET SWITCH	FLASH COLOR
1										1								
2	NB	20	5	5	2	60				2	X				X			Y
3										3								
4	EB	11	3.5	4.3	1	25				4					X			R
5	NBLT	7	5	5	2	20				5							X/2	
6	SB	20	5	5	2	60		7	26	6	X				X			Y
7	EBLT	11	3.5	4.3	1	25				7					X			R
8								7	26	8								

OVERLAP A
B
C
C
D

FLASH TIMES FROM: TO:
SYSTEM SYS# ID#:
JURIS: VALUE: REIMBURSEME FDOT 175,000 66%

NOTE

TS-2 CABINET. SPECIAL DET ASSIGNMENT. SEE INTERSECTION LOOP CHART. L4 PH 4 HAS 10 SEC DELAY DONE IN CONTROLLER. PH 8 PED WILL CALL UP PH 4 VEH THRU DUEL ENTRY.

POLE DATA

CORNER1:
CORNER2:
CORNER3:
CORNER4:

WO#: **743**
LOCATIO **US301 & CENTENNIAL**

LAST UPDATE: 2/24/2006

CONT: 3000E SER#: 22328011 TYPE: SIG REPAIR 5
MONITOR DOUBLE DIA. SER#: 1077994 SOP: 7
DETQUAN: 9 DETDELAY: POWER TECO ACCT: 1990 0162550
OTHER1: OPTICOM: YES STREET LIGHTS: NO
OTHER2: ENFORCEMENT NO STREET LIGHT QTY:
MASTARMS: NO ILLUMINATED SIGNS: NO
ILLUMINATED SIGNS

PHAS	DIRECTION	MI	PAS	YEL	RC	MAX1	MAX2	WALK	PC	PHAS	MIN REC	MAX REC	ME M	ME ON	M	CNA	DET SWITCH	FLASH COLOR
1	SBLT	7	4	3.5	1.5	45				1							X/ 6	
2	NB	20	3	6	2	40				2	X							Y
3										3								
4	EB/WB	10	3	4	1.5	60		7	20	4				X				R
5	NBLT	7	4	3.5	1.5	20				5							X/ 2	
6	SB	20	3	6	2	40				6	X							Y
7										7								
8										8								

OVERLAP	A									FLASH TIMES		SYSTEM		JURIS:		FDOT
	B									FROM:		SYS#		VALUE:		100,000
	C									TO:		ID#:		REIMBURSEME		50%
	C															
	D															

NOTE
5 SEC DELAY ON WB LOOP (L8). 2 SOLAR ADVANCE WARNING FLASHERS NB. ** (2
BATTERIES PER CABNIT)

POLE DATA

CORNER1:
CORNER2:
CORNER3:
CORNER4:

WO#: 591
LOCATIO US301 & CLINTON (CR52A)

LAST UPDATE: 12/7/2007

CONT: ASC/2S-2100 SER#: 29998 TYPE: SIG REPAIR 3
MONITOR MMU-16E SER#: 060706907 SOP: 2
DETQUAN: 4 DETDELAY: POWER TECO ACCT: 2090 0027940
OTHER1: OPTICOM: YES STREET LIGHTS: NO
OTHER2: ENFORCEMENT YES STREET LIGHT QTY:
MASTARMS: NO ILLUMINATED SIGNS: NO
ILLUMINATED SIGNS

PHAS	DIRECTION	MI	PAS	YEL	RC	MAX1	MAX2	WALK	PC	PHAS	MIN REC	MAX REC	ME M	ME ON	M	CNA	DET SWITCH	FLASH COLOR
1	SB LEFT	7	3	4	1	11				1				X				R
2	NB THRU	20	5	5	1.5	45				2	X				X			Y
3										3								
4	E&W THRU	10	6	4.5	2	35				4				X				R
5	NB LEFT	7	3	4	1	30				5				X				R
6	SB THRU	20	5	5	1.5	45				6	X				X			Y
7										7								
8										8								

OVERLAP	A	FLASH TIMES	SYSTEM	JURIS:	FDOT
	B	FROM:	SYS# 9	VALUE:	100,000
	C	TO:	ID#: 1	REIMBURSEME	50%
	C				
	D	NOTE			
		TS2-CABINET. SPECIAL DET ASSIGNMENT. SEE INT LOOP CHART. PROTECTED LEFT			
		URNS.			

POLE DATA

CORNER1:
CORNER2:
CORNER3:
CORNER4:

WO#: **671**
LOCATIO **US301 & MORNINGSIDE**

LAST UPDATE: 11/9/2007

CONT: ASC/2S-2100 SER#: 29610 TYPE: SIG REPAIR 5
MONITOR MMU-16E SER#: 060605031 SOP: 11
DETQUAN: 5 DETDELAY: POWER TECO ACCT: 1890 0069370
OTHER1: ENCON 5200 RADIO OPTICOM: YES STREET LIGHTS: NO
OTHER2: ENFORCEMENT NO STREET LIGHT QTY:
MASTARMS: NO ILLUMINATED SIGNS: NO
ILLUMINATED SIGNS

PHAS	DIRECTION	MI	PAS	YEL	RC	MAX1	MAX2	WALK	PC	PHAS	MIN REC	MAX REC	ME M	ME ON	M	CNA	DET SWITCH	FLASH COLOR
1										1								
2	SB THRU	20	6	4	1.8	50				2	X				X			Y
3										3								
4	WB THRU	7	4	4	2.2	20				4				X				R
5	SB LEFT	7	4	4	1.4	30				5					X		X/2	
6	NB THRU	20	6	4	1.8	50				6	X				X			Y
7										7								
8	EB THRU	7	4	4	2.2	20				8				X				R

OVERLAP	A	FLASH TIMES	SYSTEM	JURIS:	FDOT
	B	FROM:	SYS#	9	90,000
	C	TO:	ID#:	2	REIMBURSEME
	C				50%
	D				

NOTE

TS-2 CABINET. SPECIL DET ASSIGNMENT. SEE INT LOOP CHART. L1 PH 8 EBRT, L7 PH 4 WBRT AND L7 WB THRU/ LT HAS 3 SEC DELAY DONE IN CONTROLLER.

POLE DATA

CORNER1:
CORNER2:
CORNER3:
CORNER4:

WO#: **612**
 LOCATIO **US301 (SOUTH 7TH) & US98 SOUTH**
 CONT: ASC/2S-2100 SER#: 29608
 MONITOR MMU-16E SER#: 060608682
 DETQUAN: 3 DETDELAY: POWER
 OTHER1: ENCON 5200 RADIO
 OTHER2:

LAST UPDATE: 9/28/2007

TYPE: SIG REPAIR 1
 SOP: 1
 ACCT: 0190 0032480
 OPTICOM: YES STREET LIGHTS: NO
 ENFORCEMENT NO STREET LIGHT QTY:
 MASTARMS: NO ILLUMINATED SIGNS: NO
 ILLUMINATED SIGNS

PHAS	DIRECTION	MI	PAS	YEL	RC	MAX1	MAX2	WALK	PC	PHAS	MIN REC	MAX REC	ME M	ME ON	M	CNA	DET SWITCH	FLASH COLOR
1										1								
2	N&S THRU	15	5	4	2	40				2	X				X			Y
3										3								
4	WB LEFT	10	5	4	1	29				4				X				R
5										5								
6										6								
7										7								
8										8								

OVERLAP A	FLASH TIMES	SYSTEM	JURIS:	FDOT
B	FROM:	SYS# 9	VALUE:	90,000
C	TO:	ID# 3	REIMBURSEME	100%
C				
D	NOTE			
	TS-2 CABINET. SPECIAL DET ASSIGNMENT. SEE INT LOOP CHART. SOUTH BOUND POSTED NO LEFT TURN.			

POLE DATA

CORNER1:
 CORNER2:
 CORNER3:
 CORNER4:

Appendix B

Existing year (2008) Synchro Intersection Analysis Sheets

HCM Signalized Intersection Capacity Analysis

1: CR 54 (Eiland Boulevard) & SR 39 (US 301)

11/25/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	294	433	121	157	299	177	40	725	246	126	1069	326
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.3		4.5	5.3		4.5	5.3	5.3	4.5	5.3	5.3
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1802		1770	1759		1770	3505	1583	1770	3505	1583
Flt Permitted	0.14	1.00		0.16	1.00		0.13	1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)	256	1802		303	1759		249	3505	1583	256	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	320	471	132	171	325	192	43	788	267	137	1162	354
RTOR Reduction (vph)	0	8	0	0	17	0	0	0	127	0	0	130
Lane Group Flow (vph)	320	595	0	171	500	0	43	788	140	137	1162	224
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	pm+pt			pm+pt			pm+pt			Perm	pm+pt	Perm
Protected Phases	7	4		3	8		5	2			1	6
Permitted Phases	4			8			2		2		6	6
Actuated Green, G (s)	49.9	32.2		37.8	24.6		43.6	42.8	42.8	41.3	41.3	41.3
Effective Green, g (s)	49.9	32.2		37.8	24.6		43.6	42.8	42.8	41.3	41.3	41.3
Actuated g/C Ratio	0.42	0.27		0.32	0.20		0.36	0.36	0.36	0.34	0.34	0.34
Clearance Time (s)	4.5	5.3		4.5	5.3		4.5	5.3	5.3	4.5	5.3	5.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	369	484		257	361		264	1250	565	242	1206	545
v/s Ratio Prot	c0.15	c0.33		0.07	c0.28		0.02	c0.22		0.06	c0.33	
v/s Ratio Perm	0.21			0.14			0.04		0.09	0.14		0.14
v/c Ratio	0.87	1.23		0.67	1.39		0.16	0.63	0.25	0.57	0.96	0.41
Uniform Delay, d1	32.3	43.9		33.1	47.7		40.2	32.0	27.2	30.3	38.6	30.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.27	1.23	1.68
Incremental Delay, d2	18.8	120.3		6.4	190.0		0.3	2.4	1.0	2.1	14.7	1.6
Delay (s)	51.1	164.2		39.5	237.7		40.5	34.5	28.3	40.6	62.3	52.1
Level of Service	D	F		D	F		D	C	C	D	E	D
Approach Delay (s)		125.0			188.4			33.2			58.3	
Approach LOS		F			F			C			E	
Intersection Summary												
HCM Average Control Delay			86.6			HCM Level of Service			F			
HCM Volume to Capacity ratio			1.03									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			20.4			
Intersection Capacity Utilization			92.9%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Daugherty Road & SR 39 (US 301)

11/25/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	42	112	109	117	76	51	58	1097	115	84	1390	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	5.3	5.3	4.5	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.93		1.00	0.94		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1725		1770	1751		1770	3505	1583	1770	3480	
Flt Permitted	0.57	1.00		0.35	1.00		0.09	1.00	1.00	0.18	1.00	
Satd. Flow (perm)	1065	1725		647	1751		165	3505	1583	330	3480	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	46	122	118	127	83	55	63	1192	125	91	1511	79
RTOR Reduction (vph)	0	31	0	0	22	0	0	0	41	0	2	0
Lane Group Flow (vph)	46	209	0	127	116	0	63	1192	84	91	1588	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm			Perm			pm+pt			Perm	pm+pt	
Protected Phases	4			8			5		2	1		6
Permitted Phases	4			8			2			2		6
Actuated Green, G (s)	23.9	23.9		23.9	23.9		79.8	74.3	74.3	83.8	76.3	
Effective Green, g (s)	23.9	23.9		23.9	23.9		79.8	74.3	74.3	83.8	76.3	
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.66	0.62	0.62	0.70	0.64	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	5.3	5.3	4.5	5.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	4.0	4.0	3.0	4.0	
Lane Grp Cap (vph)	212	344		129	349		183	2170	980	320	2213	
v/s Ratio Prot		0.12			0.07		0.02	0.34		c0.02	c0.46	
v/s Ratio Perm	0.04			c0.20			0.21		0.05	0.18		
v/c Ratio	0.22	0.61		0.98	0.33		0.34	0.55	0.09	0.28	0.72	
Uniform Delay, d1	40.2	43.8		47.9	41.2		28.1	13.2	9.2	16.1	14.6	
Progression Factor	1.00	1.00		1.00	1.00		0.68	1.08	1.82	0.98	1.04	
Incremental Delay, d2	0.5	3.0		73.9	0.6		0.8	0.7	0.1	0.4	1.7	
Delay (s)	40.7	46.8		121.8	41.8		19.8	14.9	16.8	16.3	16.9	
Level of Service	D	D		F	D		B	B	B	B	B	
Approach Delay (s)		45.8			80.1			15.3			16.8	
Approach LOS		D			F			B			B	
Intersection Summary												
HCM Average Control Delay			23.2	HCM Level of Service			C					
HCM Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			120.0	Sum of lost time (s)			9.8					
Intersection Capacity Utilization			81.5%	ICU Level of Service			D					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Spanish Trails Boulevard & SR 39 (US 301)

11/25/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (veh/h)	10	0	7	33	1	25	6	6	1148	36	38	1507
Sign Control	Stop				Stop				Free			
Grade	0%				0%				0%			
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
Hourly flow rate (vph)	11	0	8	36	1	27	0	7	1248	39	41	1638
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None										None	
Median storage (veh)												
Upstream signal (ft)	686										1204	
pX, platoon unblocked	0.85	0.85	0.75	0.85	0.85	0.80	0.00	0.75			0.80	
vC, conflicting volume	2385	3021	819	2170	2989	624	0	1646			1287	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1233	1979	101	980	1942	38	0	1200			865	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1			4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			2.2	
p0 queue free %	89	100	99	78	98	97	0	98			93	
cM capacity (veh/h)	101	48	703	161	50	822	0	434			621	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	11	8	36	28	7	624	624	39	41	819	819	8
Volume Left	11	0	36	0	7	0	0	0	41	0	0	0
Volume Right	0	8	0	27	0	0	0	39	0	0	0	8
cSH	101	703	161	518	434	1700	1700	1700	621	1700	1700	1700
Volume to Capacity	0.11	0.01	0.22	0.05	0.02	0.37	0.37	0.02	0.07	0.48	0.48	0.00
Queue Length 95th (ft)	9	1	20	4	1	0	0	0	5	0	0	0
Control Delay (s)	44.8	10.2	33.6	12.4	13.4	0.0	0.0	0.0	11.2	0.0	0.0	0.0
Lane LOS	E	B	D	B	B				B			
Approach Delay (s)	30.6		24.2		0.1				0.3			
Approach LOS	D		C									
Intersection Summary												
Average Delay	0.9											
Intersection Capacity Utilization	56.8%				ICU Level of Service				B			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

3: Spanish Trails Boulevard & SR 39 (US 301)

11/25/2008

Movement	SBR
Lane Configurations	7
Volume (veh/h)	7
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	8
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis

4: Townview Square Entrance & SR 39 (US 301)

11/25/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	97	92	158	144	53	60	147	879	124	53	1161	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5		4.5	5.3	5.3	4.5	5.3	5.3
Lane Util. Factor	1.00	1.00			0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.91			0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1686			3323		1770	3505	1583	1770	3505	1583
Flt Permitted	0.46	1.00			0.60		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	856	1686			2035		1770	3505	1583	1770	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	105	100	172	157	58	65	160	955	135	58	1262	118
RTOR Reduction (vph)	0	59	0	0	27	0	0	0	52	0	0	28
Lane Group Flow (vph)	105	213	0	0	253	0	160	955	83	58	1262	90
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	20.9	20.9			20.9		16.1	74.0	74.0	10.8	68.7	68.7
Effective Green, g (s)	20.9	20.9			20.9		16.1	74.0	74.0	10.8	68.7	68.7
Actuated g/C Ratio	0.17	0.17			0.17		0.13	0.62	0.62	0.09	0.57	0.57
Clearance Time (s)	4.5	4.5			4.5		4.5	5.3	5.3	4.5	5.3	5.3
Vehicle Extension (s)	3.0	3.0			3.0		3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	149	294			354		237	2161	976	159	2007	906
v/s Ratio Prot		c0.13					c0.09	0.27		0.03	c0.36	
v/s Ratio Perm	0.12				0.12				0.05			0.06
v/c Ratio	0.70	0.72			1.59dl		0.68	0.44	0.09	0.36	0.63	0.10
Uniform Delay, d1	46.6	46.8			46.7		49.5	12.1	9.3	51.4	17.1	11.6
Progression Factor	1.00	1.00			1.00		1.10	0.99	2.48	1.00	1.00	1.00
Incremental Delay, d2	14.1	8.5			6.7		6.5	0.6	0.2	1.4	1.5	0.2
Delay (s)	60.7	55.3			53.4		60.8	12.5	23.2	52.8	18.6	11.8
Level of Service	E	E			D		E	B	C	D	B	B
Approach Delay (s)		56.8			53.4			19.9			19.5	
Approach LOS		E			D			B			B	
Intersection Summary												
HCM Average Control Delay			26.7				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)		14.3			
Intersection Capacity Utilization			78.8%				ICU Level of Service		D			
Analysis Period (min)			15									
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Kossik Road & SR 39 (US 301)

11/25/2008



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	138	104	75	856	1080	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3505	3505	1583
Flt Permitted	0.95	1.00	0.16	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	289	3505	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	150	113	82	930	1174	201
RTOR Reduction (vph)	0	96	0	0	0	87
Lane Group Flow (vph)	150	17	82	930	1174	114
Heavy Vehicles (%)	2%	2%	2%	3%	3%	2%
Turn Type	Perm		pm+pt		Perm	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	14.2	14.2	68.4	68.4	53.6	53.6
Effective Green, g (s)	14.2	14.2	68.4	68.4	53.6	53.6
Actuated g/C Ratio	0.15	0.15	0.72	0.72	0.56	0.56
Clearance Time (s)	5.3	5.3	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.5	3.5	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	265	237	330	2526	1980	894
v/s Ratio Prot	c0.08		0.02	c0.27	c0.33	
v/s Ratio Perm		0.01	0.16			0.07
v/c Ratio	0.57	0.07	0.25	0.37	0.59	0.13
Uniform Delay, d1	37.5	34.7	6.9	5.0	13.5	9.7
Progression Factor	1.00	1.00	1.00	1.00	1.01	1.05
Incremental Delay, d2	3.0	0.2	0.8	0.4	1.3	0.3
Delay (s)	40.5	34.8	7.7	5.5	15.0	10.4
Level of Service	D	C	A	A	B	B
Approach Delay (s)	38.1			5.6	14.3	
Approach LOS	D			A	B	

Intersection Summary

HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	94.9	Sum of lost time (s)	19.3
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

6: Wire Road & SR 39 (US 301)

11/25/2008

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL		
Lane Configurations									 					
Volume (veh/h)	0	0	0	55	0	89	40	0	919	42	5	106		
Sign Control	Stop			Stop			Free							
Grade	0%			0%			0%							
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		
Hourly flow rate (vph)	0	0	0	60	0	97	0	0	999	46	0	115		
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)														
Median type	None													
Median storage (veh)														
Upstream signal (ft)														
pX, platoon unblocked							0.00						0.00	
vC, conflicting volume	2011	2511	641	1870	2511	499	0	1282					0	999
vC1, stage 1 conf vol														
vC2, stage 2 conf vol														
vCu, unblocked vol	2011	2511	641	1870	2511	499	0	1282					0	999
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1					0.0	4.1
tC, 2 stage (s)														
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2					0.0	2.2
p0 queue free %	100	100	100	0	100	81	0	100					0	83
cM capacity (veh/h)	25	23	418	39	23	517	0	537					0	689
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3						
Volume Total	60	97	499	499	46	115	641	641						
Volume Left	60	0	0	0	0	115	0	0						
Volume Right	0	97	0	0	46	0	0	0						
cSH	39	517	1700	1700	1700	689	1700	1700						
Volume to Capacity	1.55	0.19	0.29	0.29	0.03	0.17	0.38	0.38						
Queue Length 95th (ft)	156	17	0	0	0	15	0	0						
Control Delay (s)	504.0	13.6	0.0	0.0	0.0	11.3	0.0	0.0						
Lane LOS	F	B					B							
Approach Delay (s)	200.9			0.0				0.9						
Approach LOS	F													
Intersection Summary														
Average Delay				12.6										
Intersection Capacity Utilization				74.7%	ICU Level of Service					D				
Analysis Period (min)				15										

HCM Unsignalized Intersection Capacity Analysis 6: Wire Road & SR 39 (US 301)

11/25/2008



Movement	SBT	SBR
Lane Configurations	↑↑	
Volume (veh/h)	1179	0
Sign Control	Free	
Grade	0%	
Peak Hour Factor	0.92	0.92
Hourly flow rate (vph)	1282	0
Pedestrians		
Lane Width (ft)		
Walking Speed (ft/s)		
Percent Blockage		
Right turn flare (veh)		
Median type	None	
Median storage (veh)		
Upstream signal (ft)		
pX, platoon unblocked		
vC, conflicting volume		
vC1, stage 1 conf vol		
vC2, stage 2 conf vol		
vCu, unblocked vol		
tC, single (s)		
tC, 2 stage (s)		
tF (s)		
p0 queue free %		
cM capacity (veh/h)		
Direction, Lane #		

HCM Signalized Intersection Capacity Analysis

7: Centennial Road & SR 39 (US 301)

11/25/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	10	10	215	10	145	10	877	136	228	1072	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.5		5.0	8.0	8.0	5.0	8.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.92			0.95		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00			0.97		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1723			1714		1770	3505	1583	1770	3500	
Flt Permitted	0.55	1.00			0.81		0.12	1.00	1.00	0.16	1.00	
Satd. Flow (perm)	1030	1723			1426		226	3505	1583	294	3500	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	11	11	234	11	158	11	953	148	248	1165	11
RTOR Reduction (vph)	0	8	0	0	18	0	0	0	58	0	1	0
Lane Group Flow (vph)	11	14	0	0	385	0	11	953	90	248	1175	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm			pm+pt			Perm	pm+pt		
Protected Phases	4		8			5			2	1		6
Permitted Phases	4		8			2			2	6		
Actuated Green, G (s)	32.5	32.5	32.5			37.2			33.0	33.0	61.0	48.8
Effective Green, g (s)	32.5	32.5	32.5			37.2			33.0	33.0	61.0	48.8
Actuated g/C Ratio	0.31	0.31	0.31			0.36			0.32	0.32	0.59	0.47
Clearance Time (s)	5.5	5.5	5.5			5.0			8.0	8.0	5.0	8.0
Vehicle Extension (s)	3.0	3.0	3.0			4.0			3.0	3.0	4.0	3.0
Lane Grp Cap (vph)	322	538	446			143			1112	502	456	1642
v/s Ratio Prot		0.01				0.00			c0.27		c0.10	0.34
v/s Ratio Perm	0.01		c0.27			0.02				0.06	0.21	
v/c Ratio	0.03	0.03	0.86			0.08			0.86	0.18	0.54	0.72
Uniform Delay, d1	24.8	24.8	33.7			37.7			33.3	25.7	26.3	22.1
Progression Factor	1.00	1.00	1.00			1.00			1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.0	15.8			0.3			8.6	0.8	1.7	2.7
Delay (s)	24.9	24.8	49.4			38.0			41.9	26.5	28.0	24.8
Level of Service	C	C	D			D			D	C	C	C
Approach Delay (s)		24.8	49.4			39.8					25.3	
Approach LOS		C	D			D					C	
Intersection Summary												
HCM Average Control Delay			34.0		HCM Level of Service				C			
HCM Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			104.0		Sum of lost time (s)				13.5			
Intersection Capacity Utilization			80.3%		ICU Level of Service				D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

8: SR 700 & SR 39 (US 301)

11/25/2008

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Volume (veh/h)	94	201	957	85	241	1233	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	102	218	1040	92	262	1340	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)		14					
Median type			None			None	
Median storage (veh)							
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	2234	520			1040		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	2234	520			1040		
tC, single (s)	6.9	7.0			4.2		
tC, 2 stage (s)							
tF (s)	3.6	3.4			2.3		
p0 queue free %	0	55			59		
cM capacity (veh/h)	20	488			635		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	321	520	520	92	262	670	670
Volume Left	102	0	0	0	262	0	0
Volume Right	218	0	0	92	0	0	0
cSH	58	1700	1700	1700	635	1700	1700
Volume to Capacity	5.49	0.31	0.31	0.05	0.41	0.39	0.39
Queue Length 95th (ft)	Err	0	0	0	50	0	0
Control Delay (s)	Err	0.0	0.0	0.0	14.6	0.0	0.0
Lane LOS	F				B		
Approach Delay (s)	Err	0.0			2.4		
Approach LOS	F						
Intersection Summary							
Average Delay		1050.6					
Intersection Capacity Utilization		55.0%		ICU Level of Service		B	
Analysis Period (min)		15					

HCM Signalized Intersection Capacity Analysis

9: CR 52A (Clinton Avenue) & SR 39 (US 301)

11/25/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	389	50	427	18	47	24	370	767	21	29	1029	283
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		5.0	6.5	6.5	5.0	6.5	6.5
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1784	1583		1777		1770	3505	1583	1770	3505	1583
Flt Permitted		0.71	1.00		0.44		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1316	1583		784		1770	3505	1583	1770	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	423	54	464	20	51	26	402	834	23	32	1118	308
RTOR Reduction (vph)	0	0	341	0	12	0	0	0	10	0	0	184
Lane Group Flow (vph)	0	477	123	0	85	0	402	834	13	32	1118	124
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm	Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)		28.5	28.5		28.5		27.0	61.9	61.9	3.6	38.5	38.5
Effective Green, g (s)		28.5	28.5		28.5		27.0	61.9	61.9	3.6	38.5	38.5
Actuated g/C Ratio		0.25	0.25		0.25		0.24	0.55	0.55	0.03	0.34	0.34
Clearance Time (s)		6.5	6.5		6.5		5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)		6.0	6.0		6.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)		335	403		200		427	1937	875	57	1205	544
v/s Ratio Prot							c0.23	0.24		0.02	c0.32	
v/s Ratio Perm		c0.36	0.08		0.11				0.01			0.08
v/c Ratio		1.42	0.30		0.43		0.94	0.43	0.01	0.56	0.93	0.23
Uniform Delay, d1		41.8	33.7		34.9		41.7	14.7	11.3	53.4	35.4	26.2
Progression Factor		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		207.4	1.2		4.1		29.1	0.3	0.0	12.0	12.7	0.4
Delay (s)		249.1	34.9		39.0		70.8	15.0	11.3	65.5	48.1	26.6
Level of Service		F	C		D		E	B	B	E	D	C
Approach Delay (s)		143.5			39.0			32.8			44.0	
Approach LOS		F			D			C			D	
Intersection Summary												
HCM Average Control Delay			65.0				HCM Level of Service			E		
HCM Volume to Capacity ratio			1.08									
Actuated Cycle Length (s)			112.0				Sum of lost time (s)			18.0		
Intersection Capacity Utilization			94.8%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Morningside Drive & SR 39 (US 301)

11/25/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	139	26	93	91	24	120	46	917	117	120	1190	133
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	6.2	5.8	5.8		5.4	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583		1792	1583	1770	3449		1770	3505	1583
Flt Permitted	0.68	1.00	1.00		0.75	1.00	0.21	1.00		0.16	1.00	1.00
Satd. Flow (perm)	1261	1863	1583		1400	1583	398	3449		292	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	151	28	101	99	26	130	50	997	127	130	1293	145
RTOR Reduction (vph)	0	0	85	0	0	109	0	8	0	0	0	44
Lane Group Flow (vph)	151	28	16	0	125	21	50	1116	0	130	1293	101
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Perm			pm+pt		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	13.6	13.6	13.6		13.6	13.6	44.2	44.2		58.1	58.1	58.1
Effective Green, g (s)	13.6	13.6	13.6		13.6	13.6	44.2	44.2		58.1	58.1	58.1
Actuated g/C Ratio	0.16	0.16	0.16		0.16	0.16	0.53	0.53		0.69	0.69	0.69
Clearance Time (s)	6.2	6.2	6.2		6.2	6.2	5.8	5.8		5.4	5.8	5.8
Vehicle Extension (s)	4.0	4.0	4.0		4.0	4.0	6.0	6.0		4.0	6.0	6.0
Lane Grp Cap (vph)	205	303	257		227	257	210	1821		353	2433	1099
v/s Ratio Prot		0.02						c0.32		0.04	c0.37	
v/s Ratio Perm	c0.12		0.01		0.09	0.01	0.13			0.22		0.06
v/c Ratio	0.74	0.09	0.06		0.55	0.08	0.24	0.61		0.37	0.53	0.09
Uniform Delay, d1	33.3	29.8	29.7		32.2	29.8	10.7	13.8		7.2	6.2	4.2
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	13.7	0.2	0.1		3.5	0.2	2.7	1.5		0.9	0.8	0.2
Delay (s)	47.0	30.0	29.8		35.8	29.9	13.3	15.3		8.1	7.0	4.3
Level of Service	D	C	C		D	C	B	B		A	A	A
Approach Delay (s)		39.1			32.8			15.2			6.9	
Approach LOS		D			C			B			A	
Intersection Summary												
HCM Average Control Delay			14.6				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			83.7				Sum of lost time (s)			17.8		
Intersection Capacity Utilization			78.8%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: SR 533 (US 98 Bypass) & SR 39 (US 301)

11/25/2008



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↱	↰	↰	↰		↰↱
Volume (vph)	742	20	752	563	0	932
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	1.00	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)	3367	1553	1845	1553		3505
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3367	1553	1845	1553		3505
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	807	22	817	612	0	1013
RTOR Reduction (vph)	0	15	0	303	0	0
Lane Group Flow (vph)	807	7	817	309	0	1013
Heavy Vehicles (%)	4%	4%	3%	4%	4%	3%
Turn Type	Perm		Perm			
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	22.4	22.4	34.0	34.0		34.0
Effective Green, g (s)	22.4	22.4	34.0	34.0		34.0
Actuated g/C Ratio	0.33	0.33	0.50	0.50		0.50
Clearance Time (s)	5.0	5.0	6.0	6.0		6.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0		5.0
Lane Grp Cap (vph)	1119	516	931	783		1768
v/s Ratio Prot	c0.24		c0.44			0.29
v/s Ratio Perm		0.00		0.20		
v/c Ratio	0.72	0.01	0.88	0.39		0.57
Uniform Delay, d1	19.8	15.1	14.8	10.3		11.6
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	2.8	0.0	11.5	1.5		1.4
Delay (s)	22.6	15.1	26.3	11.8		13.0
Level of Service	C	B	C	B		B
Approach Delay (s)	22.4		20.1			13.0
Approach LOS	C		C			B

Intersection Summary

HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	67.4	Sum of lost time (s)	11.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Arterial Level of Service: NB SR 39 (US 301)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Daugherty Road	I	45	44.7	16.3	61.0	0.51	30.0	C
Townview Square Entr	I	45	34.7	14.1	48.8	0.36	26.4	D
Kossik Road	I	45	51.8	5.8	57.6	0.65	40.4	B
Centennial Road	I	55	131.7	41.0	172.7	2.01	41.9	B
CR 52A (Clinton Aven	I	50	126.5	15.4	141.9	1.76	44.6	A
Morningside Drive	I	50	73.2	15.6	88.8	1.02	41.2	B
SR 533 (US 98 Bypass	I	45	65.8	28.9	94.7	0.82	31.2	C
Total	I		528.4	137.1	665.5	7.12	38.5	B

Arterial Level of Service: SB SR 39 (US 301)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Morningside Drive	I	45	65.8	7.2	73.0	0.82	40.5	B
CR 52A (Clinton Aven	I	50	73.2	46.3	119.5	1.02	30.6	C
Centennial Road	I	55	115.1	26.3	141.4	1.76	44.8	A
Kossik Road	I	55	131.7	16.0	147.7	2.01	49.0	A
Townview Square Entr	I	45	51.8	21.0	72.8	0.65	32.0	C
Daugherty Road	I	45	34.7	19.2	53.9	0.36	23.9	D
CR 54 (Eiland Boulev	I	45	44.7	58.9	103.6	0.51	17.7	E
Total	I		517.0	194.9	711.9	7.12	36.0	B

HCM Signalized Intersection Capacity Analysis

1: CR 54 (Eiland Boulevard) & SR 39 (US 301)

11/25/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	326	299	40	246	433	126	121	1069	157	177	725	294
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.3		4.5	5.3		4.5	5.3	5.3	4.5	5.3	5.3
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1830		1770	1800		1770	3505	1583	1770	3505	1583
Flt Permitted	0.15	1.00		0.24	1.00		0.23	1.00	1.00	0.09	1.00	1.00
Satd. Flow (perm)	277	1830		441	1800		436	3505	1583	167	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	354	325	43	267	471	137	132	1162	171	192	788	320
RTOR Reduction (vph)	0	4	0	0	8	0	0	0	56	0	0	166
Lane Group Flow (vph)	354	364	0	267	600	0	132	1162	115	192	788	154
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	49.9	28.1		39.7	22.4		51.8	41.5	41.5	58.2	44.7	44.7
Effective Green, g (s)	49.9	28.1		39.7	22.4		51.8	41.5	41.5	58.2	44.7	44.7
Actuated g/C Ratio	0.42	0.23		0.33	0.19		0.43	0.35	0.35	0.49	0.37	0.37
Clearance Time (s)	4.5	5.3		4.5	5.3		4.5	5.3	5.3	4.5	5.3	5.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	401	429		337	336		303	1212	547	261	1306	590
v/s Ratio Prot	c0.17	0.20		0.11	c0.33		0.04	c0.33		c0.08	0.22	
v/s Ratio Perm	0.20			0.15			0.15		0.07	0.27		0.10
v/c Ratio	0.88	0.85		0.79	1.79		0.44	0.96	0.21	0.74	0.60	0.26
Uniform Delay, d1	32.6	43.9		32.5	48.8		22.0	38.4	27.7	28.6	30.5	26.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	0.77	1.04	1.83
Incremental Delay, d2	19.8	14.5		12.0	365.2		1.0	17.7	0.9	8.9	1.8	0.9
Delay (s)	52.4	58.4		44.6	414.0		23.0	56.1	28.6	30.9	33.4	48.8
Level of Service	D	E		D	F		C	E	C	C	C	D
Approach Delay (s)		55.5			301.3			49.9			36.8	
Approach LOS		E			F			D			D	

Intersection Summary

HCM Average Control Delay	97.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	24.1
Intersection Capacity Utilization	104.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Daugherty Road & SR 39 (US 301)

11/25/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	76	58	115	112	84	109	1390	117	51	1097	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	5.3	5.3	4.5	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Flt Protected	1.00	0.94		1.00	0.94		1.00	1.00	0.85	1.00	0.99	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1742		1770	1743		1770	3505	1583	1770	3487	
Satd. Flow (perm)	609	1742		949	1743		321	3505	1583	209	3487	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	79	83	63	125	122	91	118	1511	127	55	1192	46
RTOR Reduction (vph)	0	26	0	0	25	0	0	0	29	0	1	0
Lane Group Flow (vph)	79	120	0	125	188	0	118	1511	98	55	1237	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm			Perm			pm+pt			Perm		pm+pt
Protected Phases		4			8		5	2			1	6
Permitted Phases	4			8			2		2		6	
Actuated Green, G (s)	19.0	19.0		19.0	19.0		88.7	79.5	79.5	84.7	77.5	
Effective Green, g (s)	19.0	19.0		19.0	19.0		88.7	79.5	79.5	84.7	77.5	
Actuated g/C Ratio	0.16	0.16		0.16	0.16		0.74	0.66	0.66	0.71	0.65	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	5.3	5.3	4.5	5.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	4.0	4.0	3.0	4.0	
Lane Grp Cap (vph)	96	276		150	276		348	2322	1049	241	2252	
v/s Ratio Prot		0.07			0.11		c0.03	c0.43		0.01	0.35	
v/s Ratio Perm	0.13			c0.13			0.22		0.06	0.15		
v/c Ratio	0.82	0.43		0.83	0.68		0.34	0.65	0.09	0.23	0.55	
Uniform Delay, d1	48.9	45.6		49.0	47.6		14.5	12.0	7.3	19.4	11.7	
Progression Factor	1.00	1.00		1.00	1.00		0.56	0.45	0.07	0.68	0.58	
Incremental Delay, d2	41.0	1.1		30.9	6.7		0.2	0.5	0.1	0.4	0.9	
Delay (s)	89.8	46.7		79.9	54.4		8.4	5.9	0.6	13.6	7.7	
Level of Service	F	D		E	D		A	A	A	B	A	
Approach Delay (s)		61.9			63.8			5.7			7.9	
Approach LOS		E			E			A			A	
Intersection Summary												
HCM Average Control Delay			15.4			HCM Level of Service			B			
HCM Volume to Capacity ratio			0.64									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			9.8			
Intersection Capacity Utilization			77.6%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Spanish Trails Boulevard & SR 39 (US 301)

11/25/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (veh/h)	7	1	6	36	0	38	6	7	1507	33	25	1148
Sign Control	Stop				Stop				Free			
Grade	0%				0%				0%			
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
Hourly flow rate (vph)	8	1	7	39	0	41	0	8	1638	36	27	1248
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type									None		None	
Median storage (veh)												
Upstream signal (ft)									686		1204	
pX, platoon unblocked	0.81	0.81	0.84	0.81	0.81	0.73	0.00	0.84			0.73	
vC, conflicting volume	2178	2991	624	2339	2966	819	0	1259			1674	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1114	2119	183	1313	2088	17	0	936			1186	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1			4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			2.2	
p0 queue free %	94	97	99	54	100	95	0	99			94	
cM capacity (veh/h)	118	37	698	86	39	773	0	614			427	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	8	8	39	41	8	819	819	36	27	624	624	11
Volume Left	8	0	39	0	8	0	0	0	27	0	0	0
Volume Right	0	7	0	41	0	0	0	36	0	0	0	11
cSH	118	198	86	773	614	1700	1700	1700	427	1700	1700	1700
Volume to Capacity	0.06	0.04	0.46	0.05	0.01	0.48	0.48	0.02	0.06	0.37	0.37	0.01
Queue Length 95th (ft)	5	3	47	4	1	0	0	0	5	0	0	0
Control Delay (s)	37.7	24.0	78.1	9.9	10.9	0.0	0.0	0.0	14.0	0.0	0.0	0.0
Lane LOS	E	C	F	A	B	B						
Approach Delay (s)	30.8	43.1		0.0		0.3						
Approach LOS	D	E										
Intersection Summary												
Average Delay	1.4											
Intersection Capacity Utilization	57.0%			ICU Level of Service					B			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

3: Spanish Trails Boulevard & SR 39 (US 301)

11/25/2008

Movement	SBR
Lane Configurations	
Volume (veh/h)	10
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	11
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis

4: Townview Square Entrance & SR 39 (US 301)

11/25/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	109	53	147	124	92	53	158	1161	144	60	879	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5		4.5	5.3	5.3	4.5	5.3	5.3
Lane Util. Factor	1.00	1.00			0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.89			0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1658			3357		1770	3505	1583	1770	3505	1583
Flt Permitted	0.44	1.00			0.60		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	824	1658			2054		1770	3505	1583	1770	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	118	58	160	135	100	58	172	1262	157	65	955	105
RTOR Reduction (vph)	0	95	0	0	21	0	0	0	60	0	0	34
Lane Group Flow (vph)	118	123	0	0	272	0	172	1262	97	65	955	71
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	21.0	21.0			21.0		17.0	73.9	73.9	10.8	67.7	67.7
Effective Green, g (s)	21.0	21.0			21.0		17.0	73.9	73.9	10.8	67.7	67.7
Actuated g/C Ratio	0.18	0.18			0.18		0.14	0.62	0.62	0.09	0.56	0.56
Clearance Time (s)	4.5	4.5			4.5		4.5	5.3	5.3	4.5	5.3	5.3
Vehicle Extension (s)	3.0	3.0			3.0		3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	144	290			359		251	2158	975	159	1977	893
v/s Ratio Prot		0.07					c0.10	c0.36		0.04	c0.27	
v/s Ratio Perm	c0.14				0.13				0.06			0.05
v/c Ratio	0.82	0.42			1.00dl		0.69	0.58	0.10	0.41	0.48	0.08
Uniform Delay, d1	47.7	44.1			47.1		49.0	13.8	9.4	51.6	15.7	11.9
Progression Factor	1.00	1.00			1.00		0.67	1.41	1.93	1.00	1.00	1.00
Incremental Delay, d2	29.1	1.0			8.9		6.1	0.9	0.2	1.7	0.8	0.2
Delay (s)	76.8	45.1			56.0		38.8	20.4	18.3	53.3	16.5	12.1
Level of Service	E	D			E		D	C	B	D	B	B
Approach Delay (s)		56.2			56.0			22.2			18.2	
Approach LOS		E			E			C			B	
Intersection Summary												
HCM Average Control Delay			27.3			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			9.0			
Intersection Capacity Utilization			72.1%			ICU Level of Service			C			
Analysis Period (min)			15									
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Kossik Road & SR 39 (US 301)

11/25/2008



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	185	75	104	1080	856	138
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.3	5.3	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1770	1583	1770	3505	3539	1568
Flt Permitted	0.95	1.00	0.22	1.00	1.00	1.00
Satd. Flow (perm)	1770	1583	409	3505	3539	1568
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	201	82	113	1174	930	150
RTOR Reduction (vph)	0	69	0	0	0	70
Lane Group Flow (vph)	201	13	113	1174	930	80
Heavy Vehicles (%)	2%	2%	2%	3%	2%	3%
Turn Type	Perm		pm+pt		Perm	
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	16.1	16.1	70.7	70.7	53.1	53.1
Effective Green, g (s)	16.1	16.1	70.7	70.7	53.1	53.1
Actuated g/C Ratio	0.16	0.16	0.71	0.71	0.54	0.54
Clearance Time (s)	5.3	5.3	7.0	7.0	7.0	7.0
Vehicle Extension (s)	3.5	3.5	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	288	257	437	2501	1896	840
v/s Ratio Prot	c0.11		0.03	c0.33	0.26	
v/s Ratio Perm		0.01	0.16			0.05
v/c Ratio	0.70	0.05	0.26	0.47	0.49	0.10
Uniform Delay, d1	39.2	35.1	6.2	6.1	14.5	11.3
Progression Factor	1.00	1.00	1.00	1.00	1.02	1.05
Incremental Delay, d2	7.4	0.1	0.7	0.6	0.9	0.2
Delay (s)	46.7	35.2	6.9	6.8	15.6	12.1
Level of Service	D	D	A	A	B	B
Approach Delay (s)	43.3			6.8	15.1	
Approach LOS	D			A	B	

Intersection Summary

HCM Average Control Delay	14.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	99.1	Sum of lost time (s)	12.3
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

6: Wire Road & SR 39 (US 301)

11/25/2008

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	
Lane Configurations									 				
Volume (veh/h)	0	0	0	42	0	106	40	0	1179	55	5	89	
Sign Control	Stop			Stop			Free						
Grade	0%			0%			0%						
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	
Hourly flow rate (vph)	0	0	0	46	0	115	0	0	1282	60	0	97	
Pedestrians													
Lane Width (ft)													
Walking Speed (ft/s)													
Percent Blockage													
Right turn flare (veh)													
Median type	None												
Median storage (veh)													
Upstream signal (ft)													
pX, platoon unblocked							0.00						0.00
vC, conflicting volume	1833	2474	499	1974	2474	641	0	999				0	1282
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	1833	2474	499	1974	2474	641	0	999				0	1282
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1				0.0	4.1
tC, 2 stage (s)													
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2				0.0	2.2
p0 queue free %	100	100	100	0	100	72	0	100				0	82
cM capacity (veh/h)	30	24	517	32	24	418	0	689				0	537
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3					
Volume Total	46	115	641	641	60	97	499	499					
Volume Left	46	0	0	0	0	97	0	0					
Volume Right	0	115	0	0	60	0	0	0					
cSH	32	418	1700	1700	1700	537	1700	1700					
Volume to Capacity	1.43	0.28	0.38	0.38	0.04	0.18	0.29	0.29					
Queue Length 95th (ft)	127	28	0	0	0	16	0	0					
Control Delay (s)	503.1	16.9	0.0	0.0	0.0	13.2	0.0	0.0					
Lane LOS	F	C				B							
Approach Delay (s)	154.8			0.0	1.2								
Approach LOS	F												
Intersection Summary													
Average Delay				10.1									
Intersection Capacity Utilization				75.7%	ICU Level of Service					D			
Analysis Period (min)				15									

HCM Unsignalized Intersection Capacity Analysis 6: Wire Road & SR 39 (US 301)

11/25/2008



Movement	SBT	SBR
Lane Configurations	↑↑	
Volume (veh/h)	919	0
Sign Control	Free	
Grade	0%	
Peak Hour Factor	0.92	0.92
Hourly flow rate (vph)	999	0
Pedestrians		
Lane Width (ft)		
Walking Speed (ft/s)		
Percent Blockage		
Right turn flare (veh)		
Median type	None	
Median storage (veh)		
Upstream signal (ft)		
pX, platoon unblocked		
vC, conflicting volume		
vC1, stage 1 conf vol		
vC2, stage 2 conf vol		
vCu, unblocked vol		
tC, single (s)		
tC, 2 stage (s)		
tF (s)		
p0 queue free %		
cM capacity (veh/h)		
Direction, Lane #		

HCM Signalized Intersection Capacity Analysis

7: Centennial Road & SR 39 (US 301)

11/25/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	10	10	136	10	228	10	1072	215	145	877	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.5		5.0	8.0	8.0	5.0	8.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.92			0.92		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1723			1679		1770	3505	1583	1770	3499	
Flt Permitted	0.44	1.00			0.87		0.30	1.00	1.00	0.10	1.00	
Satd. Flow (perm)	817	1723			1489		550	3505	1583	178	3499	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	11	11	148	11	248	11	1165	234	158	953	11
RTOR Reduction (vph)	0	8	0	0	44	0	0	0	66	0	0	0
Lane Group Flow (vph)	11	14	0	0	363	0	11	1165	168	158	964	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm			pm+pt			Perm		pm+pt	
Protected Phases	4		8			5			2		1	
Permitted Phases	4		8			2			2		6	
Actuated Green, G (s)	26.8	26.8	26.8			38.1			36.8	36.8	53.2	46.9
Effective Green, g (s)	26.8	26.8	26.8			38.1			36.8	36.8	53.2	46.9
Actuated g/C Ratio	0.29	0.29	0.29			0.41			0.39	0.39	0.57	0.50
Clearance Time (s)	5.5	5.5	5.5			5.0			8.0	8.0	5.0	8.0
Vehicle Extension (s)	3.0	3.0	3.0			4.0			3.0	3.0	4.0	3.0
Lane Grp Cap (vph)	234	494	427			241			1380	623	295	1755
v/s Ratio Prot		0.01				0.00			c0.33		c0.07	0.28
v/s Ratio Perm	0.01		c0.24			0.02				0.11	0.24	
v/c Ratio	0.05	0.03	0.85			0.05			0.84	0.27	0.54	0.55
Uniform Delay, d1	24.1	24.0	31.4			16.5			25.7	19.2	15.0	16.0
Progression Factor	1.00	1.00	1.00			1.00			1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.0	14.6			0.1			6.5	1.1	2.4	1.2
Delay (s)	24.2	24.0	46.0			16.6			32.2	20.3	17.4	17.3
Level of Service	C	C	D			B			C	C	B	B
Approach Delay (s)		24.1	46.0			30.1					17.3	
Approach LOS		C	D			C					B	
Intersection Summary												
HCM Average Control Delay			27.4		HCM Level of Service				C			
HCM Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			93.5		Sum of lost time (s)				18.5			
Intersection Capacity Utilization			81.8%		ICU Level of Service				D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

8: SR 700 & SR 39 (US 301)

11/25/2008

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Volume (veh/h)	85	241	1233	94	201	957	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	92	262	1340	102	218	1040	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)		14					
Median type			None			None	
Median storage (veh)							
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	2297	670			1340		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	2297	670			1340		
tC, single (s)	6.9	7.0			4.2		
tC, 2 stage (s)							
tF (s)	3.6	3.4			2.3		
p0 queue free %	0	32			55		
cM capacity (veh/h)	17	388			485		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	354	670	670	102	218	520	520
Volume Left	92	0	0	0	218	0	0
Volume Right	262	0	0	102	0	0	0
cSH	59	1700	1700	1700	485	1700	1700
Volume to Capacity	6.03	0.39	0.39	0.06	0.45	0.31	0.31
Queue Length 95th (ft)	Err	0	0	0	58	0	0
Control Delay (s)	Err	0.0	0.0	0.0	18.4	0.0	0.0
Lane LOS	F				C		
Approach Delay (s)	Err	0.0			3.2		
Approach LOS	F						
Intersection Summary							
Average Delay		1160.9					
Intersection Capacity Utilization		59.9%		ICU Level of Service		B	
Analysis Period (min)		15					

HCM Signalized Intersection Capacity Analysis

9: CR 52A (Clinton Avenue) & SR 39 (US 301)

11/25/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	283	47	370	21	50	29	427	1029	18	24	767	389
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		5.0	6.5	6.5	5.0	6.5	6.5
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1786	1583		1770		1770	3505	1583	1770	3505	1583
Flt Permitted		0.70	1.00		0.70		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1297	1583		1256		1770	3505	1583	1770	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	308	51	402	23	54	32	464	1118	20	26	834	423
RTOR Reduction (vph)	0	0	298	0	13	0	0	0	9	0	0	275
Lane Group Flow (vph)	0	359	104	0	96	0	464	1118	11	26	834	148
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm	Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)		28.5	28.5		28.5		25.0	59.8	59.8	3.5	38.3	38.3
Effective Green, g (s)		28.5	28.5		28.5		25.0	59.8	59.8	3.5	38.3	38.3
Actuated g/C Ratio		0.26	0.26		0.26		0.23	0.54	0.54	0.03	0.35	0.35
Clearance Time (s)		6.5	6.5		6.5		5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)		6.0	6.0		6.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)		337	411		326		403	1909	862	56	1223	552
v/s Ratio Prot							c0.26	0.32		0.01	c0.24	
v/s Ratio Perm		c0.28	0.07		0.08				0.01			0.09
v/c Ratio		1.07	0.25		0.29		1.15	0.59	0.01	0.46	0.68	0.27
Uniform Delay, d1		40.6	32.2		32.6		42.4	16.7	11.5	52.2	30.5	25.7
Progression Factor		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		67.4	0.9		1.4		93.0	0.7	0.0	6.0	2.0	0.5
Delay (s)		108.0	33.1		34.0		135.4	17.4	11.5	58.2	32.6	26.2
Level of Service		F	C		C		F	B	B	E	C	C
Approach Delay (s)		68.5			34.0			51.5			31.0	
Approach LOS		E			C			D			C	
Intersection Summary												
HCM Average Control Delay		47.4					HCM Level of Service		D			
HCM Volume to Capacity ratio		0.93										
Actuated Cycle Length (s)		109.8					Sum of lost time (s)		18.0			
Intersection Capacity Utilization		84.7%					ICU Level of Service		E			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Morningside Drive & SR 39 (US 301)

11/25/2008

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	133	24	46	117	26	120	93	1190	91	120	917	139
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	6.2	5.8	5.8		5.4	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583		1789	1583	1770	3470		1770	3505	1583
Flt Permitted	0.64	1.00	1.00		0.75	1.00	0.29	1.00		0.09	1.00	1.00
Satd. Flow (perm)	1186	1863	1583		1391	1583	535	3470		163	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	145	26	50	127	28	130	101	1293	99	130	997	151
RTOR Reduction (vph)	0	0	42	0	0	109	0	5	0	0	0	46
Lane Group Flow (vph)	145	26	8	0	155	21	101	1387	0	130	997	105
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Perm			pm+pt		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	13.8	13.8	13.8		13.8	13.8	44.3	44.3		58.7	58.7	58.7
Effective Green, g (s)	13.8	13.8	13.8		13.8	13.8	44.3	44.3		58.7	58.7	58.7
Actuated g/C Ratio	0.16	0.16	0.16		0.16	0.16	0.52	0.52		0.69	0.69	0.69
Clearance Time (s)	6.2	6.2	6.2		6.2	6.2	5.8	5.8		5.4	5.8	5.8
Vehicle Extension (s)	4.0	4.0	4.0		4.0	4.0	6.0	6.0		4.0	6.0	6.0
Lane Grp Cap (vph)	194	304	259		227	259	280	1819		284	2435	1100
v/s Ratio Prot		0.01						c0.40		0.05	c0.28	
v/s Ratio Perm	c0.12		0.01		0.11	0.01	0.19			0.27		0.07
v/c Ratio	0.75	0.09	0.03		0.68	0.08	0.36	0.76		0.46	0.41	0.10
Uniform Delay, d1	33.7	30.0	29.7		33.3	30.0	11.8	15.9		11.1	5.5	4.2
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	15.4	0.2	0.1		8.9	0.2	3.6	3.1		1.6	0.5	0.2
Delay (s)	49.1	30.2	29.8		42.2	30.2	15.4	19.0		12.7	6.0	4.4
Level of Service	D	C	C		D	C	B	B		B	A	A
Approach Delay (s)		42.5			36.7			18.8			6.5	
Approach LOS		D			D			B			A	
Intersection Summary												
HCM Average Control Delay			17.1				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			84.5				Sum of lost time (s)			17.8		
Intersection Capacity Utilization			71.5%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: SR 533 (US 98 Bypass) & SR 39 (US 301)

11/25/2008

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	543	20	912	762	0	772
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	1.00	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)	3367	1553	1845	1553		3505
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3367	1553	1845	1553		3505
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	590	22	991	828	0	839
RTOR Reduction (vph)	0	15	0	388	0	0
Lane Group Flow (vph)	590	7	991	440	0	839
Heavy Vehicles (%)	4%	4%	3%	4%	4%	3%
Turn Type	Perm		Perm			
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	19.0	19.0	34.1	34.1		34.1
Effective Green, g (s)	19.0	19.0	34.1	34.1		34.1
Actuated g/C Ratio	0.30	0.30	0.53	0.53		0.53
Clearance Time (s)	5.0	5.0	6.0	6.0		6.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0		5.0
Lane Grp Cap (vph)	998	460	982	826		1865
v/s Ratio Prot	c0.18		c0.54			0.24
v/s Ratio Perm		0.00		0.28		
v/c Ratio	0.59	0.01	1.01	0.53		0.45
Uniform Delay, d1	19.2	15.9	15.0	9.8		9.2
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	1.4	0.0	31.0	2.5		0.8
Delay (s)	20.7	16.0	46.0	12.3		10.0
Level of Service	C	B	D	B		B
Approach Delay (s)	20.5		30.6			10.0
Approach LOS	C		C			B
Intersection Summary						
HCM Average Control Delay			23.4	HCM Level of Service		C
HCM Volume to Capacity ratio			0.86			
Actuated Cycle Length (s)			64.1	Sum of lost time (s)		11.0
Intersection Capacity Utilization			72.7%	ICU Level of Service		C
Analysis Period (min)			15			
c Critical Lane Group						

Arterial Level of Service: NB SR 39 (US 301)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Daugherty Road	I	45	44.7	6.8	51.5	0.51	35.5	B
Townview Square Entr	I	45	34.7	23.0	57.7	0.36	22.3	D
Kossik Road	I	45	51.8	7.2	59.0	0.65	39.5	B
Centennial Road	I	55	131.7	41.7	173.4	2.01	41.8	B
CR 52A (Clinton Aven	I	50	126.5	17.9	144.4	1.76	43.8	A
Morningside Drive	I	50	73.2	19.7	92.9	1.02	39.4	B
SR 533 (US 98 Bypass	I	45	65.8	50.6	116.4	0.82	25.4	D
Total	I		528.4	166.9	695.3	7.12	36.9	B

Arterial Level of Service: SB SR 39 (US 301)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Morningside Drive	I	45	65.8	6.1	71.9	0.82	41.2	B
CR 52A (Clinton Aven	I	50	73.2	34.9	108.1	1.02	33.9	C
Centennial Road	I	55	115.1	17.7	132.8	1.76	47.7	A
Kossik Road	I	55	131.7	16.5	148.2	2.01	48.9	A
Townview Square Entr	I	45	51.8	18.6	70.4	0.65	33.1	C
Daugherty Road	I	45	34.7	8.3	43.0	0.36	30.0	C
CR 54 (Eiland Boulev	I	45	44.7	34.2	78.9	0.51	23.2	D
Total	I		517.0	136.3	653.3	7.12	39.2	B

Appendix C

Proposed Access Management Plan and Zephyr Commons Site Plan



Florida Department of Transportation

CHARLIE CRIST
GOVERNOR

11201 North Malcolm McKinley Drive
Tampa FL 33612

STEPHANIE C. KOPELOUSOS
SECRETARY

ACCESS MANAGEMENT REVIEW COMMITTEE (AMRC) TARPON ROOM

May 27, 2009

3. 10:00 AM PD&E study for US 301 – Zephyrhills to Dade City
Section: 14050000
Location: North Avenue/Geiger Road to US 98 Bypass/SR 533 (MP 5.834 – MP 13.476)
Status: New application

Posted Speed:	Begin MP	End MP	Posted Speed (MPH)
	5.834	6.148	35
	6.148	8.020	45
	8.020	11.130	55
	11.130	12.431	50
	12.431	13.259	45
	13.259	13.476	40

Typical Section: Rural, 4 lane, 2-way, divided, raised (MP 5.834 – MP 13.040)
Urban, 4-5 lane, 2-way, divided, raised (MP 13.040 – MP 13.476)

Existing Land Use: Urban built-up/agriculture

Access Class: Class 5 – North Avenue/Geiger Road to Pretty Pond Road (MP 5.834 – MP 7.362)
Class 3 – Pretty Pond Road to US 98 Bypass/SR 533 (MP 7.362 – MP 13.476)

Project Manager: Manny Santos

Presenters: HDR Engineering

Applicant Request: Review / approve suggested median modifications for PD&E study

STAFF RECOMMENDATION: approve

The applicant request is: Approved ☐ Disapproved ☐ Conditionally Approved ☒ Tabled ☐
Comments:

• CLOSE MEDIAN OPENING AT INTERSECTION OF BETH / McDONALD.

A ruling by the Access Management Review Committee (AMRC) only defines the number and type of access points and associated features that may be permitted and is not the final action in your permit process. Committee approval, or other favorable ruling, generally means that the property owner may develop plans complying with the ruling and submit them within six months to the Department for permit processing. Department permits personnel have the duties of checking the viability of the design plans in terms of standards compliance and constructability and of assuring that the plan substantially complies with the engineering drawings approved by the Committee. Committee approvals or rulings, which are at variance with Department rules or standards, are not binding in the permitting process for more than one year.

Please submit a copy of this letter with your permit application.

ACCESS MANAGEMENT REVIEW COMMITTEE

With the above ruling I:

Rochelle Garrett, PE Rochelle Garrett
District Traffic Design Engineer

Gary Thompson, PE Gary Thompson
District Traffic Operations Engineer

Ming Gao, PE Ming Gao
District Intermodal Systems Development Manager

Agree

Disagree

Date

☒

☐

5-27-09

☒

☐

5-27-09

☒

☐

5-27-09

Tuesday, May 26, 2009

ACCESS MANAGEMENT REVIEW COMMITTEE – SIGN IN US 301 PD&E

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<i>John Kilkenny, FDOT</i>	16411 Seawing Hill Dr., Suite 34604	John.kilkenny@dot.state.fl.us

PROPOSED ACCESS MANAGEMENT PLAN
US 301 (SR 39) Project Development and Environment (PD&E) Study from South of CR 54 (Eiland Boulevard) to
US 98 Bypass (SR 533), Pasco County Florida - FPID: 408075-1-22-01

Median Opening Number	Cross-Street	Location		Type of Existing Median Opening	Proposed Median Opening		FDOT Access Classification	Maximum Posted Speed (mph)	Proposed Minimum Spacing (ft)		Percent Compliant with FDOT Access Class		Remarks
		Milepost ¹	(Approx Sta.)		Type	Control			Signal	Median	Signal	Median	
1	Geiger Road/North Avenue	5.834	359+50	Full	Full	Signalized	5	35	1,320	1,320	100	100	
2	Unnamed - Hess, Beall's Outlet and McDonald's Driveway	5.910	363+50	SB-Directional	Closed	N/A	5	35					
3	Unnamed - McDonald's Driveway	5.950	365+65	Full	Closed	N/A	5	35					
4	Fort King Road	6.090	373+20	Full	Full	Signalized	5	35	1,320	1,320	100	100	
5	Unnamed - Kaufman Eye Institute Driveway	6.224	380+30	Bi-Directional	Bi-Directional	Unsignalized	5	45	--	687	--	100	
6	CR 54 (Eiland Boulevard)	6.354	387+10	Full	Full	Signalized	5	45	1,393	1,393	100	100	
7	Market Square Drive/Bentley Drive	6.509	395+25	Full	Bi-Directional	Unsignalized	5	45	--	632	--	96	
8	Pierre Lane	6.616	401+50	Full	Bi-Directional	Unsignalized	5	45	--	605	--	92	
9	Unnamed - Golden Coral and Eye Glass World Driveways	6.740	407+60	Full	Bi-Directional	Unsignalized	5	45	--	605	--	92	
10	Daughtery Road	6.862	413+75	Full	Full	Signalized	5	45	1,923	1,923	100	100	
11	Spanish Trails Boulevard/East Pasco Medical Center	6.992	420+50	Full	Bi-Directional	Unsignalized	5	45	--	530	--	80	
12	Medical Center Drive	7.080	425+80	Full	SB-Directional Only	Unsignalized	5	45	--	530	--	80	Southbound left-turn only; provides access to medical offices
13	Townview Square Center / Merchant's Square Driveways	7.220	433+00	Full	Full	Signalized	5	45	1,923	1,923	100	100	
14	Pretty Pond Road	7.362	440+25	Bi-Directional	Bi-Directional	Unsignalized	5	45	--	731	--	100	
15	Unnamed - Wal-Mart South Driveway	7.520	448+70	Full	Bi-Directional	Unsignalized	3	45	--	735	--	56	Included in Zephyr Commons site plan; coordination with John Kilkenny
16	Unnamed - Wal-Mart North Driveway	7.668	456+00	SB LT-In/WB LT-Out	Bi-Directional	Unsignalized	3	45	--	735	--	56	Included in Zephyr Commons site plan; coordination with John Kilkenny
17	Kossik Road	7.867	466+35	Full	Full	Signalized	3	45	3,338	3,338	100	100	
18	Unnamed - Vacant Driveway	7.938	470+10	Full	Closed	N/A	3	55					
19	Unnamed (south of Phelps Road)	8.239	486+00	Full	Closed	N/A	3	55					
20	Poncan Circle	8.490	500+00	Full	Full	Unsignalized	3	55	--	1,972	--	75	Adequate spacing is achieved if a directional median is placed at Bailey Hill Road/Roberts Road
21	Avoca Avenue	8.704	510+80	Full	Closed	N/A	3	55					
22	Baily Hill Road/Roberts Road	8.868	519+70	Full	Full	Unsignalized	3	55	--	1,227	--	46	Recommend full median opening in lieu of directional median opening due to large trucks accessing Roberts Road
23	Wire Road/TLC Lane	9.103	532+00	Full	SB LT-In/WB LT-Out	Unsignalized	3	55	--	1,227	--	46	
24	Unnamed (north of Callaway Boulevard)	9.332	544+10	Full	Closed	N/A	3	55					
25	Unnamed (south of Tweedsmuir Road)	9.527	554+40	Full	Closed	N/A	3	55					
26	Kingsmere Road	9.716	564+20	Full	Closed	N/A	3	55					
27	Centennial Road	9.879	573+05	Full	Full	Signalized	3	55	10,669	2,651	100	100	
28	Maltby Road	10.129	585+60	Full	NB-Directional	Unsignalized	3	55	--	1,255	--	95	
29	Townsend Road	10.381	599+50	Full	Full	Unsignalized	3	55	--	2,651	--	100	
30	Unnamed - Aaron's, Fastenal, Whirlpool, Masters-Hill, East Pasco Interiors, Sonny Appliances, Auto Repair and Marine & Tackle Driveway	10.550	608+45	Full	Closed	N/A	3	55					
31	Unnamed (south of Musselman Road)	10.809	622+10	Full	Closed	N/A	3	55					
32	Musselman Road	10.889	626+10	Closed	Full	Unsignalized	3	55	--	2,399	--	91	
33	Unnamed (south of US 98/SR 35/SR 700)	11.120	638+30	Full	Closed	N/A	3	55					
34	US 98/SR 35/SR 700 ²	11.342	650+20	Full	Full	Unsignalized	3	50	--	1,565	--	59	Existing spacing is maintained between two primary cross-streets. Possible realignment of US 98 (SR 700) to resolve spacing deficiency.
35	CR 52A (Clinton Avenue)	11.637	665+90	Full	Full	Signalized	3	50	1,565	1,565	59	59	
36	Pine Street	11.843	676+50	Full	Closed	N/A	3	50					
37	Unnamed - Citrus Dodge Driveway and Frontage Road Access	12.024	686+10	Full	Bi-Directional	Unsignalized	3	50	--	1,271	--	96	
38	Beth Street/McDonald Street	12.255	699+00	Full	Closed	N/A	3	50					
39	Dade City Avenue	12.399	706+20	Full	Closed	N/A	3	50					

Median Opening Number	Cross-Street	Location		Type of Existing Median Opening	Proposed Median Opening		FDOT Access Classification	Maximum Posted Speed (mph)	Proposed Minimum Spacing (ft)		Percent Compliant with FDOT Access Class		Remarks
		Milepost ¹	(Approx Sta.)		Type	Control			Signal	Median	Signal	Median	
40	Morningside Plaza Drvieway	12.523	712+45	Full	Closed	N/A	3	45					
41	Morningside Drive	12.654	719+20	Full	Full	Signalized	3	45	4,410	4,410	100	100	
42	Unnamed	12.724	722+90	SB-Directional	Closed	N/A	3	45					
43	Dade Village Entrance	12.799	727+00	SB-Directional	Closed	N/A	3	45					
44	Countryside Place	12.993	737+30	Full	Bi-Directional	Unsignalized	3	45	--	1,066	--	81	One of only two median openings between Morningside Drive and US 98 Bypass (SR 533). Located at collector cross-street.
45	Multiple Driveways Between MP 12.993 and MP 13.199	12.993 - 13.199	737+30 - 748+00	Two-Way Center Left-Turn Lane	Closed	N/A	3	45					
46	Willingham Avenue	13.199	748+00	Full	Bi-Directional	Unsignalized	3	45	--	1,066	--	81	One of only two median openings between Morningside Drive and US 98 Bypass (SR 533). Located at collector cross-street.
47	Lake Drive/Heather Plaza	13.257	751+00	Full	Closed	N/A	3	45					
48	E. Shadow Avenue	13.314	754+00	NB-SB LT-In/WB Lt-Out	Closed	N/A	3	40					
49	E. Sunset Avenue/Hillside Lane	13.363	757+00	Full	Closed	N/A	3	40					
50	E. Dixie Avenue	13.413	760+00	Full	Closed	N/A	3	40					

Notes:

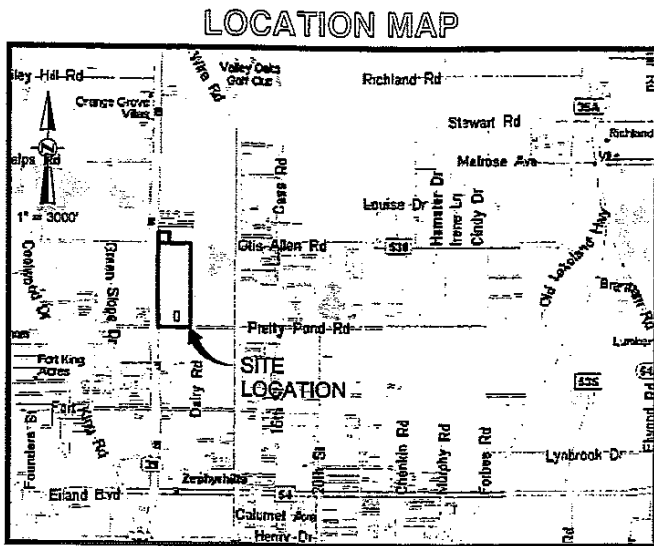
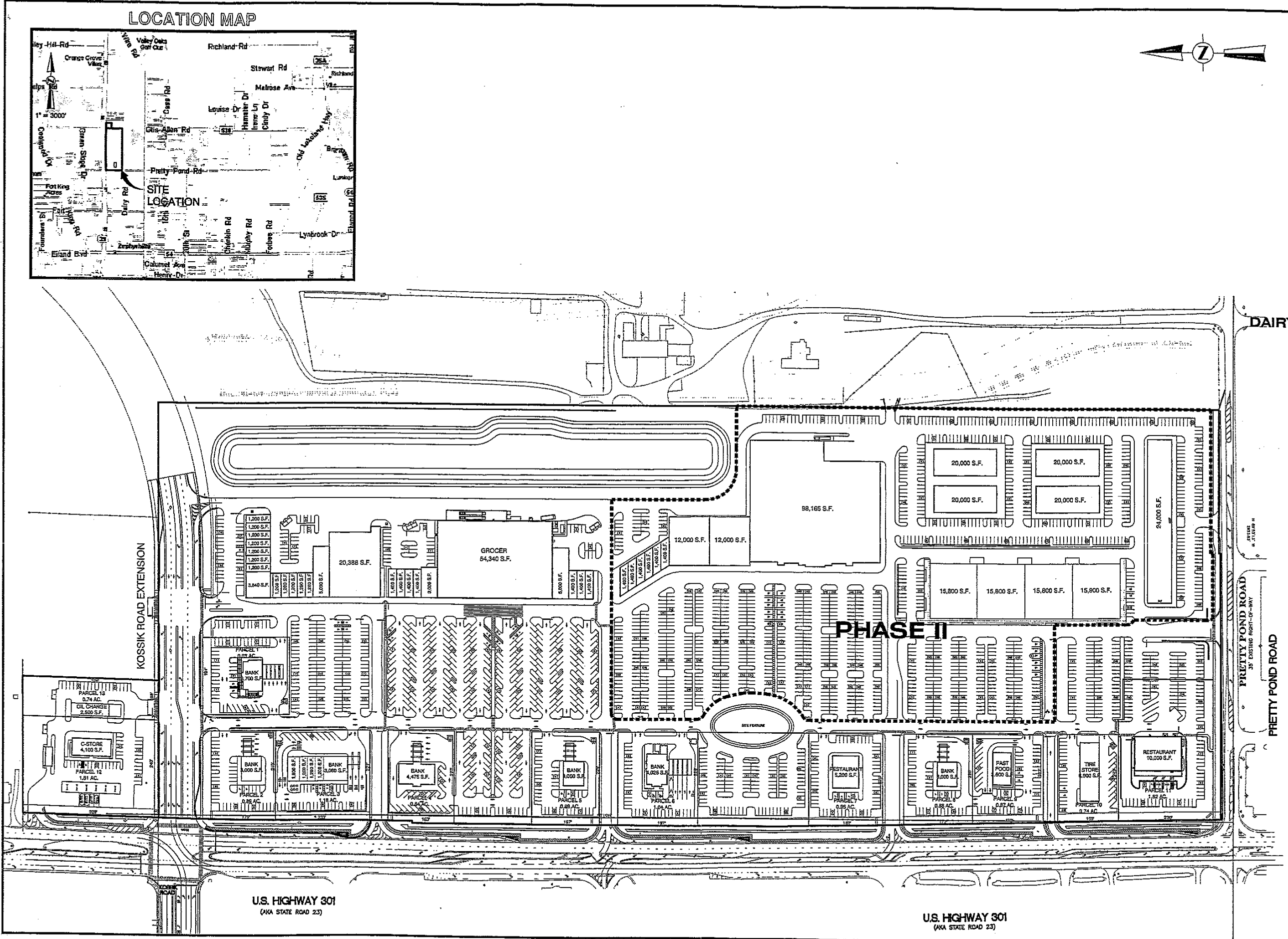
Bold - indicates signalized intersection

¹ Source: FDOT Straight Line Diagram of Road Inventory for roadway Section 14-050-000 (Revised 05/31/2002)

² Traffic signalization is recommended at the US 301 (SR 39)/US 98 (SR 700) intersection when warranted.

- indicates proposed closing of existing median opening

K:\PROJECTS\100152023\DWG\CONCEPT\152023 Marketing Plan-2.dwg, 8/15/2007 12:56:37 PM, ly.gurr



ZEPHYR COMMONS ZEPHYRHILLS, FLORIDA SITE PLAN	PRIMERICA GROUP ONE, INC. CIVIL ENGINEERING LAND PLANNING TRAFFIC/TRANSPORTATION LANDSCAPE ARCHITECTURE ENVIRONMENTAL SCIENCES 2500 GULFVIEW ROAD, STE 100 PALM HARBOR, FL 34683 PHONE (727) 788-9880 FAX (727) 788-9882 WWW.PRIMERICA.COM		SCALE: DRAWN BY: T.G. PROJ. MANAGER: T.G. PROJ. # 152-023 DATE: 7-25-07	ISSUED FOR: ☐ PRELIMINARY ☐ PERMITTING ☐ FINAL ☐ CONSTRUCTION ☐ RECORD DWG
	BY: DESCRIPTION: DATE: NO. DATE: NO.			

ZEPHYR COMMONS PHASE 1

A REPLAT OF A PORTION OF TRACTS 7, 10, 23, 25, 26, 39, 40, 41, 42, 55, 56, 57 AND 58, TOGETHER WITH TRACTS 8, 9, AND 24, ZEPHYRHILLS COLONY COMPANY LANDS SUBDIVISION AS RECORDED IN PLAT BOOK 1, PAGE 55 OF THE PUBLIC RECORDS OF PASCO COUNTY, FLORIDA, ALL LYING WITHIN SECTION 35, TOWNSHIP 25 SOUTH, RANGE 21 EAST, PASCO COUNTY, FLORIDA; AND A REPLAT OF THAT PORTION OF TRACTS 33 AND 48, ZEPHYRHILLS COLONY COMPANY LANDS SUBDIVISION AS RECORDED IN PLAT BOOK 1, PAGE 55, IN SECTION 34, TOWNSHIP 25 SOUTH, RANGE 21 EAST, LYING EAST OF U.S. HIGHWAY 301, PASCO COUNTY, FLORIDA; AND A PORTION OF THE SOUTHWEST 1/4 OF SECTION 26 AND A PORTION OF THE SOUTHEAST 1/4 OF SECTION 27, TOWNSHIP 25, SOUTH, RANGE 21 EAST, LYING EAST OF U.S. HIGHWAY 301, PASCO COUNTY, FLORIDA.

DEDICATION

STATE OF FLORIDA)
COUNTY OF PASCO) S.S.

KNOW ALL MEN BY THESE PRESENTS THAT "ZEPHYR COMMONS, L.L.C.", A LIMITED LIABILITY COMPANY, DULY ORGANIZED AND EXISTING UNDER THE LAWS OF THE STATE OF FLORIDA - OWNERS OF THE LAND SHOWN ON THIS PLAT TO BE KNOWN AS "ZEPHYR COMMONS PHASE ONE" BEING A REPLAT OF A PORTION OF TRACTS 7, 10, 23, 25, 26, 39, 40, 41, 42, 55, 56, 57 AND 58, TOGETHER WITH TRACTS 8, 9, AND 24, ZEPHYRHILLS COLONY COMPANY LANDS SUBDIVISION AS RECORDED IN PLAT BOOK 1, PAGE 55 OF THE PUBLIC RECORDS OF PASCO COUNTY, FLORIDA, ALL LYING WITHIN SECTION 35, TOWNSHIP 25 SOUTH, RANGE 21 EAST, PASCO COUNTY, FLORIDA; AND A REPLAT OF THAT PORTION OF TRACTS 33 AND 48, ZEPHYRHILLS COLONY COMPANY LANDS SUBDIVISION AS RECORDED IN PLAT BOOK 1, PAGE 55, IN SECTION 34, TOWNSHIP 25 SOUTH, RANGE 21 EAST, LYING EAST OF U.S. HIGHWAY 301, PASCO COUNTY, FLORIDA; AND A PORTION OF THE SOUTHWEST 1/4 OF SECTION 26 AND A PORTION OF THE SOUTHEAST 1/4 OF SECTION 27, TOWNSHIP 25, SOUTH, RANGE 21 EAST, LYING EAST OF U.S. HIGHWAY 301, PASCO COUNTY, FLORIDA; ALL BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGIN AT THE NORTHWEST CORNER OF SAID SECTION 35, TOWNSHIP 25 SOUTH, RANGE 21 EAST, PASCO COUNTY, FLORIDA; THENCE ALONG THE NORTH BOUNDARY OF SAID SECTION 35, S. 89°59'50" E., 1015.17 FEET; THENCE DEPARTING SAID NORTH BOUNDARY, S. 00°09'45" W., 2,618.61 FEET, TO THE NORTH RIGHT OF WAY LINE OF PRETTY POND ROAD; THENCE WESTERLY, ALONG SAID NORTH RIGHT OF WAY LINE, THE FOLLOWING THREE (3) COURSES: (1) N. 89°53'13" W., 351.59 FEET; (2) S. 00°09'48" W., 5.00 FEET; (3) N. 89°53'13" W., 657.26 FEET, TO THE EASTERLY RIGHT-OF-WAY LINE OF U.S. HIGHWAY NO. 301; THENCE NORTHERLY, ALONG SAID EASTERLY RIGHT-OF-WAY LINE, THE FOLLOWING FOUR (4) COURSES: (1) N. 01°07'18" W., 101.25 FEET; (2) N. 00°11'30" E., 894.96 FEET; (3) N. 89°46'32" E., 5.00 FEET; (4) NORTHERLY, 625.74 FEET, ALONG THE ARC OF A CURVE CONCAVE TO THE EAST (SAID CURVE HAVING A RADIUS 38082.19 FEET, DELTA ANGLE OF 00°26'59", AND A CHORD BEARING AND DISTANCE OF N. 00°41'43" E., 625.73 FEET), TO A POINT ON THE SOUTH BOUNDARY OF SAID SECTION 34; THENCE S. 89°58'32" E., ALONG SAID SOUTH BOUNDARY, 7.21 FEET TO THE POINT OF BEGINNING.

AND COMMENCE AT THE SOUTHWEST CORNER OF SAID SECTION 26; THENCE N. 00°13'58" E., ALONG THE WEST BOUNDARY OF THE SOUTHWEST 1/4 OF SAID SECTION 26, 12.45 FEET; THENCE N. 89°59'19" W., 7.00 FEET, TO THE EASTERLY RIGHT-OF-WAY LINE OF U.S. HIGHWAY NO. 301 AND FOR A POINT OF BEGINNING; THENCE NORTHERLY, 325.92 FEET, ALONG SAID RIGHT-OF-WAY LINE AND ALONG THE ARC OF A CURVE CONCAVE TO THE EAST (SAID CURVE HAVING A RADIUS OF 38082.19 FEET, DELTA ANGLE OF 00°29'25", AND A CHORD BEARING AND DISTANCE OF N. 01°25'47" E., 325.92 FEET); THENCE DEPARTING SAID RIGHT-OF-WAY LINE, N. 89°57'59" E., 338.00 FEET; THENCE S. 01°25'10" W., 326.18 FEET; THENCE N. 89°59'19" W., 338.05 FEET, TO THE POINT OF BEGINNING.

ALL LESS AND EXCEPT THE FOLLOWING:
FOR A POINT OF REFERENCE COMMENCE AT NORTHWEST CORNER OF SAID SECTION 35, TOWNSHIP 25 SOUTH, RANGE 21 EAST, PASCO COUNTY, FLORIDA; THENCE ALONG THE NORTH BOUNDARY OF SAID SECTION 35, S. 89°59'50" E., 1015.17 FEET; THENCE DEPARTING SAID SECTION LINE, S. 00°09'45" W., 1433.91 FEET; THENCE N. 89°50'15" W., 55.00 FEET FOR A POINT OF BEGINNING; THENCE S. 00°09'45" W., 1164.74 FEET, TO A POINT LYING 55.00 FEET NORTH OF THE SOUTH BOUNDARY OF THE NORTHWEST 1/4 OF SAID SECTION 35; THENCE N. 89°53'13" W., PARALLEL WITH SAID SOUTH BOUNDARY, 296.70 FEET; THENCE S. 00°09'48" W., 5.00 FEET, TO A POINT LYING 50.00 FEET NORTH OF THE SOUTH BOUNDARY OF THE NORTHWEST 1/4 OF SAID SECTION 35; THENCE N. 89°53'13" W., PARALLEL WITH SAID SOUTH BOUNDARY, 160.29 FEET; THENCE N. 00°00'10" E., 438.53 FEET; THENCE N. 89°59'50" W., 248.34 FEET; THENCE N. 00°00'10" E., 563.59 FEET; THENCE N. 46°07'14" E., 83.24 FEET; THENCE N. 00°00'10" E., 150.00 FEET; THENCE N. 45°42'43" W., 83.81 FEET; THENCE N. 00°00'10" E., 204.08 FEET; THENCE N. 89°38'24" E., 524.59 FEET TO THE POINT OF BEGINNING.

SAID LAND CONTAINING 44.47 ACRES MORE OR LESS.

AND DOES HEREBY FURTHER DEDICATES AND GRANTS EASEMENTS TO THE CITY OF ZEPHYRHILLS, A MUNICIPAL CORPORATION, DULY ORGANIZED AND EXISTING UNDER AND BY VIRTUE OF THE CONSTITUTION OF THE STATE OF FLORIDA, OVER THOSE AREAS IDENTIFIED ON THIS PLAT AS TRACT E, TRACT F, EASEMENT A, INGRESS-EGRESS EASEMENTS AND UTILITY EASEMENTS IN PERPETUITY AND UTILITY EASEMENTS OVER ALL STREET RIGHTS-OF-WAYS; TO SURVEY, CONSTRUCT, OPERATE, MAINTAIN, TEST, INSPECT, REPAIR, REMOVE, REPLACE OR ABANDON IN PLACE AND TO CONTROL UTILITY FACILITIES, TOGETHER WITH ALL NECESSARY APPURTENANCES THEREON IN, OVER, UPON, ACROSS, THROUGH AND UNDER THE ABOVE DESCRIBED PREMISES SITUATED IN THE CITY OF ZEPHYRHILLS, STATE OF FLORIDA, RESERVING THE RIGHT, HOWEVER, TO THE OWNER, THEIR HEIRS AND ASSIGNS THE RIGHT TO UTILIZE AND ENJOY THE ABOVE DESCRIBED PREMISES PROVIDING THE SAME SHALL NOT INTERFERE WITH THE CONSTRUCTION, MAINTENANCE, REPAIRING, INSPECTION AND OPERATION OF SAID UTILITIES, AND FURTHER PROVIDING THAT THE GRANTOR SHALL NOT ERECT OR PLACE ANY BUILDING OR TREE ON THE HEREON DEPICTED RIGHTS-OF-WAYS OR EASEMENTS AND THE CITY SHALL NOT BE LIABLE FOR THEIR REMOVAL IF THEY ARE SO PLACED.

THIS THE _____ DAY OF _____, A.D., 2007.

OWNER: ZEPHYR COMMONS, L.L.C.

BY: _____ WITNESS
RICHARD TRZCINSKI
MANAGING MEMBER &
AUTHORIZED REPRESENTATIVE WITNESS

ACKNOWLEDGEMENT

STATE OF FLORIDA)
COUNTY OF PASCO) S.S.

I HEREBY CERTIFY THAT ON THIS _____ DAY OF _____, 2007, BEFORE ME PERSONALLY APPEARED RICHARD TRZCINSKI, MANAGING PARTNER AND AUTHORIZED REPRESENTATIVE OF ZEPHYR COMMONS, L.L.C., A LIMITED LIABILITY COMPANY, TO ME KNOWN TO BE THE PERSON DESCRIBED IN AND WHO EXECUTED THE FOREGOING CERTIFICATE AND ACKNOWLEDGED THE EXECUTION THEREOF TO BE THEIR FREE ACT AND DEED FOR THE USES AND PURPOSES THEREIN EXPRESSED.

WITNESS MY HAND AND OFFICIAL SEAL AT PASCO COUNTY, FLORIDA, THE DAY AND YEAR AFORESAID.

NOTARY PUBLIC - STATE OF FLORIDA, AT LARGE

PRINTED NAME OF NOTARY PUBLIC
MY COMMISSION EXPIRES _____

FOR: RICHARD TRZCINSKI
PERSONALLY KNOWN
PRODUCED IDENTIFICATION
TYPE OF IDENTIFICATION PRODUCED _____

JOINDER AND CONSENT TO DEDICATE

STATE OF FLORIDA)
COUNTY OF PASCO) S.S.

THE UNDERSIGNED HEREBY CERTIFIES THAT IT IS THE HOLDER OF A MORTGAGE, LIEN OR OTHER ENCUMBRANCE UPON THE ABOVE DESCRIBED PROPERTY, AND THAT THE UNDERSIGNED HEREBY JOINS IN AND CONSENTS TO THE DEDICATION OF THE LANDS DESCRIBED HEREON BY THE OWNER THEREOF, AND AGREES THAT ITS MORTGAGE, LIEN OR OTHER ENCUMBRANCE SHALL BE SUBORDINATED TO THE ABOVE DEDICATION.

WELLS FARGO BANK

BY: _____ WITNESS
BRANDON GRANAI
VICE-PRESIDENT AND AUTHORIZED
REPRESENTATIVE OF WELLS FARGO BANK, WITNESS
NATIONAL ASSOCIATION

ACKNOWLEDGEMENT

I HEREBY CERTIFY ON THIS _____ DAY OF _____

2007, BEFORE ME, AN OFFICER AUTHORIZED TO TAKE ACKNOWLEDGEMENTS IN THE STATE AND COUNTY AFORESAID, PERSONALLY APPEARED BRANDON GRANAI, VICE-PRESIDENT OF WELLS FARGO BANK, NATIONAL ASSOCIATION, TO ME KNOWN TO BE THE PERSON DESCRIBED IN AND WHO EXECUTED THE FOREGOING CONSENT TO DEDICATION AND SEVERALLY ACKNOWLEDGED THE EXECUTION THEREOF TO BE THEIR FREE ACT AND DEED FOR THE USES AND PURPOSES THEREIN EXPRESSED.

WITNESS MY HAND AND OFFICIAL SEAL AT PASCO COUNTY, FLORIDA, THE DAY AND YEAR AFORESAID.

NOTARY PUBLIC - STATE OF FLORIDA, AT LARGE

PRINTED NAME OF NOTARY PUBLIC
MY COMMISSION EXPIRES _____

FOR: BRANDON GRANAI
PERSONALLY KNOWN
PRODUCED IDENTIFICATION
TYPE OF IDENTIFICATION PRODUCED _____

CERTIFICATE OF TITLE

STATE OF FLORIDA)
COUNTY OF PASCO) SS

I, W. LAWRENCE SMITH, DULY AUTHORIZED AGENT FOR FIRST AMERICAN TITLE INSURANCE COMPANY, DO HEREBY CERTIFY THAT THE RECORD TITLE TO THE LAND DESCRIBED AND SHOWN ON THIS PLAT IS IN THE NAME OF THE LIMITED LIABILITY COMPANY EXECUTING THE DEDICATION AS SHOWN ON THE PLAT. IN THE EVENT THE PLAT DOES NOT CONTAIN A DEDICATION, I HEREBY CERTIFY THAT THE DEVELOPER OF THE PLATTED SUBDIVISION HAS RECORD TITLE TO THE LAND. ADDITIONALLY, I CERTIFY THAT THERE ARE NO LIENS AND/OR ENCUMBRANCES OF RECORD AGAINST SAID PROPERTY, EXCEPT AS SHOWN ON SAID PLAT; AND THAT THE TAXES FOR THE YEAR 2006 HAVE BEEN PAID.

THIS THE _____ DAY OF _____, 2007

W. LAWRENCE SMITH, AS THE DULY AUTHORIZED AGENT FOR
FIRST AMERICAN TITLE INSURANCE COMPANY

CERTIFICATE OF APPROVAL BY CITY COUNCIL

THIS IS TO CERTIFY THAT ON _____ THIS PLAT WAS
APPROVED BY THE CITY COUNCIL OF THE CITY OF ZEPHYRHILLS, FLORIDA.

PRESIDENT OF COUNCIL _____

ATTEST:

CITY MANAGER _____

PLAT BOOK _____, PAGE _____

CERTIFICATE OF APPROVAL BY CITY OF ZEPHYRHILLS PLANNING COMMISSION

THIS IS TO CERTIFY THAT ON _____ THE CITY OF ZEPHYRHILLS PLANNING COMMISSION REVIEWED THIS PLAT AND RECOMMENDS THAT THE ZEPHYRHILLS CITY COUNCIL APPROVE THE PROPOSED SUBDIVISION OF LANDS AS INDICATED HEREON.

PLANNING COMMISSION CHAIRMAN _____

CERTIFICATE OF THE CLERK OF CIRCUIT COURT

I HEREBY CERTIFY THAT I HAVE EXAMINED THIS PLAT AND FIND THAT IT COMPLIES IN FORM WITH ALL THE REQUIREMENTS OF CHAPTER 177, FLORIDA STATUTES, AND HAS BEEN FILED IN THE PUBLIC RECORDS OF PASCO COUNTY, FLORIDA THIS _____ DAY

OF _____, 2007 A.D. IN PLAT BOOK _____.

PAGES _____ THROUGH _____.

CLERK OF CIRCUIT COURT _____

REVIEW OF PLAT BY REGISTERED SURVEYOR

REVIEWED FOR COMPLIANCE WITH CHAPTER 177 OF THE FLORIDA STATUTES ON THIS _____ DAY OF _____, 2007.

PLAT GEOMETRIC DATA HAS NOT BEEN VERIFIED

????????????????????
FLORIDA PROFESSIONAL SURVEYOR AND MAPPER NO. ??????

SURVEYOR'S CERTIFICATE

I, MAURICE W. BEALL, JR., THE UNDERSIGNED REGISTERED SURVEYOR, DO HEREBY CERTIFY THAT ON _____, 2007, THE AFORESAID PROPERTY WAS SURVEYED, THAT THIS PLAT IS A TRUE AND CORRECT REPRESENTATION OF SAID SURVEY MADE UNDER MY RESPONSIBLE DIRECTION AND SUPERVISION. I FURTHER CERTIFY THAT PERMANENT REFERENCE MONUMENTS (PRM'S) HAVE BEEN SET AS OF THE DATE OF THIS CERTIFICATE AND THAT PERMANENT CONTROL POINTS (PCP'S) WILL BE SET WITHIN ONE YEAR OF THE DATE OF THIS CERTIFICATE AND DO HEREBY FURTHER CERTIFY THAT MONUMENTS SHALL BE SET AT ALL LOT CORNERS AS PRESCRIBED BY CHAPTER 177 OF THE FLORIDA STATUTES AND DO HEREBY FURTHER CERTIFY THAT THIS PLAT COMPLIES WITH ALL PLATTING REQUIREMENTS OF CHAPTER 177 OF THE FLORIDA STATUTES AND AMENDMENTS THEREOF.

MAURICE W. BEALL, JR.
PROFESSIONAL SURVEYOR AND MAPPER
FLORIDA REGISTRATION NUMBER 4281

GENERAL NOTES.

1. BEARINGS SHOWN HEREON ARE BASED ON ASSUMED DATUM. THE NORTH BOUNDARY OF SECTION 35, TOWNSHIP 25 SOUTH, RANGE 21 EAST BEARS S. 89°59'50" E.
2. TRACT "A" (RETENTION AREA) AND ALL DRAINAGE FACILITIES AND/OR EASEMENTS SHOWN HEREON ARE DEDICATED AND EASEMENTS ARE GRANTED FOR THE PRIVATE USE AND MAINTENANCE OF THE "ZEPHYR COMMONS OWNER'S ASSOCIATION" AND ITS MEMBERS.
3. TRACTS "B, C AND G" (PARKING AREAS) SHOWN HEREON ARE DEDICATED AND EASEMENTS ARE GRANTED FOR THE PRIVATE USE AND MAINTENANCE OF THE "ZEPHYR COMMONS OWNER'S ASSOCIATION" AND ITS MEMBERS.
4. TRACT "E" (LIFT STATION) SHOWN HEREON IS DEDICATED TO AND GRANTED FOR THE PERPETUAL USE BY THE CITY OF ZEPHYRHILLS.
5. TRACT "F" (ADDITIONAL ROAD RIGHT-OF-WAY) SHOWN HEREON IS DEDICATED TO AND GRANTED FOR THE PERPETUAL USE BY THE CITY OF ZEPHYRHILLS AND THE PUBLIC.
6. EASEMENT "A" (INGRESS-EGRESS AND UTILITY EASEMENT) SHOWN HEREON IS AN EASEMENT FOR THE POTABLE WATER AND SANITARY SEWER SYSTEM AND IS DEDICATED FOR THE USE OF AND EASEMENTS ARE GRANTED TO THE CITY OF ZEPHYRHILLS FOR MAINTENANCE AND OPERATION.
7. ALL LANDSCAPE BUFFER EASEMENTS SHOWN HEREON ARE GRANTED TO AND SHALL BE MAINTAINED AND ENFORCED BY THE "ZEPHYR COMMONS OWNER'S ASSOCIATION" AND ITS MEMBERS.

SIMMONS & BEALL, INC.
SURVEYING & MAPPING

P.O. BOX 1297
12222 HWY. 301 S.
DADE CITY, FLORIDA 33526
(352) 587-0048
LB NUMBER LB6382

SHEET 1 OF 4

NOTICE: THIS PLAT, AS RECORDED IN ITS GRAPHIC FORM, IS THE OFFICIAL DEPICTION OF THE SUBDIVIDED LANDS DESCRIBED HEREIN AND WILL, IN NO CIRCUMSTANCES BE SUPPLANTED IN AUTHORITY BY ANY OTHER GRAPHIC OR DIGITAL FORM OF THE PLAT, THERE MAY BE ADDITIONAL RESTRICTIONS THAT ARE NOT RECORDED ON THIS PLAT THAT MAY BE FOUND IN THE PUBLIC RECORDS OF THIS COUNTY.

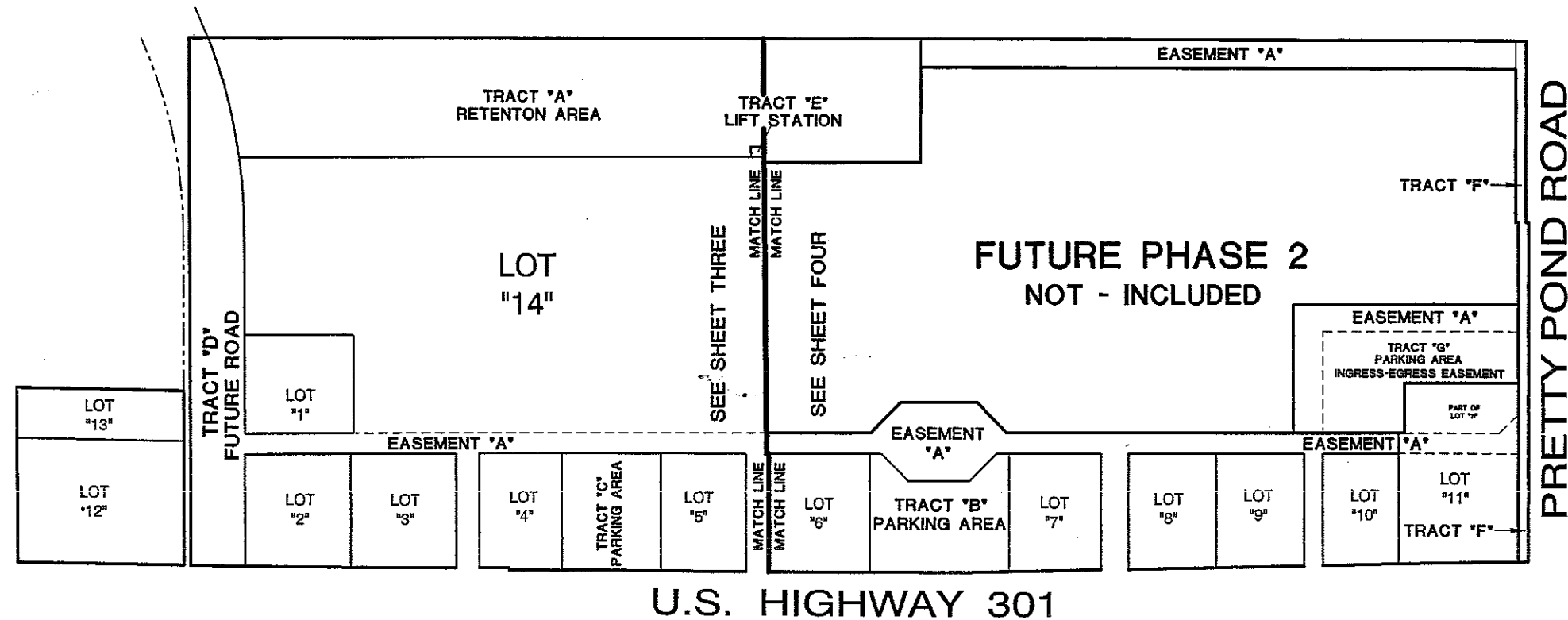
PDF Created with docuPDF PDF Writer - trial - http://www.docuask.com

ZEPHYR COMMONS PHASE 1

PLAT BOOK _____, PAGE _____

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NO SCALE



SHEET INDEX MAP

LEGEND

- DENOTES PERMANENT REFERENCE MONUMENT (P.R.M.)
SET # LB 6382 EXCEPT AS SHOWN ON PLAT
- (R) - DENOTES A RADIAL LOT LINE
- (NR) - DENOTES A NON-RADIAL LOT LINE
- R/W - DENOTES RIGHT-OF-WAY
- POB - DENOTES POINT OF BEGINNING
- ZCCL - DENOTES ZEPHYRHILLS COLONY COMPANY LANDS
- PB, PG - DENOTES PLAT BOOK & PAGE NUMBER
- △ - DENOTES ZEPHYRHILLS COLONY COMPANY LANDS TRACT NUMBER

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SIMMONS & BEALL, INC.
SURVEYING & MAPPING

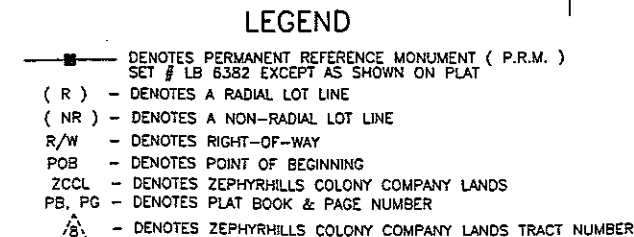
P.O. BOX 1287
12222 HWY. 301 S.
DADE CITY, FLORIDA 33525
(352) 567 - 0048
LB NUMBER LB6382

SHEET 2 OF 4

PLAT BOOK _____, PAGE _____

SCALE - 1" = 80'

CURVE TABLE					
CURVE	ARC	RADIUS	DELTA ANGLE	CHORD BEARING	CHORD
C1	525.24'	38082.19'	0°27'26" E	N 0°21'43" E	325.73'
C2	325.92'	38082.19'	0°29'25" E	N 0°12'47" E	325.92'
C3	12.45'	38082.19'	0°01'46" E	N 1°10'31" W	12.45'
C4	140.27'	10220.00'	9°52'46" E	N 8°04'18" E	140.16'
C5	74.03'	10220.00'	1°37'58" E	N 1°39'47" E	73.97'
C6	59.01'	38082.19'	0°03'20" E	N 0°16'08" E	59.01'
C7	45.00'	38082.19'	0°04'04" E	N 0°20'50" E	45.00'
C8	205.98'	38082.19'	0°13'36" E	N 0°32'39" E	205.98'
C9	108.17'	38082.19'	0°07'17" E	N 0°08'17" E	108.17'
C10	107.57'	38082.19'	0°09'43" E	N 0°05'06" E	107.57'



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SIMMONS & BEALL, INC.
SURVEYING & MAPPING

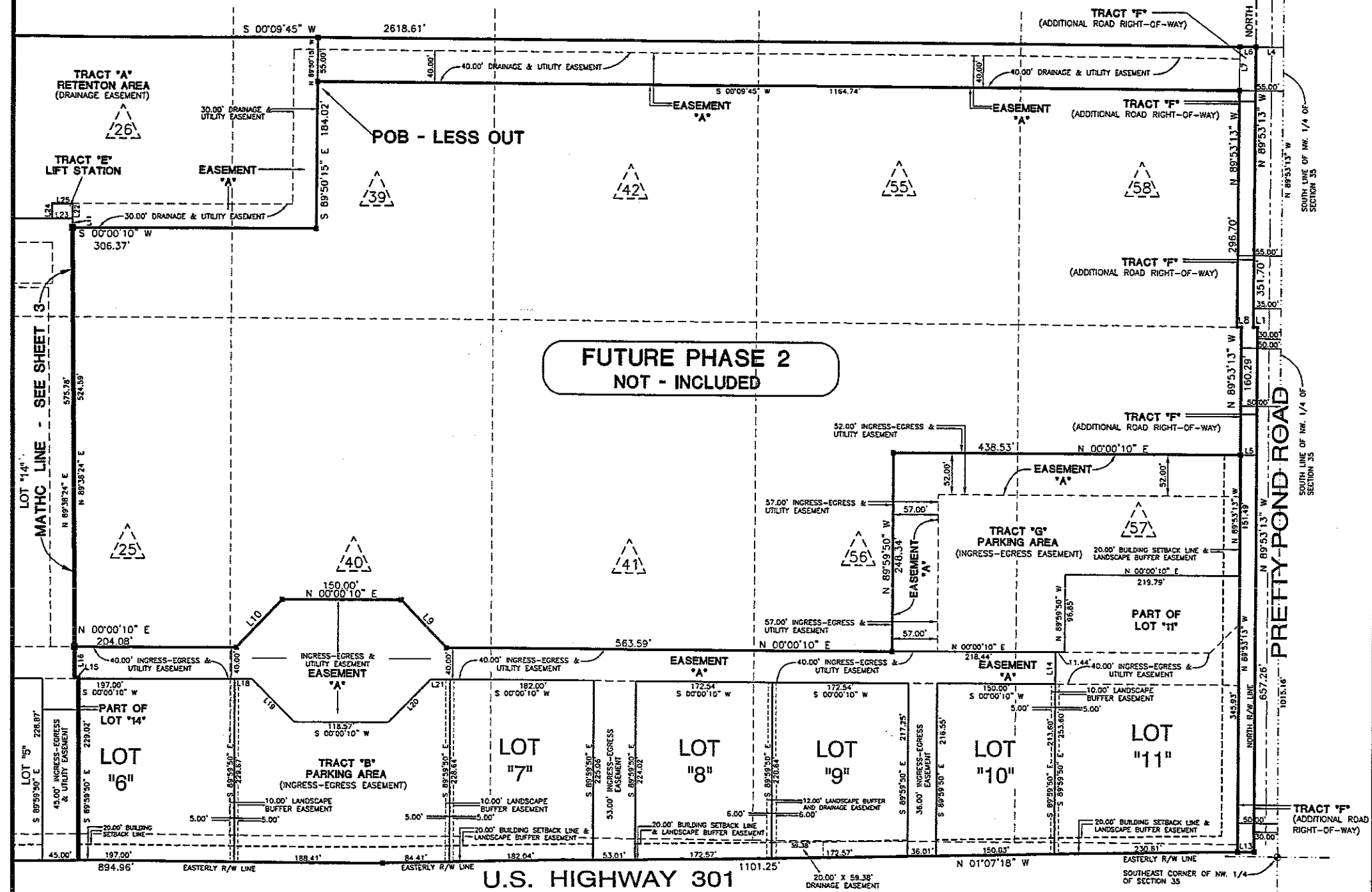
  P.O. BOX 1257
12222 HWY. 301 S.
DADE CITY, FLORIDA 33526
(813) 557-0048
LB NUMBER LB6382

ZEPHYR COMMONS PHASE 1

PLAT BOOK _____, PAGE _____

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SCALE - 1" = 80'



LEGEND

- DENOTES PERMANENT REFERENCE MONUMENT (P.R.M.) SET # LB 6382 EXCEPT AS SHOWN ON PLAT
- (R) - DENOTES A RADIAL LOT LINE
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- ZCCL - DENOTES ZEPHYRHILLS COLONY COMPANY LANDS
- PB, PG - DENOTES PLAT BOOK & PAGE NUMBER
- 25 - DENOTES ZEPHYRHILLS COLONY COMPANY LANDS TRACT NUMBER

LINE TABLE

LINE	BEARING	DISTANCE	LINE	BEARING	DISTANCE
L1	S 00°09'45" W	5.00'	L14	S 89°59'50" E	40.00'
L2	S 89°46'32" E	5.00'	L15	S 00°00'10" W	4.75'
L3	S 89°58'32" E	7.21'	L16	S 89°58'24" W	40.00'
L4	N 00°09'45" E	35.00'	L17	S 89°59'19" E	40.00'
L5	N 00°00'10" E	20.00'	L18	S 00°00'10" W	22.84'
L6	N 00°09'45" E	20.00'	L19	S 45°00'11" W	75.61'
L7	N 89°53'13" W	55.00'	L20	S 44°59'49" E	75.61'
L8	S 00°09'45" W	5.00'	L21	S 00°00'10" W	24.46'
L9	N 46°07'14" E	63.24'	L22	N 89°59'50" W	18.52'
L10	N 45°42'43" W	83.81'	L23	N 00°00'10" E	25.50'
L11	N 89°38'24" E	11.18'	L24	S 89°59'50" E	18.82'
L12	S 00°09'45" W	37.63'	L25	S 00°00'10" W	25.59'
L13	N 01°07'18" W	20.00'			

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SHEET 4 OF 4

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Appendix D

Design year (2035) Synchro Intersection Analysis Sheets for No-Build Conditions

HCM Signalized Intersection Capacity Analysis

1: CR 54 (Eiland Boulevard) & SR 39 (US 301)

2/4/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	414	485	130	186	429	342	64	1200	334	242	1722	500
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.3		4.5	5.3		4.5	5.3	5.3	4.5	5.3	5.3
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1804		1770	1739		1770	3505	1583	1770	3505	1583
Flt Permitted	0.07	1.00		0.17	1.00		0.14	1.00	1.00	0.12	1.00	1.00
Satd. Flow (perm)	132	1804		310	1739		261	3505	1583	225	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	450	527	141	202	466	372	70	1304	363	263	1872	543
RTOR Reduction (vph)	0	7	0	0	22	0	0	0	96	0	0	113
Lane Group Flow (vph)	450	661	0	202	816	0	70	1304	267	263	1872	430
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	72.0	60.0		59.5	52.0		33.0	28.6	28.6	52.4	43.5	43.5
Effective Green, g (s)	72.0	60.0		59.5	52.0		33.0	28.6	28.6	52.4	43.5	43.5
Actuated g/C Ratio	0.53	0.44		0.44	0.39		0.24	0.21	0.21	0.39	0.32	0.32
Clearance Time (s)	4.5	5.3		4.5	5.3		4.5	5.3	5.3	4.5	5.3	5.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	258	802		218	670		113	743	335	308	1129	510
v/s Ratio Prot	c0.20	0.37		0.05	0.47		0.02	0.37		c0.12	c0.53	
v/s Ratio Perm	c0.73			0.36			0.13		0.17	0.21		0.27
v/c Ratio	1.74	0.82		0.93	1.22		0.62	1.76	0.80	0.85	1.66	0.84
Uniform Delay, d1	44.2	32.9		34.3	41.5		42.4	53.2	50.4	36.8	45.8	42.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.37	1.16	1.25
Incremental Delay, d2	350.5	6.9		40.7	111.6		9.7	345.3	17.6	2.3	296.5	1.7
Delay (s)	394.7	39.7		75.0	153.1		52.2	398.5	68.1	52.7	349.4	54.9
Level of Service	F	D		E	F		D	F	E	D	F	D
Approach Delay (s)		182.6			137.9			315.5			260.6	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	242.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.65		
Actuated Cycle Length (s)	135.0	Sum of lost time (s)	14.3
Intersection Capacity Utilization	134.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Daugherty Road & SR 39 (US 301)

2/4/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	69	132	161	131	103	70	84	1734	138	96	2197	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	5.3	5.3	4.5	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Flt	1.00	0.92		1.00	0.94		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1709		1770	1750		1770	3505	1583	1770	3483	
Flt Permitted	0.42	1.00		0.16	1.00		0.05	1.00	1.00	0.05	1.00	
Satd. Flow (perm)	785	1709		303	1750		84	3505	1583	88	3483	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	75	143	175	142	112	76	91	1885	150	104	2388	109
RTOR Reduction (vph)	0	33	0	0	18	0	0	0	17	0	2	0
Lane Group Flow (vph)	75	285	0	142	170	0	91	1885	133	104	2495	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm			Perm			pm+pt			Perm		pm+pt
Protected Phases		4			8		5	2			1	6
Permitted Phases	4			8			2		2		6	
Actuated Green, G (s)	24.6	24.6		24.6	24.6		93.5	88.5	88.5	98.7	91.1	
Effective Green, g (s)	24.6	24.6		24.6	24.6		93.5	88.5	88.5	98.7	91.1	
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.69	0.66	0.66	0.73	0.67	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	5.3	5.3	4.5	5.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	4.0	4.0	3.0	4.0	
Lane Grp Cap (vph)	143	311		55	319		121	2298	1038	159	2350	
v/s Ratio Prot		0.17			0.10		0.03	0.54		c0.04	c0.72	
v/s Ratio Perm	0.10			c0.47			0.49		0.08	0.44		
v/c Ratio	0.52	0.92		2.58	0.53		0.75	0.82	0.13	0.65	1.06	
Uniform Delay, d1	49.9	54.2		55.2	50.0		36.7	17.3	8.7	29.6	22.0	
Progression Factor	1.00	1.00		1.00	1.00		1.28	2.34	2.61	0.99	1.63	
Incremental Delay, d2	3.4	30.3		761.7	1.7		2.4	0.3	0.0	4.4	32.9	
Delay (s)	53.4	84.5		816.9	51.7		49.4	40.9	22.9	33.7	68.7	
Level of Service	D	F		F	D		D	D	C	C	E	
Approach Delay (s)		78.6			381.0			40.0			67.3	
Approach LOS		E			F			D			E	
Intersection Summary												
HCM Average Control Delay			76.4			HCM Level of Service				E		
HCM Volume to Capacity ratio			1.36									
Actuated Cycle Length (s)			135.0			Sum of lost time (s)			13.5			
Intersection Capacity Utilization			109.4%			ICU Level of Service			H			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Spanish Trails Boulevard & SR 39 (US 301)

2/4/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (veh/h)	11	7	8	50	2	39	8	8	1815	50	59	2310
Sign Control	Stop				Stop				Free			
Grade	0%				0%				0%			
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
Hourly flow rate (vph)	12	8	9	54	2	42	0	9	1973	54	64	2511
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None										None	
Median storage (veh)												
Upstream signal (ft)	686										1204	
pX, platoon unblocked	0.67	0.67	0.45	0.67	0.67	0.56	0.00	0.45			0.56	
vC, conflicting volume	3686	4684	1255	3386	4641	986	0	2523			2027	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1093	2576	0	648	2513	0	0	1949			1270	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1			4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			2.2	
p0 queue free %	84	40	98	46	84	93	0	94			79	
cM capacity (veh/h)	75	13	492	100	14	610	0	135			305	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	12	16	54	45	9	986	986	54	64	1255	1255	12
Volume Left	12	0	54	0	9	0	0	0	64	0	0	0
Volume Right	0	9	0	42	0	0	0	54	0	0	0	12
cSH	75	26	100	197	135	1700	1700	1700	305	1700	1700	1700
Volume to Capacity	0.16	0.62	0.54	0.23	0.06	0.58	0.58	0.03	0.21	0.74	0.74	0.01
Queue Length 95th (ft)	13	48	62	21	5	0	0	0	19	0	0	0
Control Delay (s)	62.3	270.7	77.2	28.6	33.6	0.0	0.0	0.0	19.9	0.0	0.0	0.0
Lane LOS	F	F	F	D	D				C			
Approach Delay (s)	182.5		55.3		0.1				0.5			
Approach LOS	F		F									
Intersection Summary												
Average Delay	2.6											
Intersection Capacity Utilization	80.0%				ICU Level of Service				D			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

3: Spanish Trails Boulevard & SR 39 (US 301)

2/4/2009

Movement	SBR
Lane Configurations	
Volume (veh/h)	11
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	12
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis

4: Townview Square Entrance & SR 39 (US 301)

2/4/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	104	95	170	207	58	89	203	1416	131	72	1829	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5		4.5	5.3	5.3	4.5	5.3	5.3
Lane Util. Factor	1.00	1.00			0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.90			0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1683			3309		1770	3505	1583	1770	3505	1583
Flt Permitted	0.35	1.00			0.57		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	657	1683			1931		1770	3505	1583	1770	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	113	103	185	225	63	97	221	1539	142	78	1988	153
RTOR Reduction (vph)	0	48	0	0	25	0	0	0	55	0	0	30
Lane Group Flow (vph)	113	240	0	0	360	0	221	1539	87	78	1988	123
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm			Perm			Prot			Perm	Prot	Perm
Protected Phases		4			8		5	2			1	6
Permitted Phases	4			8					2			6
Actuated Green, G (s)	27.8	27.8			27.8		17.0	82.4	82.4	10.5	75.9	75.9
Effective Green, g (s)	27.8	27.8			27.8		17.0	82.4	82.4	10.5	75.9	75.9
Actuated g/C Ratio	0.21	0.21			0.21		0.13	0.61	0.61	0.08	0.56	0.56
Clearance Time (s)	4.5	4.5			4.5		4.5	5.3	5.3	4.5	5.3	5.3
Vehicle Extension (s)	3.0	3.0			3.0		3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	135	347			398		223	2139	966	138	1971	890
v/s Ratio Prot		0.14					c0.12	0.44		0.04	c0.57	
v/s Ratio Perm	0.17				c0.19				0.05			0.08
v/c Ratio	0.84	0.69			1.88dl		0.99	0.72	0.09	0.57	1.01	0.14
Uniform Delay, d1	51.4	49.6			52.3		58.9	18.3	10.8	60.0	29.6	14.0
Progression Factor	1.00	1.00			1.00		1.35	1.86	3.98	1.00	1.00	1.00
Incremental Delay, d2	34.0	5.8			23.5		44.4	1.3	0.1	5.2	22.4	0.3
Delay (s)	85.5	55.4			75.8		124.3	35.2	43.2	65.3	51.9	14.4
Level of Service	F	E			E		F	D	D	E	D	B
Approach Delay (s)		63.9			75.8			46.2			49.8	
Approach LOS		E			E			D			D	
Intersection Summary												
HCM Average Control Delay			51.6			HCM Level of Service				D		
HCM Volume to Capacity ratio			0.98									
Actuated Cycle Length (s)			135.0			Sum of lost time (s)				14.3		
Intersection Capacity Utilization			104.4%			ICU Level of Service				G		
Analysis Period (min)			15									
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Kossik Road & SR 39 (US 301)

2/4/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	105	239	200	110	170	90	1000	257	317	1256	254
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	7.0	7.0	7.0	4.5	7.0	7.0
Lane Util. Factor	0.97	1.00	1.00	0.97	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	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)	3433	1863	1583	3433	1863	1583	1770	3505	1583	1770	3505	1583
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.15	1.00	1.00	0.12	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	286	3505	1583	231	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	272	114	260	217	120	185	98	1087	279	345	1365	276
RTOR Reduction (vph)	0	0	110	0	0	162	0	0	132	0	0	147
Lane Group Flow (vph)	272	114	150	217	120	23	98	1087	147	345	1365	129
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot		Perm	Prot		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8	2		2	6		6
Actuated Green, G (s)	14.9	17.3	17.3	12.1	14.5	14.5	42.6	42.6	42.6	53.9	53.9	53.9
Effective Green, g (s)	14.9	17.3	17.3	12.1	14.5	14.5	42.6	42.6	42.6	53.9	53.9	53.9
Actuated g/C Ratio	0.13	0.15	0.15	0.10	0.13	0.13	0.37	0.37	0.37	0.47	0.47	0.47
Clearance Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	7.0	7.0	7.0	4.5	7.0	7.0
Vehicle Extension (s)	3.5	3.5	3.5	3.0	3.0	3.0	5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	442	279	237	359	233	198	205	1291	583	395	1633	737
v/s Ratio Prot	c0.08	0.06		0.06	0.06		0.03	c0.31		0.16	c0.39	
v/s Ratio Perm			c0.09			0.01	0.14		0.09	0.24		0.08
v/c Ratio	0.62	0.41	0.63	0.60	0.52	0.12	0.48	0.84	0.25	0.87	0.84	0.17
Uniform Delay, d1	47.7	44.6	46.2	49.5	47.3	44.9	37.9	33.5	25.5	31.9	27.0	18.0
Progression Factor	1.00	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	2.7	1.2	5.7	2.9	1.9	0.3	3.6	5.7	0.5	18.7	4.3	0.2
Delay (s)	50.4	45.7	51.9	52.4	49.2	45.2	41.6	39.2	25.9	50.6	31.4	18.2
Level of Service	D	D	D	D	D	D	D	D	C	D	C	B
Approach Delay (s)		50.2			49.1			36.8			32.9	
Approach LOS		D			D			D			C	

Intersection Summary

HCM Average Control Delay	38.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	115.7	Sum of lost time (s)	24.6
Intersection Capacity Utilization	73.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

6: Wire Road & SR 39 (US 301)

2/4/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (veh/h)	0	0	0	140	0	145	0	1645	104	8	137	2102
Sign Control		Stop			Stop			Free				Free
Grade		0%			0%			0%				0%
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
Hourly flow rate (vph)	0	0	0	152	0	158	0	1788	113	0	149	2285
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None				None
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked										0.00		
vC, conflicting volume	3477	4371	1142	3228	4371	894	2285			0	1788	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3477	4371	1142	3228	4371	894	2285			0	1788	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			0.0	4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			0.0	2.2	
p0 queue free %	100	100	100	0	100	45	100			0	57	
cM capacity (veh/h)	1	1	194	3	1	284	218			0	342	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	152	158	894	894	113	149	1142	1142				
Volume Left	152	0	0	0	0	149	0	0				
Volume Right	0	158	0	0	113	0	0	0				
cSH	3	284	1700	1700	1700	342	1700	1700				
Volume to Capacity	59.08	0.55	0.53	0.53	0.07	0.43	0.67	0.67				
Queue Length 95th (ft)	Err	78	0	0	0	53	0	0				
Control Delay (s)	Err	32.4	0.0	0.0	0.0	23.4	0.0	0.0				
Lane LOS	F	D				C						
Approach Delay (s)	4928.3		0.0			1.4						
Approach LOS	F											
Intersection Summary												
Average Delay			329.5									
Intersection Capacity Utilization			72.5%			ICU Level of Service			C			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 6: Wire Road & SR 39 (US 301)

2/4/2009

Movement	SBR
Lane Configurations	
Volume (veh/h)	0
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	0
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis

7: Centennial Road & SR 39 (US 301)

2/4/2009

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Volume (vph)	50	50	50	381	50	241	50	1426	251	333	1785	50		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)	5.5	5.5			5.5		5.0	8.0	8.0	5.0	8.0			
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95			
Frt	1.00	0.92			0.95		1.00	1.00	0.85	1.00	1.00			
Flt Protected	0.95	1.00			0.97		0.95	1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1770	1723			1724		1770	3505	1583	1770	3492			
Flt Permitted	0.49	1.00			0.76		0.08	1.00	1.00	0.07	1.00			
Satd. Flow (perm)	915	1723			1355		149	3505	1583	135	3492			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92		
Adj. Flow (vph)	54	54	54	414	54	262	54	1550	273	362	1940	54		
RTOR Reduction (vph)	0	26	0	0	15	0	0	0	77	0	1	0		
Lane Group Flow (vph)	54	82	0	0	715	0	54	1550	196	362	1993	0		
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%		
Turn Type	Perm			Perm			pm+pt			Perm			pm+pt	
Protected Phases	4			8			5			2			1	6
Permitted Phases	4			8			2			2			6	
Actuated Green, G (s)	55.5	55.5			55.5		55.6	50.0	50.0	72.0	61.4			
Effective Green, g (s)	55.5	55.5			55.5		55.6	50.0	50.0	72.0	61.4			
Actuated g/C Ratio	0.39	0.39			0.39		0.39	0.35	0.35	0.51	0.44			
Clearance Time (s)	5.5	5.5			5.5		5.0	8.0	8.0	5.0	8.0			
Vehicle Extension (s)	3.0	3.0			3.0		4.0	3.0	3.0	4.0	3.0			
Lane Grp Cap (vph)	360	678			533		123	1243	561	266	1521			
v/s Ratio Prot		0.05					0.02	0.44		c0.16	0.57			
v/s Ratio Perm	0.06				c0.53		0.16		0.12	c0.53				
v/c Ratio	0.15	0.12			1.34		0.44	1.25	0.35	1.36	1.31			
Uniform Delay, d1	27.5	27.2			42.8		34.4	45.5	33.5	46.2	39.8			
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	0.2	0.1			166.3		3.4	118.0	0.4	184.8	144.4			
Delay (s)	27.7	27.3			209.1		37.8	163.5	33.9	231.0	184.2			
Level of Service	C	C			F		D	F	C	F	F			
Approach Delay (s)		27.4			209.1			141.1			191.4			
Approach LOS		C			F			F			F			
Intersection Summary														
HCM Average Control Delay	170.3			HCM Level of Service			F							
HCM Volume to Capacity ratio	1.30													
Actuated Cycle Length (s)	141.0			Sum of lost time (s)			10.5							
Intersection Capacity Utilization	118.4%			ICU Level of Service			H							
Analysis Period (min)	15													
c Critical Lane Group														

HCM Unsignalized Intersection Capacity Analysis

8: SR 700 & SR 39 (US 301)

2/4/2009

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Volume (veh/h)	100	258	1570	94	310	2008	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	109	280	1707	102	337	2183	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)		14					
Median type			None			None	
Median storage (veh)							
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	3472	853			1707		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	3472	853			1707		
tC, single (s)	6.9	7.0			4.2		
tC, 2 stage (s)							
tF (s)	3.6	3.4			2.3		
p0 queue free %	0	4			3		
cM capacity (veh/h)	0	292			347		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	389	853	853	102	337	1091	1091
Volume Left	109	0	0	0	337	0	0
Volume Right	280	0	0	102	0	0	0
cSH	0	1700	1700	1700	347	1700	1700
Volume to Capacity	847.70	0.50	0.50	0.06	0.97	0.64	0.64
Queue Length 95th (ft)	Err	0	0	0	266	0	0
Control Delay (s)	Err	0.0	0.0	0.0	76.5	0.0	0.0
Lane LOS	F				F		
Approach Delay (s)	Err	0.0			10.2		
Approach LOS	F						
Intersection Summary							
Average Delay		830.3					
Intersection Capacity Utilization		76.1%		ICU Level of Service		D	
Analysis Period (min)		15					

HCM Signalized Intersection Capacity Analysis

9: CR 52A (Clinton Avenue) & SR 39 (US 301)

2/4/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	430	119	589	79	51	35	558	1210	48	43	1681	401
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		5.0	6.5	6.5	5.0	6.5	6.5
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1793	1583		1767		1770	3505	1583	1770	3505	1583
Flt Permitted		0.61	1.00		0.10		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1143	1583		188		1770	3505	1583	1770	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	467	129	640	86	55	38	607	1315	52	47	1827	436
RTOR Reduction (vph)	0	0	211	0	6	0	0	0	18	0	0	114
Lane Group Flow (vph)	0	596	429	0	173	0	607	1315	34	47	1827	322
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm	Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)		28.5	28.5		28.5		28.0	98.9	98.9	5.6	76.5	76.5
Effective Green, g (s)		28.5	28.5		28.5		28.0	98.9	98.9	5.6	76.5	76.5
Actuated g/C Ratio		0.19	0.19		0.19		0.19	0.65	0.65	0.04	0.51	0.51
Clearance Time (s)		6.5	6.5		6.5		5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)		6.0	6.0		6.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)		216	299		35		328	2296	1037	66	1776	802
v/s Ratio Prot							c0.34	0.38		0.03	c0.52	
v/s Ratio Perm		0.52	0.27		c0.92				0.02			0.20
v/c Ratio		2.76	1.44		4.93		1.85	0.57	0.03	0.71	1.03	0.40
Uniform Delay, d1		61.3	61.3		61.3		61.5	14.4	9.2	71.9	37.2	23.1
Progression Factor		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		804.5	213.9		1830.3		394.4	0.6	0.0	30.3	29.1	0.7
Delay (s)		865.8	275.2		1891.6		455.9	14.9	9.2	102.2	66.3	23.8
Level of Service		F	F		F		F	B	A	F	E	C
Approach Delay (s)		560.0			1891.6			150.4			59.0	
Approach LOS		F			F			F			E	
Intersection Summary												
HCM Average Control Delay		256.9			HCM Level of Service			F				
HCM Volume to Capacity ratio		2.02										
Actuated Cycle Length (s)		151.0			Sum of lost time (s)			18.0				
Intersection Capacity Utilization		129.1%			ICU Level of Service			H				
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Morningside Drive & SR 39 (US 301)

2/4/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	148	30	157	154	28	125	88	1147	185	147	1500	163
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	6.2	5.8	5.8		5.4	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583		1787	1583	1770	3437		1770	3505	1583
Flt Permitted	0.53	1.00	1.00		0.74	1.00	0.13	1.00		0.08	1.00	1.00
Satd. Flow (perm)	987	1863	1583		1370	1583	238	3437		152	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	161	33	171	167	30	136	96	1247	201	160	1630	177
RTOR Reduction (vph)	0	0	35	0	0	111	0	14	0	0	0	57
Lane Group Flow (vph)	161	33	136	0	197	25	96	1434	0	160	1630	120
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Perm		pm+pt			Perm
Protected Phases		4			8			2		1	6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	16.3	16.3	16.3		16.3	16.3	47.8	47.8		60.2	60.2	60.2
Effective Green, g (s)	16.3	16.3	16.3		16.3	16.3	47.8	47.8		60.2	60.2	60.2
Actuated g/C Ratio	0.18	0.18	0.18		0.18	0.18	0.54	0.54		0.68	0.68	0.68
Clearance Time (s)	6.2	6.2	6.2		6.2	6.2	5.8	5.8		5.4	5.8	5.8
Vehicle Extension (s)	4.0	4.0	4.0		4.0	4.0	6.0	6.0		4.0	6.0	6.0
Lane Grp Cap (vph)	182	343	292		252	292	129	1856		231	2384	1077
v/s Ratio Prot		0.02						c0.42		0.05	c0.47	
v/s Ratio Perm	c0.16		0.09		0.14	0.02	0.40			0.42		0.08
v/c Ratio	0.88	0.10	0.47		0.78	0.09	0.74	0.77		0.69	0.68	0.11
Uniform Delay, d1	35.2	30.0	32.2		34.4	29.9	15.6	16.1		15.2	8.5	4.9
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	36.9	0.2	1.6		15.3	0.2	26.6	2.6		9.3	1.3	0.1
Delay (s)	72.1	30.1	33.8		49.7	30.1	42.3	18.7		24.5	9.7	5.0
Level of Service	E	C	C		D	C	D	B		C	A	A
Approach Delay (s)		50.4			41.7			20.1			10.5	
Approach LOS		D			D			C			B	
Intersection Summary												
HCM Average Control Delay			20.0				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			88.5				Sum of lost time (s)			17.8		
Intersection Capacity Utilization			89.6%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: SR 533 (US 98 Bypass) & SR 39 (US 301)

2/4/2009

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	770	30	850	610	0	1090
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	1.00	1.00		*0.65
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)	3367	1553	1845	1553		2398
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3367	1553	1845	1553		2398
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	837	33	924	663	0	1185
RTOR Reduction (vph)	0	24	0	287	0	0
Lane Group Flow (vph)	837	9	924	376	0	1185
Heavy Vehicles (%)	4%	4%	3%	4%	4%	3%
Turn Type	Perm		Perm			
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	19.0	19.0	39.3	39.3		39.3
Effective Green, g (s)	19.0	19.0	39.3	39.3		39.3
Actuated g/C Ratio	0.27	0.27	0.57	0.57		0.57
Clearance Time (s)	5.0	5.0	6.0	6.0		6.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0		5.0
Lane Grp Cap (vph)	923	426	1046	881		1360
v/s Ratio Prot	c0.25		c0.50			0.49
v/s Ratio Perm		0.01		0.24		
v/c Ratio	0.91	0.02	0.88	0.43		0.87
Uniform Delay, d1	24.3	18.4	13.0	8.6		12.8
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	13.0	0.0	9.6	0.7		6.9
Delay (s)	37.3	18.4	22.7	9.3		19.8
Level of Service	D	B	C	A		B
Approach Delay (s)	36.6		17.1			19.8
Approach LOS	D		B			B
Intersection Summary						
HCM Average Control Delay			22.6	HCM Level of Service		C
HCM Volume to Capacity ratio			0.89			
Actuated Cycle Length (s)			69.3	Sum of lost time (s)		11.0
Intersection Capacity Utilization			75.9%	ICU Level of Service		D
Analysis Period (min)			15			
c Critical Lane Group						

Arterial Level of Service: NB SR 39 (US 301)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Daugherty Road	I	45	44.7	42.4	87.1	0.51	21.0	E
Townview Square Entr	I	45	34.7	37.0	71.7	0.36	18.0	E
Kossik Road	I	45	51.8	41.7	93.5	0.65	24.9	D
Centennial Road	I	55	131.7	163.5	295.2	2.01	24.5	D
CR 52A (Clinton Aven	I	50	126.5	15.6	142.1	1.76	44.5	A
Morningside Drive	I	50	73.2	19.4	92.6	1.02	39.5	B
SR 533 (US 98 Bypass	I	45	65.8	25.5	91.3	0.82	32.4	C
Total	I		528.4	345.1	873.5	7.12	29.4	C

Arterial Level of Service: SB SR 39 (US 301)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Morningside Drive	I	45	65.8	10.4	76.2	0.82	38.8	B
CR 52A (Clinton Aven	I	50	73.2	67.8	141.0	1.02	26.0	D
Centennial Road	I	55	115.1	174.0	289.1	1.76	21.9	D
Kossik Road	I	55	131.7	33.6	165.3	2.01	43.8	A
Townview Square Entr	I	45	51.8	52.2	104.0	0.65	22.4	D
Daugherty Road	I	45	34.7	67.4	102.1	0.36	12.6	F
CR 54 (Eiland Boulev	I	45	44.7	315.1	359.8	0.51	5.1	F
Total	I		517.0	720.5	1237.5	7.12	20.7	E

HCM Signalized Intersection Capacity Analysis

1: CR 54 (Eiland Boulevard) & SR 39 (US 301)

2/4/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	500	429	64	334	485	242	130	1722	186	342	1200	414
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.3		4.5	5.3		4.5	5.3	5.3	4.5	5.3	5.3
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Flt	1.00	0.98		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1826		1770	1770		1770	3505	1583	1770	3505	1583
Flt Permitted	0.08	1.00		0.30	1.00		0.14	1.00	1.00	0.12	1.00	1.00
Satd. Flow (perm)	148	1826		559	1770		261	3505	1583	226	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	543	466	70	363	527	263	141	1872	202	372	1304	450
RTOR Reduction (vph)	0	4	0	0	13	0	0	0	34	0	0	131
Lane Group Flow (vph)	543	532	0	363	777	0	141	1872	168	372	1304	319
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	pm+pt			pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)	68.7	58.7		51.2	45.7		34.0	28.5	28.5	60.7	50.7	50.7
Effective Green, g (s)	68.7	58.7		51.2	45.7		34.0	28.5	28.5	60.7	50.7	50.7
Actuated g/C Ratio	0.49	0.42		0.37	0.33		0.24	0.20	0.20	0.43	0.36	0.36
Clearance Time (s)	4.5	5.3		4.5	5.3		4.5	5.3	5.3	4.5	5.3	5.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	287	766		252	578		123	714	322	403	1269	573
v/s Ratio Prot	c0.25	0.29		0.06	0.44		0.05	c0.53		c0.18	c0.37	
v/s Ratio Perm	c0.68			0.47			0.23		0.11	0.22		0.20
v/c Ratio	1.89	0.69		1.44	1.34		1.15	2.62	0.52	0.92	1.03	0.56
Uniform Delay, d1	45.4	33.3		45.9	47.1		51.5	55.8	49.7	41.5	44.7	35.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.29	1.44	1.90
Incremental Delay, d2	414.3	2.7		219.3	166.4		125.8	733.9	5.9	15.7	25.1	1.9
Delay (s)	459.7	36.0		265.3	213.6		177.3	789.6	55.6	69.3	89.2	69.7
Level of Service	F	D		F	F		F	F	E	E	F	E
Approach Delay (s)		249.3			229.8			683.7			81.6	
Approach LOS		F			F			F			F	

Intersection Summary

HCM Average Control Delay	338.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.90		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	19.6
Intersection Capacity Utilization	150.9%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Daugherty Road & SR 39 (US 301)

2/4/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	103	84	138	132	96	161	2197	131	70	1734	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	5.3	5.3	4.5	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.93		1.00	0.94		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1737		1770	1745		1770	3505	1583	1770	3486	
Flt Permitted	0.32	1.00		0.41	1.00		0.04	1.00	1.00	0.04	1.00	
Satd. Flow (perm)	597	1737		770	1745		83	3505	1583	82	3486	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	112	91	150	143	104	175	2388	142	76	1885	75
RTOR Reduction (vph)	0	21	0	0	19	0	0	0	12	0	2	0
Lane Group Flow (vph)	109	182	0	150	228	0	175	2388	130	76	1958	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm			Perm			pm+pt			Perm		pm+pt
Protected Phases		4			8		5	2			1	6
Permitted Phases	4			8			2		2		6	
Actuated Green, G (s)	28.2	28.2		28.2	28.2		97.1	90.3	90.3	97.9	90.7	
Effective Green, g (s)	28.2	28.2		28.2	28.2		97.1	90.3	90.3	97.9	90.7	
Actuated g/C Ratio	0.20	0.20		0.20	0.20		0.69	0.64	0.64	0.70	0.65	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	5.3	5.3	4.5	5.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	4.0	4.0	3.0	4.0	
Lane Grp Cap (vph)	120	350		155	351		140	2261	1021	144	2258	
v/s Ratio Prot		0.10			0.13		c0.06	0.68		0.03	0.56	
v/s Ratio Perm	0.18			c0.19			c0.81		0.08	0.34		
v/c Ratio	0.91	0.52		0.97	0.65		1.25	1.06	0.13	0.53	0.87	
Uniform Delay, d1	54.6	49.9		55.4	51.4		43.4	24.8	9.6	34.6	19.8	
Progression Factor	1.00	1.00		1.00	1.00		1.66	1.99	0.75	0.93	1.72	
Incremental Delay, d2	54.0	1.4		61.9	4.1		118.0	26.6	0.0	2.5	3.5	
Delay (s)	108.7	51.3		117.4	55.5		190.2	76.0	7.3	34.5	37.6	
Level of Service	F	D		F	E		F	E	A	C	D	
Approach Delay (s)		71.3			78.9			79.8			37.5	
Approach LOS		E			E			E			D	
Intersection Summary												
HCM Average Control Delay			63.4			HCM Level of Service			E			
HCM Volume to Capacity ratio			1.18									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			13.5			
Intersection Capacity Utilization			101.7%			ICU Level of Service			G			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Spanish Trails Boulevard & SR 39 (US 301)

2/4/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (veh/h)	11	2	8	50	7	59	8	8	2310	50	39	1815
Sign Control	Stop				Stop				Free			
Grade	0%				0%				0%			
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
Hourly flow rate (vph)	12	2	9	54	8	64	0	9	2511	54	42	1973
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None										None	
Median storage (veh)												
Upstream signal (ft)	686										1204	
pX, platoon unblocked	0.55	0.55	0.63	0.55	0.55	0.36	0.00	0.63			0.36	
vC, conflicting volume	3398	4640	986	3609	4598	1255	0	1985			2565	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	708	2981	0	1094	2903	0	0	1397			1802	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	0.0	4.1			4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			2.2	
p0 queue free %	0	55	99	0	0	84	0	97			65	
cM capacity (veh/h)	0	5	687	43	5	394	0	307			123	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	12	11	54	72	9	1255	1255	54	42	986	986	12
Volume Left	12	0	54	0	9	0	0	0	42	0	0	0
Volume Right	0	9	0	64	0	0	0	54	0	0	0	12
cSH	0	23	43	45	307	1700	1700	1700	123	1700	1700	1700
Volume to Capacity	Err	0.47	1.26	1.58	0.03	0.74	0.74	0.03	0.35	0.58	0.58	0.01
Queue Length 95th (ft)	Err	35	132	177	2	0	0	0	35	0	0	0
Control Delay (s)	Err	256.6	371.7	484.5	17.1	0.0	0.0	0.0	49.1	0.0	0.0	0.0
Lane LOS	F	F	F	F	C	E						
Approach Delay (s)	Err	435.9		0.1		1.0						
Approach LOS	F	F										
Intersection Summary												
Average Delay	Err											
Intersection Capacity Utilization	80.0%			ICU Level of Service					D			
Analysis Period (min)	15											

HCM Unsignalized Intersection Capacity Analysis

3: Spanish Trails Boulevard & SR 39 (US 301)

2/4/2009

Movement	SBR
Lane Configurations	
Volume (veh/h)	11
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	12
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis

4: Townview Square Entrance & SR 39 (US 301)

2/4/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	141	58	203	131	95	72	170	1829	207	89	1416	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5			4.5		4.5	5.3	5.3	4.5	5.3	5.3
Lane Util. Factor	1.00	1.00			0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.88			0.96		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	1645			3338		1770	3505	1583	1770	3505	1583
Flt Permitted	0.42	1.00			0.55		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	780	1645			1863		1770	3505	1583	1770	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	153	63	221	142	103	78	185	1988	225	97	1539	113
RTOR Reduction (vph)	0	91	0	0	22	0	0	0	69	0	0	27
Lane Group Flow (vph)	153	193	0	0	301	0	185	1988	156	97	1539	86
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm			Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)	28.7	28.7			28.7		18.8	87.5	87.5	9.5	78.2	78.2
Effective Green, g (s)	28.7	28.7			28.7		18.8	87.5	87.5	9.5	78.2	78.2
Actuated g/C Ratio	0.20	0.20			0.20		0.13	0.62	0.62	0.07	0.56	0.56
Clearance Time (s)	4.5	4.5			4.5		4.5	5.3	5.3	4.5	5.3	5.3
Vehicle Extension (s)	3.0	3.0			3.0		3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	160	337			382		238	2191	989	120	1958	884
v/s Ratio Prot		0.12					0.10	c0.57		0.05	c0.44	
v/s Ratio Perm	c0.20				0.16				0.10			0.05
v/c Ratio	0.96	0.57			1.19dl		0.78	0.91	0.16	0.81	0.79	0.10
Uniform Delay, d1	55.0	50.1			52.8		58.6	22.7	10.9	64.4	24.3	14.4
Progression Factor	1.00	1.00			1.00		1.32	1.76	2.92	1.00	1.00	1.00
Incremental Delay, d2	57.6	2.3			10.3		1.5	0.7	0.0	31.5	3.3	0.2
Delay (s)	112.6	52.4			63.0		78.8	40.8	32.0	95.9	27.6	14.6
Level of Service	F	D			E		E	D	C	F	C	B
Approach Delay (s)		73.5			63.0			42.9			30.5	
Approach LOS		E			E			D			C	
Intersection Summary												
HCM Average Control Delay			42.5				HCM Level of Service			D		
HCM Volume to Capacity ratio			0.93									
Actuated Cycle Length (s)			140.0				Sum of lost time (s)			15.1		
Intersection Capacity Utilization			96.3%				ICU Level of Service			F		
Analysis Period (min)			15									
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Kossik Road & SR 39 (US 301)

2/4/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	254	110	90	257	105	317	239	1256	200	170	1000	250
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	4.5	5.3	5.3	7.0	7.0	7.0	4.5	7.0	7.0
Lane Util. Factor	0.97	1.00	1.00	0.97	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	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)	3433	1863	1583	3433	1863	1583	1770	3505	1583	1770	3539	1568
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.11	1.00	1.00	0.10	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	3433	1863	1583	196	3505	1583	189	3539	1568
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	276	120	98	279	114	345	260	1365	217	185	1087	272
RTOR Reduction (vph)	0	0	85	0	0	304	0	0	67	0	0	167
Lane Group Flow (vph)	276	120	13	279	114	41	260	1365	150	185	1087	105
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%	3%
Turn Type	Prot		Perm	Prot		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8	2		2	6		6
Actuated Green, G (s)	13.9	13.5	13.5	13.3	12.1	12.1	55.3	43.3	43.3	50.2	39.5	39.5
Effective Green, g (s)	13.9	13.5	13.5	13.3	12.1	12.1	55.3	43.3	43.3	50.2	39.5	39.5
Actuated g/C Ratio	0.14	0.13	0.13	0.13	0.12	0.12	0.54	0.42	0.42	0.49	0.39	0.39
Clearance Time (s)	5.3	5.3	5.3	4.5	5.3	5.3	7.0	7.0	7.0	4.5	7.0	7.0
Vehicle Extension (s)	3.5	3.5	3.5	3.0	3.0	3.0	5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	467	246	209	447	221	188	291	1486	671	259	1369	607
v/s Ratio Prot	0.08	c0.06		c0.08	0.06		c0.10	c0.39		0.07	0.31	
v/s Ratio Perm			0.01			0.03	0.38		0.09	0.28		0.07
v/c Ratio	0.59	0.49	0.06	0.62	0.52	0.22	0.89	0.92	0.22	0.71	0.79	0.17
Uniform Delay, d1	41.4	41.1	38.8	42.0	42.2	40.7	24.8	27.7	18.7	20.2	27.7	20.6
Progression Factor	1.00	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	2.1	1.8	0.1	2.7	2.0	0.6	28.8	9.8	0.4	9.0	3.8	0.3
Delay (s)	43.6	42.9	38.9	44.7	44.3	41.3	53.6	37.5	19.1	29.2	31.5	20.9
Level of Service	D	D	D	D	D	D	D	D	B	C	C	C
Approach Delay (s)		42.5			43.1			37.6			29.3	
Approach LOS		D			D			D			C	

Intersection Summary

HCM Average Control Delay	36.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	102.1	Sum of lost time (s)	18.5
Intersection Capacity Utilization	77.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

6: Wire Road & SR 39 (US 301)

2/4/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (veh/h)	0	0	0	104	0	137	0	2102	140	8	145	1645
Sign Control		Stop			Stop			Free				Free
Grade		0%			0%			0%				0%
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
Hourly flow rate (vph)	0	0	0	113	0	149	0	2285	152	0	158	1788
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None				None
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked										0.00		
vC, conflicting volume	3246	4388	894	3494	4388	1142	1788			0	2285	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3246	4388	894	3494	4388	1142	1788			0	2285	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			0.0	4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			0.0	2.2	
p0 queue free %	100	100	100	0	100	23	100			0	28	
cM capacity (veh/h)	0	0	284	1	0	194	342			0	218	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3				
Volume Total	113	149	1142	1142	152	158	894	894				
Volume Left	113	0	0	0	0	158	0	0				
Volume Right	0	149	0	0	152	0	0	0				
cSH	1	194	1700	1700	1700	218	1700	1700				
Volume to Capacity	114.23	0.77	0.67	0.67	0.09	0.72	0.53	0.53				
Queue Length 95th (ft)	Err	129	0	0	0	119	0	0				
Control Delay (s)	Err	67.0	0.0	0.0	0.0	55.1	0.0	0.0				
Lane LOS	F	F				F						
Approach Delay (s)	4353.0		0.0			4.5						
Approach LOS	F											
Intersection Summary												
Average Delay			247.4									
Intersection Capacity Utilization			85.1%			ICU Level of Service			E			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis6: Wire Road & SR 39 (US 301)

2/4/2009

Movement	SBR
Lane Configurations	
Volume (veh/h)	0
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	0
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis

7: Centennial Road & SR 39 (US 301)

2/4/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	50	50	251	50	333	50	1785	381	241	1426	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5			5.5		5.0	8.0	8.0	5.0	8.0	
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.92			0.93		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00			0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1723			1697		1770	3505	1583	1770	3488	
Flt Permitted	0.40	1.00			0.81		0.06	1.00	1.00	0.06	1.00	
Satd. Flow (perm)	743	1723			1407		118	3505	1583	110	3488	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	54	54	273	54	362	54	1940	414	262	1550	54
RTOR Reduction (vph)	0	24	0	0	27	0	0	0	87	0	2	0
Lane Group Flow (vph)	54	84	0	0	662	0	54	1940	327	262	1602	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm			pm+pt		Perm		pm+pt		
Protected Phases	4		8			5		2		1		6
Permitted Phases	4		8			2		2		6		
Actuated Green, G (s)	54.5	54.5			54.5		68.6	63.0	63.0	83.0	72.4	
Effective Green, g (s)	54.5	54.5			54.5		68.6	63.0	63.0	83.0	72.4	
Actuated g/C Ratio	0.36	0.36			0.36		0.45	0.42	0.42	0.55	0.48	
Clearance Time (s)	5.5	5.5			5.5		5.0	8.0	8.0	5.0	8.0	
Vehicle Extension (s)	3.0	3.0			3.0		4.0	3.0	3.0	4.0	3.0	
Lane Grp Cap (vph)	268	622			508		115	1462	660	225	1672	
v/s Ratio Prot		0.05					0.02	c0.55		c0.12	0.46	
v/s Ratio Perm	0.07				c0.47		0.20		0.21	0.53		
v/c Ratio	0.20	0.13			1.30		0.47	1.33	0.50	1.16	0.96	
Uniform Delay, d1	33.3	32.4			48.2		32.9	44.0	32.3	51.0	37.8	
Progression Factor	1.00	1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	0.1			150.4		4.1	152.0	0.6	111.6	13.3	
Delay (s)	33.6	32.5			198.6		37.0	196.0	32.9	162.6	51.2	
Level of Service	C	C			F		D	F	C	F	D	
Approach Delay (s)		32.9			198.6			164.4			66.8	
Approach LOS		C			F			F			E	
Intersection Summary												
HCM Average Control Delay	129.3			HCM Level of Service			F					
HCM Volume to Capacity ratio	1.30											
Actuated Cycle Length (s)	151.0			Sum of lost time (s)			18.5					
Intersection Capacity Utilization	121.7%			ICU Level of Service			H					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

8: SR 700 & SR 39 (US 301)

2/4/2009

							
Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations							
Volume (veh/h)	94	310	2008	100	258	1570	
Sign Control	Stop		Free			Free	
Grade	0%		0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	
Hourly flow rate (vph)	102	337	2183	109	280	1707	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)		14					
Median type			None			None	
Median storage veh)							
Upstream signal (ft)							
pX, platoon unblocked							
vC, conflicting volume	3597	1091			2183		
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol	3597	1091			2183		
tC, single (s)	6.9	7.0			4.2		
tC, 2 stage (s)							
tF (s)	3.6	3.4			2.3		
p0 queue free %	0	0			0		
cM capacity (veh/h)	0	202			223		
Direction, Lane #	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2	SB 3
Volume Total	439	1091	1091	109	280	853	853
Volume Left	102	0	0	0	280	0	0
Volume Right	337	0	0	109	0	0	0
cSH	0	1700	1700	1700	223	1700	1700
Volume to Capacity	Err	0.64	0.64	0.06	1.26	0.50	0.50
Queue Length 95th (ft)	Err	0	0	0	361	0	0
Control Delay (s)	Err	0.0	0.0	0.0	190.1	0.0	0.0
Lane LOS	F				F		
Approach Delay (s)	Err	0.0			26.8		
Approach LOS	F						
Intersection Summary							
Average Delay			Err				
Intersection Capacity Utilization			85.0%		ICU Level of Service		E
Analysis Period (min)			15				

HCM Signalized Intersection Capacity Analysis

9: CR 52A (Clinton Avenue) & SR 39 (US 301)

2/4/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	401	51	558	48	119	43	589	1681	79	35	1210	430
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		5.0	6.5	6.5	5.0	6.5	6.5
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		1.00	0.85		0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96	1.00		0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1784	1583		1790		1770	3505	1583	1770	3505	1583
Flt Permitted		0.54	1.00		0.43		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1006	1583		779		1770	3505	1583	1770	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	436	55	607	52	129	47	640	1827	86	38	1315	467
RTOR Reduction (vph)	0	0	223	0	6	0	0	0	40	0	0	172
Lane Group Flow (vph)	0	491	384	0	222	0	640	1827	46	38	1315	295
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm	Perm			Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)		51.5	51.5		51.5		25.0	75.9	75.9	5.6	56.5	56.5
Effective Green, g (s)		51.5	51.5		51.5		25.0	75.9	75.9	5.6	56.5	56.5
Actuated g/C Ratio		0.34	0.34		0.34		0.17	0.50	0.50	0.04	0.37	0.37
Clearance Time (s)		6.5	6.5		6.5		5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)		6.0	6.0		6.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)		343	540		266		293	1762	796	66	1311	592
v/s Ratio Prot							c0.36	c0.52		0.02	c0.38	
v/s Ratio Perm		c0.49	0.24		0.29				0.03			0.19
v/c Ratio		1.43	0.71		0.83		2.18	1.04	0.06	0.58	1.00	0.50
Uniform Delay, d1		49.7	43.3		45.8		63.0	37.6	19.2	71.5	47.2	36.3
Progression Factor		1.00	1.00		1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		210.2	6.3		22.5		544.0	31.7	0.1	11.6	25.6	1.4
Delay (s)		260.0	49.6		68.3		607.0	69.2	19.3	83.1	72.8	37.7
Level of Service		F	D		E		F	E	B	F	E	D
Approach Delay (s)		143.7			68.3			202.4			64.0	
Approach LOS		F			E			F			E	
Intersection Summary												
HCM Average Control Delay		141.5					HCM Level of Service		F			
HCM Volume to Capacity ratio		1.49										
Actuated Cycle Length (s)		151.0					Sum of lost time (s)		24.5			
Intersection Capacity Utilization		122.9%					ICU Level of Service		H			
Analysis Period (min)		15										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Morningside Drive & SR 39 (US 301)

2/4/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	163	28	88	185	30	147	157	1500	154	125	1147	148
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	6.2	5.8	5.8		5.4	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	1.00
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		0.96	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	1863	1583		1786	1583	1770	3459		1770	3505	1583
Flt Permitted	0.46	1.00	1.00		0.73	1.00	0.22	1.00		0.08	1.00	1.00
Satd. Flow (perm)	865	1863	1583		1369	1583	417	3459		142	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	177	30	96	201	33	160	171	1630	167	136	1247	161
RTOR Reduction (vph)	0	0	71	0	0	123	0	9	0	0	0	55
Lane Group Flow (vph)	177	30	25	0	234	37	171	1788	0	136	1247	106
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Perm			pm+pt		Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8		8	2			6		6
Actuated Green, G (s)	18.5	18.5	18.5		18.5	18.5	47.1	47.1		59.5	59.5	59.5
Effective Green, g (s)	18.5	18.5	18.5		18.5	18.5	47.1	47.1		59.5	59.5	59.5
Actuated g/C Ratio	0.21	0.21	0.21		0.21	0.21	0.52	0.52		0.66	0.66	0.66
Clearance Time (s)	6.2	6.2	6.2		6.2	6.2	5.8	5.8		5.4	5.8	5.8
Vehicle Extension (s)	4.0	4.0	4.0		4.0	4.0	6.0	6.0		4.0	6.0	6.0
Lane Grp Cap (vph)	178	383	325		281	325	218	1810		221	2317	1047
v/s Ratio Prot		0.02						c0.52		0.05	c0.36	
v/s Ratio Perm	c0.20		0.02		0.17	0.02	0.41			0.36		0.07
v/c Ratio	0.99	0.08	0.08		0.83	0.11	0.78	0.99		0.62	0.54	0.10
Uniform Delay, d1	35.7	28.9	28.9		34.3	29.1	17.3	21.2		19.3	8.0	5.5
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	65.5	0.1	0.1		19.3	0.2	20.3	18.4		5.7	0.6	0.1
Delay (s)	101.2	29.0	29.0		53.6	29.3	37.6	39.6		25.0	8.6	5.7
Level of Service	F	C	C		D	C	D	D		C	A	A
Approach Delay (s)		71.2			43.7			39.4			9.7	
Approach LOS		E			D			D			A	
Intersection Summary												
HCM Average Control Delay			31.2				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			90.0				Sum of lost time (s)			17.8		
Intersection Capacity Utilization			86.3%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: SR 533 (US 98 Bypass) & SR 39 (US 301)

2/4/2009

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	580	30	1060	800	0	880
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	5.0	6.0	6.0		6.0
Lane Util. Factor	0.97	1.00	1.00	1.00		*0.65
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)	3367	1553	1845	1553		2398
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3367	1553	1845	1553		2398
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	630	33	1152	870	0	957
RTOR Reduction (vph)	0	23	0	267	0	0
Lane Group Flow (vph)	630	10	1152	603	0	957
Heavy Vehicles (%)	4%	4%	3%	4%	4%	3%
Turn Type	Perm		Perm			
Protected Phases	8		2			6
Permitted Phases		8		2		
Actuated Green, G (s)	21.5	21.5	40.2	40.2		40.2
Effective Green, g (s)	21.5	21.5	40.2	40.2		40.2
Actuated g/C Ratio	0.30	0.30	0.55	0.55		0.55
Clearance Time (s)	5.0	5.0	6.0	6.0		6.0
Vehicle Extension (s)	5.0	5.0	5.0	5.0		5.0
Lane Grp Cap (vph)	996	459	1020	859		1326
v/s Ratio Prot	c0.19		c0.62			0.40
v/s Ratio Perm		0.01		0.39		
v/c Ratio	0.63	0.02	1.13	0.70		0.72
Uniform Delay, d1	22.2	18.1	16.2	11.9		12.1
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	1.8	0.0	70.9	3.3		2.4
Delay (s)	24.0	18.2	87.1	15.1		14.5
Level of Service	C	B	F	B		B
Approach Delay (s)	23.7		56.2			14.5
Approach LOS	C		E			B
Intersection Summary						
HCM Average Control Delay			39.3		HCM Level of Service	D
HCM Volume to Capacity ratio			0.96			
Actuated Cycle Length (s)			72.7		Sum of lost time (s)	11.0
Intersection Capacity Utilization			81.5%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Arterial Level of Service: NB SR 39 (US 301)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Daugherty Road	I	45	44.7	72.6	117.3	0.51	15.6	F
Townview Square Entr	I	45	34.7	42.1	76.8	0.36	16.8	E
Kossik Road	I	45	51.8	40.3	92.1	0.65	25.3	D
Centennial Road	I	55	131.7	193.1	324.8	2.01	22.3	D
CR 52A (Clinton Aven	I	50	126.5	66.1	192.6	1.76	32.9	C
Morningside Drive	I	50	73.2	40.5	113.7	1.02	32.2	C
SR 533 (US 98 Bypass	I	45	65.8	91.8	157.6	0.82	18.8	E
Total	I		528.4	546.5	1074.9	7.12	23.9	D

Arterial Level of Service: SB SR 39 (US 301)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Morningside Drive	I	45	65.8	9.1	74.9	0.82	39.5	B
CR 52A (Clinton Aven	I	50	73.2	70.1	143.3	1.02	25.6	D
Centennial Road	I	55	115.1	50.8	165.9	1.76	38.1	B
Kossik Road	I	55	131.7	33.9	165.6	2.01	43.7	A
Townview Square Entr	I	45	51.8	28.5	80.3	0.65	29.0	C
Daugherty Road	I	45	34.7	38.5	73.2	0.36	17.6	E
CR 54 (Eiland Boulev	I	45	44.7	86.1	130.8	0.51	14.0	F
Total	I		517.0	317.0	834.0	7.12	30.7	C

Appendix E

Design year (2035) Synchro Intersection Analysis Sheets for Build Conditions

HCM Signalized Intersection Capacity Analysis

1: CR 54 (Eiland Boulevard) & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	414	485	130	186	429	342	64	1200	334	242	1722	500
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.3		4.5	5.3	5.3	4.5	5.3	5.3	4.5	5.3	5.3
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	0.97		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)	3433	3427		3433	3539	1583	1770	5036	1583	3433	5036	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3427		3433	3539	1583	1770	5036	1583	3433	5036	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	450	527	141	202	466	372	70	1304	363	263	1872	543
RTOR Reduction (vph)	0	26	0	0	0	124	0	0	144	0	0	151
Lane Group Flow (vph)	450	642	0	202	466	248	70	1304	219	263	1872	392
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	20.3	39.6		7.0	26.3	26.3	8.5	36.7	36.7	17.1	45.3	45.3
Effective Green, g (s)	20.3	39.6		7.0	26.3	26.3	8.5	36.7	36.7	17.1	45.3	45.3
Actuated g/C Ratio	0.17	0.33		0.06	0.22	0.22	0.07	0.31	0.31	0.14	0.38	0.38
Clearance Time (s)	4.5	5.3		4.5	5.3	5.3	4.5	5.3	5.3	4.5	5.3	5.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	581	1131		200	776	347	125	1540	484	489	1901	598
v/s Ratio Prot	c0.13	0.19		c0.06	0.13		0.04	0.26		c0.08	c0.37	
v/s Ratio Perm						c0.16			0.14			0.25
v/c Ratio	0.77	0.57		1.01	0.60	0.71	0.56	0.85	0.45	0.54	0.98	0.66
Uniform Delay, d1	47.7	33.1		56.5	42.1	43.4	53.9	39.0	33.5	47.8	37.0	30.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.11	0.49	0.44
Incremental Delay, d2	6.4	0.7		66.2	1.3	6.8	5.6	5.9	3.0	0.5	10.3	2.4
Delay (s)	54.0	33.8		122.7	43.4	50.2	59.6	45.0	36.6	53.7	28.5	15.8
Level of Service	D	C		F	D	D	E	D	D	D	C	B
Approach Delay (s)		41.9			61.3			43.8			28.4	
Approach LOS		D			E			D			C	
Intersection Summary												
HCM Average Control Delay			40.0			HCM Level of Service				D		
HCM Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			19.6			
Intersection Capacity Utilization			79.1%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Daugherty Road & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	69	132	161	131	103	70	84	1734	138	96	2197	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	5.3		4.5	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.91		1.00	0.91	
Frt	1.00	0.92		1.00	0.94		1.00	0.99		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)	1770	1709		1770	1750		1770	4984		1770	5005	
Flt Permitted	0.53	1.00		0.33	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	996	1709		621	1750		1770	4984		1770	5005	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	75	143	175	142	112	76	91	1885	150	104	2388	109
RTOR Reduction (vph)	0	37	0	0	20	0	0	8	0	0	4	0
Lane Group Flow (vph)	75	281	0	142	168	0	91	2027	0	104	2493	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm			Prot			Prot			
Protected Phases	4		8			5		2	1		6	
Permitted Phases	4		8									
Actuated Green, G (s)	33.9	33.9		33.9	33.9		7.1	49.7		22.1	64.7	
Effective Green, g (s)	33.9	33.9		33.9	33.9		7.1	49.7		22.1	64.7	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.06	0.41		0.18	0.54	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	5.3		4.5	5.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)	281	483		175	494		105	2064		326	2699	
v/s Ratio Prot		0.16			0.10		0.05	c0.41		0.06	c0.50	
v/s Ratio Perm	0.08			c0.23								
v/c Ratio	0.27	0.58		0.81	0.34		0.87	0.98		0.32	0.92	
Uniform Delay, d1	33.4	37.0		40.1	34.2		56.0	34.7		42.4	25.4	
Progression Factor	1.00	1.00		1.00	1.00		1.37	0.65		0.49	0.35	
Incremental Delay, d2	0.5	1.8		32.1	1.9		34.4	12.0		0.3	3.3	
Delay (s)	33.9	38.8		72.2	36.0		110.9	34.7		21.1	12.2	
Level of Service	C	D		E	D		F	C		C	B	
Approach Delay (s)		37.8			51.6			37.9			12.5	
Approach LOS		D			D			D			B	
Intersection Summary												
HCM Average Control Delay	26.6			HCM Level of Service			C					
HCM Volume to Capacity ratio	0.89											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			9.8					
Intersection Capacity Utilization	91.3%			ICU Level of Service			F					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Spanish Trails Boulevard & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (veh/h)	11	7	8	50	2	39	8	8	1815	50	59	2310
Sign Control		Stop			Stop				Free			Free
Grade		0%			0%				0%			0%
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
Hourly flow rate (vph)	12	8	9	54	2	42	0	9	1973	54	64	2511
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type									None			None
Median storage (veh)												
Upstream signal (ft)									686			1204
pX, platoon unblocked	0.80	0.80	0.62	0.80	0.80	0.61	0.00	0.62			0.61	
vC, conflicting volume	3364	4690	843	2995	4668	685	0	2523			2027	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	1520	0	0	1494	0	0	1295			463	
tC, single (s)	*8.0	*7.0	6.9	*8.0	*7.0	6.9	0.0	*4.6			*4.6	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			2.2	
p0 queue free %	98	89	99	92	97	94	0	97			90	
cM capacity (veh/h)	677	68	669	669	71	664	0	278			632	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	12	16	54	45	9	789	789	449	64	1004	1004	514
Volume Left	12	0	54	0	9	0	0	0	64	0	0	0
Volume Right	0	9	0	42	0	0	0	54	0	0	0	12
cSH	677	130	669	471	278	1700	1700	1700	632	1700	1700	1700
Volume to Capacity	0.02	0.13	0.08	0.09	0.03	0.46	0.46	0.26	0.10	0.59	0.59	0.30
Queue Length 95th (ft)	1	10	7	8	2	0	0	0	8	0	0	0
Control Delay (s)	10.4	36.6	10.9	13.4	18.4	0.0	0.0	0.0	11.3	0.0	0.0	0.0
Lane LOS	B	E	B	B	C				B			
Approach Delay (s)	25.5		12.0		0.1				0.3			
Approach LOS	D		B									
Intersection Summary												
Average Delay			0.6									
Intersection Capacity Utilization			65.1%		ICU Level of Service				C			
Analysis Period (min)			15									

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis

3: Spanish Trails Boulevard & SR 39 (US 301)

2/16/2009

Movement	SBR
Lane Configurations	
Volume (veh/h)	11
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	12
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis

4: Townview Square Entrance & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	104	95	170	207	58	89	203	1416	131	72	1829	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	5.3	5.3	4.5	5.3	
Lane Util. Factor	1.00	1.00		1.00	0.95		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.90		1.00	0.91		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1683		1770	3217		1770	5036	1583	1770	4985	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1683		1770	3217		1770	5036	1583	1770	4985	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	113	103	185	225	63	97	221	1539	142	78	1988	153
RTOR Reduction (vph)	0	59	0	0	89	0	0	0	76	0	6	0
Lane Group Flow (vph)	113	229	0	225	71	0	221	1539	66	78	2135	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot			Prot			Prot		Perm	Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			
Actuated Green, G (s)	27.1	21.1		16.2	10.2		14.1	55.5	55.5	8.4	49.8	
Effective Green, g (s)	27.1	21.1		16.2	10.2		14.1	55.5	55.5	8.4	49.8	
Actuated g/C Ratio	0.23	0.18		0.13	0.08		0.12	0.46	0.46	0.07	0.42	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	5.3	5.3	4.5	5.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	4.0	4.0	3.0	4.0	
Lane Grp Cap (vph)	400	296		239	273		208	2329	732	124	2069	
v/s Ratio Prot	0.06	c0.14		c0.13	0.02		c0.12	0.31		0.04	c0.43	
v/s Ratio Perm									0.04			
v/c Ratio	0.28	0.78		0.94	0.26		1.06	0.66	0.09	0.63	1.03	
Uniform Delay, d1	38.4	47.2		51.4	51.4		53.0	25.0	18.1	54.3	35.1	
Progression Factor	1.00	1.00		1.00	1.00		0.66	0.60	0.60	1.22	0.61	
Incremental Delay, d2	0.4	12.0		42.1	0.5		57.5	0.6	0.1	8.8	27.6	
Delay (s)	38.8	59.2		93.5	51.9		92.5	15.5	11.0	75.3	49.1	
Level of Service	D	E		F	D		F	B	B	E	D	
Approach Delay (s)		53.4			76.2			24.1			50.0	
Approach LOS		D			E			C			D	
Intersection Summary												
HCM Average Control Delay			42.3			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.97									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			18.8			
Intersection Capacity Utilization			92.3%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Kossik Road & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	105	239	200	110	170	90	1000	257	317	1256	254
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	7.0	7.0	7.0	4.5	7.0	7.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	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)	3433	1863	1583	3433	1863	1583	1770	5036	1583	1770	5036	1583
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)	3433	1863	1583	3433	1863	1583	1770	5036	1583	1770	5036	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	272	114	260	217	120	185	98	1087	279	345	1365	276
RTOR Reduction (vph)	0	0	167	0	0	164	0	0	173	0	0	141
Lane Group Flow (vph)	272	114	93	217	120	21	98	1087	106	345	1365	135
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	15.7	14.5	14.5	14.5	13.3	13.3	7.6	45.4	45.4	23.5	58.8	58.8
Effective Green, g (s)	15.7	14.5	14.5	14.5	13.3	13.3	7.6	45.4	45.4	23.5	58.8	58.8
Actuated g/C Ratio	0.13	0.12	0.12	0.12	0.11	0.11	0.06	0.38	0.38	0.20	0.49	0.49
Clearance Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	7.0	7.0	7.0	4.5	7.0	7.0
Vehicle Extension (s)	3.5	3.5	3.5	3.0	3.0	3.0	5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	449	225	191	415	206	175	112	1905	599	347	2468	776
v/s Ratio Prot	c0.08	0.06		0.06	c0.06		0.06	0.22		c0.19	c0.27	
v/s Ratio Perm			0.06			0.01			0.07			0.09
v/c Ratio	0.61	0.51	0.49	0.52	0.58	0.12	0.88	0.57	0.18	0.99	0.55	0.17
Uniform Delay, d1	49.2	49.4	49.3	49.5	50.7	48.1	55.7	29.6	24.8	48.2	21.4	17.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.85	0.33	0.18	1.00	1.00	1.00
Incremental Delay, d2	2.4	2.1	2.3	1.2	4.2	0.3	43.8	1.0	0.5	46.5	0.9	0.5
Delay (s)	51.7	51.5	51.6	50.7	54.9	48.4	90.9	10.7	5.0	94.7	22.3	17.6
Level of Service	D	D	D	D	D	D	F	B	A	F	C	B
Approach Delay (s)		51.6			50.8			15.0			34.2	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM Average Control Delay			32.4			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			16.8			
Intersection Capacity Utilization			64.7%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

6: Wire Road & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations								  				  
Volume (veh/h)	0	0	0	140	0	145	0	1645	104	8	137	2102
Sign Control		Stop			Stop			Free				Free
Grade		0%			0%			0%				0%
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
Hourly flow rate (vph)	0	0	0	152	0	158	0	1788	113	0	149	2285
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None				None
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked										0.00		
vC, conflicting volume	3179	4371	762	2847	4371	596	2285			0	1788	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	3179	4371	762	2847	4371	596	2285			0	1788	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			0.0	4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			0.0	2.2	
p0 queue free %	100	100	100	0	100	65	100			0	57	
cM capacity (veh/h)	2	1	348	5	1	447	218			0	342	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	152	158	596	596	596	113	149	914	914	457		
Volume Left	152	0	0	0	0	0	149	0	0	0		
Volume Right	0	158	0	0	0	113	0	0	0	0		
cSH	5	447	1700	1700	1700	1700	342	1700	1700	1700		
Volume to Capacity	29.57	0.35	0.35	0.35	0.35	0.07	0.43	0.54	0.54	0.27		
Queue Length 95th (ft)	Err	39	0	0	0	0	53	0	0	0		
Control Delay (s)	Err	17.4	0.0	0.0	0.0	0.0	23.4	0.0	0.0	0.0		
Lane LOS	F	C					C					
Approach Delay (s)	4920.6		0.0				1.4					
Approach LOS	F											
Intersection Summary												
Average Delay			328.9									
Intersection Capacity Utilization			58.8%			ICU Level of Service			B			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 6: Wire Road & SR 39 (US 301)

2/16/2009

Movement	SBR
Left Lane Configurations	
Volume (veh/h)	0
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	0
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis

7: Centennial Road & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	50	50	381	50	241	50	1426	251	333	1785	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	5.0	8.0	8.0	5.0	8.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1723		1770	1863	1583	1770	5036	1583	1770	5017	
Flt Permitted	0.72	1.00		0.69	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1345	1723		1280	1863	1583	1770	5036	1583	1770	5017	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	54	54	414	54	262	54	1550	273	362	1940	54
RTOR Reduction (vph)	0	33	0	0	0	176	0	0	142	0	3	0
Lane Group Flow (vph)	54	75	0	414	54	86	54	1550	131	362	1991	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm			Perm			Perm	Prot	Perm		Prot	
Protected Phases	4			8			8	5	2	1		6
Permitted Phases	4			8			8	2				
Actuated Green, G (s)	36.5	36.5		36.5	36.5	36.5	5.6	34.8	34.8	21.0	50.2	
Effective Green, g (s)	36.5	36.5		36.5	36.5	36.5	5.6	34.8	34.8	21.0	50.2	
Actuated g/C Ratio	0.33	0.33		0.33	0.33	0.33	0.05	0.31	0.31	0.19	0.45	
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	5.0	8.0	8.0	5.0	8.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	4.0	3.0	3.0	4.0	3.0	
Lane Grp Cap (vph)	443	568		422	614	521	89	1582	497	335	2273	
v/s Ratio Prot		0.04			0.03		0.03	c0.31		c0.20	0.40	
v/s Ratio Perm	0.04			c0.32		0.05			0.08			
v/c Ratio	0.12	0.13		0.98	0.09	0.17	0.61	0.98	0.26	1.08	0.88	
Uniform Delay, d1	26.0	26.0		36.8	25.7	26.3	51.5	37.7	28.4	44.9	27.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.1		38.6	0.1	0.2	12.8	17.8	0.3	72.4	4.1	
Delay (s)	26.1	26.2		75.4	25.7	26.5	64.3	55.4	28.7	117.3	31.6	
Level of Service	C	C		E	C	C	E	E	C	F	C	
Approach Delay (s)		26.1			54.2			51.8			44.8	
Approach LOS		C			D			D			D	
Intersection Summary												
HCM Average Control Delay			48.1	HCM Level of Service			D					
HCM Volume to Capacity ratio			1.00									
Actuated Cycle Length (s)			110.8	Sum of lost time (s)			18.5					
Intersection Capacity Utilization			89.2%	ICU Level of Service			E					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

8: SR 700 & SR 39 (US 301)

2/16/2009



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			  			  
Volume (vph)	100	258	1570	94	310	2008
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
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)	1687	1509	5036	1509	1687	5036
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1687	1509	5036	1509	1687	5036
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	280	1707	102	337	2183
RTOR Reduction (vph)	0	250	0	55	0	0
Lane Group Flow (vph)	109	30	1707	47	337	2183
Heavy Vehicles (%)	7%	7%	3%	7%	7%	3%
Turn Type	Perm		Perm		Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	12.7	12.7	55.3	55.3	38.5	98.3
Effective Green, g (s)	12.7	12.7	55.3	55.3	38.5	98.3
Actuated g/C Ratio	0.11	0.11	0.46	0.46	0.32	0.82
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	179	160	2321	695	541	4125
v/s Ratio Prot	c0.06		c0.34		c0.20	0.43
v/s Ratio Perm		0.02		0.03		
v/c Ratio	0.61	0.19	0.74	0.07	0.62	0.53
Uniform Delay, d1	51.3	48.9	26.4	18.0	34.6	3.5
Progression Factor	1.00	1.00	1.00	1.00	1.33	1.52
Incremental Delay, d2	5.8	0.6	2.1	0.2	0.9	0.2
Delay (s)	57.0	49.5	28.5	18.2	46.9	5.4
Level of Service	E	D	C	B	D	A
Approach Delay (s)	51.6		27.9			11.0
Approach LOS	D		C			B
Intersection Summary						
HCM Average Control Delay			20.8	HCM Level of Service		C
HCM Volume to Capacity ratio			0.68			
Actuated Cycle Length (s)			120.0	Sum of lost time (s)		13.5
Intersection Capacity Utilization			64.3%	ICU Level of Service		C
Analysis Period (min)			15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

9: CR 52A (Clinton Avenue) & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	430	119	589	79	51	35	558	1210	48	43	1681	401
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.5	6.5	6.5	6.5		5.0	6.5		5.0	6.5	6.5
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00		0.97	0.91		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.94		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1749		3433	5009		1770	5036	1583
Flt Permitted	0.95	1.00	1.00	0.67	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1256	1749		3433	5009		1770	5036	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	467	129	640	86	55	38	607	1315	52	47	1827	436
RTOR Reduction (vph)	0	0	257	0	21	0	0	3	0	0	0	205
Lane Group Flow (vph)	467	129	383	86	72	0	607	1364	0	47	1827	231
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot		Perm	Perm			Prot			Prot		Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases			4	8								6
Actuated Green, G (s)	16.5	35.4	35.4	14.4	14.4		22.0	59.1		7.5	44.6	44.6
Effective Green, g (s)	16.5	35.4	35.4	14.4	14.4		22.0	59.1		7.5	44.6	44.6
Actuated g/C Ratio	0.14	0.30	0.30	0.12	0.12		0.18	0.49		0.06	0.37	0.37
Clearance Time (s)	4.5	6.5	6.5	6.5	6.5		5.0	6.5		5.0	6.5	6.5
Vehicle Extension (s)	3.0	6.0	6.0	6.0	6.0		3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	472	550	467	151	210		629	2467		111	1872	588
v/s Ratio Prot	c0.14	0.07			0.04		c0.18	0.27		0.03	c0.36	
v/s Ratio Perm			c0.24	0.07								0.15
v/c Ratio	0.99	0.23	0.82	0.57	0.34		0.97	0.55		0.42	0.98	0.39
Uniform Delay, d1	51.7	32.0	39.4	49.9	48.5		48.6	21.2		54.2	37.2	27.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.76	0.96		1.00	1.00	1.00
Incremental Delay, d2	38.2	0.6	12.9	9.8	2.7		21.3	0.6		2.6	15.8	2.0
Delay (s)	89.9	32.7	52.2	59.7	51.2		58.4	21.0		56.8	53.0	29.7
Level of Service	F	C	D	E	D		E	C		E	D	C
Approach Delay (s)		64.4			55.3			32.5			48.7	
Approach LOS		E			E			C			D	
Intersection Summary												
HCM Average Control Delay			46.7			HCM Level of Service				D		
HCM Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)				16.0		
Intersection Capacity Utilization			93.5%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Morningside Drive & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	148	30	157	154	28	125	88	1147	185	147	1500	163
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	6.2	4.5	5.8	5.8	5.4	5.8	
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583		1787	1583	1770	5036	1583	1770	4967	
Flt Permitted	0.63	1.00	1.00		0.74	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1181	1863	1583		1370	1583	1770	5036	1583	1770	4967	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	161	33	171	167	30	136	96	1247	201	160	1630	177
RTOR Reduction (vph)	0	0	140	0	0	111	0	0	127	0	21	0
Lane Group Flow (vph)	161	33	31	0	197	25	96	1247	74	160	1786	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)	10.7	10.7	10.7		10.7	10.7	5.7	21.6	21.6	8.8	25.6	
Effective Green, g (s)	10.7	10.7	10.7		10.7	10.7	5.7	21.6	21.6	8.8	25.6	
Actuated g/C Ratio	0.18	0.18	0.18		0.18	0.18	0.10	0.37	0.37	0.15	0.44	
Clearance Time (s)	6.2	6.2	6.2		6.2	6.2	4.5	5.8	5.8	5.4	5.8	
Vehicle Extension (s)	4.0	4.0	4.0		4.0	4.0	3.0	6.0	6.0	4.0	6.0	
Lane Grp Cap (vph)	216	341	290		251	290	172	1859	584	266	2174	
v/s Ratio Prot		0.02					0.05	c0.25		0.09	c0.36	
v/s Ratio Perm	0.14		0.02		c0.14	0.02			0.05			
v/c Ratio	0.75	0.10	0.11		0.78	0.09	0.56	0.67	0.13	0.60	0.82	
Uniform Delay, d1	22.6	19.9	19.9		22.8	19.8	25.2	15.5	12.2	23.2	14.4	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	13.8	0.2	0.2		15.6	0.2	3.9	1.5	0.3	4.4	3.1	
Delay (s)	36.5	20.1	20.1		38.4	20.0	29.1	17.0	12.5	27.6	17.5	
Level of Service	D	C	C		D	C	C	B	B	C	B	
Approach Delay (s)		27.3			30.9			17.1			18.4	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM Average Control Delay			19.7				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			58.5				Sum of lost time (s)			17.8		
Intersection Capacity Utilization			68.9%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: SR 533 (US 98 Bypass) & SR 39 (US 301)

2/16/2009

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	770	30	850	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5			
Lane Util. Factor	0.97	1.00	1.00			
Frt	1.00	0.85	1.00			
Flt Protected	0.95	1.00	1.00			
Satd. Flow (prot)	3367	1553	1845			
Flt Permitted	0.95	1.00	1.00			
Satd. Flow (perm)	3367	1553	1845			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	837	33	924	0	0	0
RTOR Reduction (vph)	0	23	0	0	0	0
Lane Group Flow (vph)	837	10	924	0	0	0
Heavy Vehicles (%)	4%	4%	3%	4%	4%	3%
Turn Type	Perm					
Protected Phases	8		2			
Permitted Phases		8				
Actuated Green, G (s)	18.9	18.9	35.8			
Effective Green, g (s)	18.9	18.9	35.8			
Actuated g/C Ratio	0.30	0.30	0.56			
Clearance Time (s)	4.5	4.5	4.5			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	999	461	1037			
v/s Ratio Prot	c0.25		c0.50			
v/s Ratio Perm		0.01				
v/c Ratio	0.84	0.02	0.89			
Uniform Delay, d1	21.0	15.9	12.2			
Progression Factor	1.00	1.00	1.00			
Incremental Delay, d2	6.2	0.0	9.8			
Delay (s)	27.2	15.9	22.0			
Level of Service	C	B	C			
Approach Delay (s)	26.8		22.0		0.0	
Approach LOS	C		C		A	
Intersection Summary						
HCM Average Control Delay			24.3	HCM Level of Service		C
HCM Volume to Capacity ratio			0.87			
Actuated Cycle Length (s)			63.7	Sum of lost time (s)		9.0
Intersection Capacity Utilization			74.2%	ICU Level of Service		D
Analysis Period (min)			15			
c Critical Lane Group						

Arterial Level of Service: NB SR 39 (US 301)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Daugherty Road	I	45	44.7	35.4	80.1	0.51	22.8	D
Townview Square Entr	I	45	34.7	16.4	51.1	0.36	25.2	D
Kossik Road	I	45	51.8	11.2	63.0	0.65	37.0	B
Centennial Road	I	55	131.7	54.2	185.9	2.01	39.0	B
SR 700	I	55	95.8	29.3	125.1	1.46	42.1	A
CR 52A (Clinton Aven	I	50	28.0	21.6	49.6	0.29	21.4	D
Morningside Drive	I	50	73.2	18.2	91.4	1.02	40.1	B
SR 533 (US 98 Bypass	I	45	65.8	25.8	91.6	0.82	32.3	C
Total	I		525.7	212.1	737.8	7.12	34.8	B

Arterial Level of Service: SB SR 39 (US 301)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Morningside Drive	I	45	65.8	18.5	84.3	0.82	35.1	B
CR 52A (Clinton Aven	I	50	73.2	49.2	122.4	1.02	29.9	C
SR 700	I	50	28.0	5.9	33.9	0.29	31.3	C
Centennial Road	I	55	95.8	32.7	128.5	1.46	41.0	B
Kossik Road	I	55	131.7	23.5	155.2	2.01	46.7	A
Townview Square Entr	I	45	51.8	46.6	98.4	0.65	23.7	D
Daugherty Road	I	45	34.7	12.8	47.5	0.36	27.1	C
CR 54 (Eiland Boulev	I	45	44.7	31.0	75.7	0.51	24.2	D
Total	I		525.7	220.2	745.9	7.12	34.4	B

HCM Signalized Intersection Capacity Analysis

1: CR 54 (Eiland Boulevard) & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	500	429	64	334	485	242	130	1722	186	342	1200	414
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.3		4.5	5.3	5.3	4.5	5.3	5.3	4.5	5.3	5.3
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	0.98		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)	3433	3470		3433	3539	1583	1770	5036	1583	3433	5036	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3470		3433	3539	1583	1770	5036	1583	3433	5036	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	543	466	70	363	527	263	141	1872	202	372	1304	450
RTOR Reduction (vph)	0	8	0	0	0	82	0	0	45	0	0	142
Lane Group Flow (vph)	543	528	0	363	527	181	141	1872	157	372	1304	308
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	31.3	43.8		19.1	31.6	31.6	31.5	60.7	60.7	21.8	51.0	51.0
Effective Green, g (s)	31.3	43.8		19.1	31.6	31.6	31.5	60.7	60.7	21.8	51.0	51.0
Actuated g/C Ratio	0.19	0.27		0.12	0.19	0.19	0.19	0.37	0.37	0.13	0.31	0.31
Clearance Time (s)	4.5	5.3		4.5	5.3	5.3	4.5	5.3	5.3	4.5	5.3	5.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	651	921		397	678	303	338	1853	582	454	1557	489
v/s Ratio Prot	c0.16	0.15		0.11	c0.15		0.08	c0.37		0.11	c0.26	
v/s Ratio Perm						0.11			0.10			0.19
v/c Ratio	0.83	0.57		0.91	0.78	0.60	0.42	1.01	0.27	0.82	0.84	0.63
Uniform Delay, d1	64.4	52.5		72.1	63.4	60.9	58.7	52.2	36.6	69.7	53.1	48.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.64	0.62	0.64
Incremental Delay, d2	9.0	0.9		25.1	5.6	3.1	0.8	23.4	1.1	7.1	3.5	3.8
Delay (s)	73.4	53.4		97.2	69.0	64.0	59.5	75.6	37.7	51.4	36.2	34.9
Level of Service	E	D		F	E	E	E	E	D	D	D	C
Approach Delay (s)		63.4			76.7			71.1			38.6	
Approach LOS		E			E			E			D	
Intersection Summary												
HCM Average Control Delay			60.3			HCM Level of Service			E			
HCM Volume to Capacity ratio			0.91									
Actuated Cycle Length (s)			165.0			Sum of lost time (s)			20.4			
Intersection Capacity Utilization			87.0%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Daugherty Road & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	103	84	138	132	96	161	2197	131	70	1734	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	5.3		4.5	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.91		1.00	0.91	
Frt	1.00	0.93		1.00	0.94		1.00	0.99		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)	1770	1737		1770	1745		1770	4996		1770	5009	
Flt Permitted	0.44	1.00		0.50	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	812	1737		933	1745		1770	4996		1770	5009	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	112	91	150	143	104	175	2388	142	76	1885	75
RTOR Reduction (vph)	0	18	0	0	16	0	0	4	0	0	3	0
Lane Group Flow (vph)	109	186	0	150	231	0	175	2526	0	76	1957	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases	4			8			5			2		
Permitted Phases	4			8						1		
Actuated Green, G (s)	49.5	49.5		49.5	49.5		21.3	84.7		16.5	79.9	
Effective Green, g (s)	49.5	49.5		49.5	49.5		21.3	84.7		16.5	79.9	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.13	0.51		0.10	0.48	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	5.3		4.5	5.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)	244	521		280	524		228	2565		177	2426	
v/s Ratio Prot		0.11			0.13		0.10	c0.51		0.04	c0.39	
v/s Ratio Perm	0.13			c0.16								
v/c Ratio	0.45	0.36		0.54	0.44		0.77	0.98		0.43	0.81	
Uniform Delay, d1	46.7	45.3		48.2	46.6		69.5	39.5		69.8	36.0	
Progression Factor	1.00	1.00		1.00	1.00		1.25	0.46		0.68	0.44	
Incremental Delay, d2	5.8	1.9		7.2	2.7		6.6	8.7		1.4	2.4	
Delay (s)	52.5	47.2		55.3	49.3		93.2	26.7		48.8	18.2	
Level of Service	D	D		E	D		F	C		D	B	
Approach Delay (s)		49.0			51.6			31.0			19.4	
Approach LOS		D			D			C			B	
Intersection Summary												
HCM Average Control Delay	29.2			HCM Level of Service			C					
HCM Volume to Capacity ratio	0.80											
Actuated Cycle Length (s)	165.0			Sum of lost time (s)			9.8					
Intersection Capacity Utilization	88.0%			ICU Level of Service			E					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Spanish Trails Boulevard & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (veh/h)	11	2	8	50	7	59	8	8	2310	50	39	1815
Sign Control		Stop			Stop				Free			Free
Grade		0%			0%				0%			0%
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
Hourly flow rate (vph)	12	2	9	54	8	64	0	9	2511	54	42	1973
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type									None			None
Median storage (veh)												
Upstream signal (ft)									686			1204
pX, platoon unblocked	0.62	0.62	0.77	0.62	0.62	0.51	0.00	0.77			0.51	
vC, conflicting volume	2986	4646	664	3308	4625	864	0	1985			2565	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	0	2207	0	61	2173	0	0	1218			684	
tC, single (s)	*8.0	*7.0	6.9	*8.0	*7.0	6.9	0.0	*4.6			*4.6	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			2.2	
p0 queue free %	97	88	99	88	60	88	0	98			90	
cM capacity (veh/h)	355	18	831	468	19	550	0	373			421	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	12	11	54	72	9	1004	1004	557	42	789	789	407
Volume Left	12	0	54	0	9	0	0	0	42	0	0	0
Volume Right	0	9	0	64	0	0	0	54	0	0	0	12
cSH	355	83	468	139	373	1700	1700	1700	421	1700	1700	1700
Volume to Capacity	0.03	0.13	0.12	0.52	0.02	0.59	0.59	0.33	0.10	0.46	0.46	0.24
Queue Length 95th (ft)	3	11	10	62	2	0	0	0	8	0	0	0
Control Delay (s)	15.5	54.7	13.7	55.5	14.9	0.0	0.0	0.0	14.5	0.0	0.0	0.0
Lane LOS	C	F	B	F	B				B			
Approach Delay (s)	34.2		37.5		0.1				0.3			
Approach LOS	D		E									
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			61.8%		ICU Level of Service				B			
Analysis Period (min)			15									

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis 3: Spanish Trails Boulevard & SR 39 (US 301)

2/16/2009

Movement	SBR
Volume (veh/h)	11
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	12
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis

4: Townview Square Entrance & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	141	58	203	131	95	72	170	1829	207	89	1416	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	5.3	5.3	4.5	5.3	
Lane Util. Factor	1.00	1.00		1.00	0.95		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.88		1.00	0.94		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1645		1770	3310		1770	5036	1583	1770	4988	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1645		1770	3310		1770	5036	1583	1770	4988	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	153	63	221	142	103	78	185	1988	225	97	1539	113
RTOR Reduction (vph)	0	86	0	0	73	0	0	0	70	0	4	0
Lane Group Flow (vph)	153	198	0	142	108	0	185	1988	155	97	1648	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot			Prot			Prot			Perm		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases										2		
Actuated Green, G (s)	31.9	24.9		18.5	11.5		20.5	95.3	95.3	7.5	82.3	
Effective Green, g (s)	31.9	24.9		18.5	11.5		20.5	95.3	95.3	7.5	82.3	
Actuated g/C Ratio	0.19	0.15		0.11	0.07		0.12	0.58	0.58	0.05	0.50	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	5.3	5.3	4.5	5.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	4.0	4.0	3.0	4.0	
Lane Grp Cap (vph)	342	248		198	231		220	2909	914	80	2488	
v/s Ratio Prot	0.09	c0.12		c0.08	0.03		c0.10	c0.39		c0.05	0.33	
v/s Ratio Perm										0.10		
v/c Ratio	0.45	0.80		0.72	0.47		0.84	0.68	0.17	1.21	0.66	
Uniform Delay, d1	58.8	67.6		70.7	73.8		70.7	24.3	16.3	78.8	31.0	
Progression Factor	1.00	1.00		1.00	1.00		0.56	0.46	0.21	0.83	0.58	
Incremental Delay, d2	0.9	16.3		11.7	1.5		10.9	0.5	0.2	162.1	1.2	
Delay (s)	59.7	83.9		82.4	75.3		50.3	11.6	3.6	227.1	19.1	
Level of Service	E	F		F	E		D	B	A	F	B	
Approach Delay (s)	75.5			78.4			13.9			30.6		
Approach LOS	E			E			B			C		
Intersection Summary												
HCM Average Control Delay			29.6	HCM Level of Service			C					
HCM Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			165.0	Sum of lost time (s)			23.3					
Intersection Capacity Utilization			79.6%	ICU Level of Service			D					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Kossik Road & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	254	110	90	257	105	317	239	1256	200	170	1000	250
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	7.0	7.0	7.0	4.5	7.0	7.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	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)	3433	1863	1583	3433	1863	1583	1770	5036	1583	1770	5085	1568
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)	3433	1863	1583	3433	1863	1583	1770	5036	1583	1770	5085	1568
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	276	120	98	279	114	345	260	1365	217	185	1087	272
RTOR Reduction (vph)	0	0	78	0	0	315	0	0	104	0	0	172
Lane Group Flow (vph)	276	120	20	279	114	30	260	1365	113	185	1087	100
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	2%	3%
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	35.3	33.5	33.5	16.2	14.4	14.4	29.8	55.7	55.7	37.5	60.9	60.9
Effective Green, g (s)	35.3	33.5	33.5	16.2	14.4	14.4	29.8	55.7	55.7	37.5	60.9	60.9
Actuated g/C Ratio	0.21	0.20	0.20	0.10	0.09	0.09	0.18	0.34	0.34	0.23	0.37	0.37
Clearance Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	7.0	7.0	7.0	4.5	7.0	7.0
Vehicle Extension (s)	3.5	3.5	3.5	3.0	3.0	3.0	5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	734	378	321	337	163	138	320	1700	534	402	1877	579
v/s Ratio Prot	c0.08	0.06		c0.08	0.06		0.15	c0.27		0.10	c0.21	
v/s Ratio Perm			0.01			0.02			0.07			0.06
v/c Ratio	0.38	0.32	0.06	0.83	0.70	0.22	0.81	0.80	0.21	0.46	0.58	0.17
Uniform Delay, d1	55.4	56.0	53.1	73.0	73.2	70.1	64.9	49.7	39.0	55.0	41.8	35.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.84	0.49	0.26	1.00	1.00	1.00
Incremental Delay, d2	0.4	2.2	0.4	15.3	12.3	0.8	12.7	3.1	0.7	0.8	1.3	0.7
Delay (s)	55.8	58.2	53.4	88.3	85.5	70.9	67.0	27.3	10.8	55.9	43.1	35.7
Level of Service	E	E	D	F	F	E	E	C	B	E	D	D
Approach Delay (s)		55.9			79.7			30.9			43.3	
Approach LOS		E			E			C			D	
Intersection Summary												
HCM Average Control Delay			45.5			HCM Level of Service				D		
HCM Volume to Capacity ratio			0.61									
Actuated Cycle Length (s)			165.0			Sum of lost time (s)			12.3			
Intersection Capacity Utilization			65.8%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

6: Wire Road & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations								  			 	  
Volume (veh/h)	0	0	0	104	0	137	0	2102	140	8	145	1645
Sign Control		Stop			Stop			Free				Free
Grade		0%			0%			0%				0%
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
Hourly flow rate (vph)	0	0	0	113	0	149	0	2285	152	0	158	1788
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None				None
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked										0.00		
vC, conflicting volume	2865	4388	596	3196	4388	762	1788			0	2285	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2865	4388	596	3196	4388	762	1788			0	2285	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			0.0	4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			0.0	2.2	
p0 queue free %	100	100	100	0	100	57	100			0	28	
cM capacity (veh/h)	2	0	447	2	0	348	342			0	218	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	113	149	762	762	762	152	158	715	715	358		
Volume Left	113	0	0	0	0	0	158	0	0	0		
Volume Right	0	149	0	0	0	152	0	0	0	0		
cSH	2	348	1700	1700	1700	1700	218	1700	1700	1700		
Volume to Capacity	66.13	0.43	0.45	0.45	0.45	0.09	0.72	0.42	0.42	0.21		
Queue Length 95th (ft)	Err	52	0	0	0	0	119	0	0	0		
Control Delay (s)	Err	22.9	0.0	0.0	0.0	0.0	55.1	0.0	0.0	0.0		
Lane LOS	F	C					F					
Approach Delay (s)	4327.9		0.0				4.5					
Approach LOS	F											
Intersection Summary												
Average Delay			246.0									
Intersection Capacity Utilization			67.6%			ICU Level of Service				C		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 6: Wire Road & SR 39 (US 301)

2/16/2009

Movement	SBR
Left Lane Configurations	
Volume (veh/h)	0
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	0
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis

7: Centennial Road & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	50	50	251	50	333	50	1785	381	241	1426	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	5.0	8.0	8.0	5.0	8.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1723		1770	1863	1583	1770	5036	1583	1770	5012	
Flt Permitted	0.72	1.00		0.69	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1345	1723		1280	1863	1583	1770	5036	1583	1770	5012	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	54	54	273	54	362	54	1940	414	262	1550	54
RTOR Reduction (vph)	0	40	0	0	0	145	0	0	198	0	4	0
Lane Group Flow (vph)	54	68	0	273	54	217	54	1940	216	262	1600	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm			Perm			Perm	Prot	Perm		Prot	
Protected Phases	4			8			5		2	1		6
Permitted Phases	4			8			8		2			
Actuated Green, G (s)	22.2	22.2		22.2	22.2	22.2	4.0	34.8	34.8	12.0	42.8	
Effective Green, g (s)	22.2	22.2		22.2	22.2	22.2	4.0	34.8	34.8	12.0	42.8	
Actuated g/C Ratio	0.25	0.25		0.25	0.25	0.25	0.05	0.40	0.40	0.14	0.49	
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	5.0	8.0	8.0	5.0	8.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	4.0	3.0	3.0	4.0	3.0	
Lane Grp Cap (vph)	341	437		325	473	402	81	2003	630	243	2452	
v/s Ratio Prot	0.04			0.03			0.03		c0.39	c0.15		0.32
v/s Ratio Perm	0.04			c0.21			0.14		0.14			
v/c Ratio	0.16	0.15		0.84	0.11	0.54	0.67	0.97	0.34	1.08	0.65	
Uniform Delay, d1	25.4	25.4		31.0	25.1	28.2	41.1	25.8	18.4	37.8	16.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.2		17.4	0.1	1.5	20.5	13.3	0.3	80.1	0.6	
Delay (s)	25.6	25.5		48.4	25.2	29.7	61.6	39.1	18.7	117.8	17.4	
Level of Service	C	C		D	C	C	E	D	B	F	B	
Approach Delay (s)	25.6			36.8			36.1				31.5	
Approach LOS	C			D			D				C	
Intersection Summary												
HCM Average Control Delay			34.2	HCM Level of Service					C			
HCM Volume to Capacity ratio			0.95									
Actuated Cycle Length (s)			87.5	Sum of lost time (s)					18.5			
Intersection Capacity Utilization			83.8%	ICU Level of Service					E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

8: SR 700 & SR 39 (US 301)

2/16/2009



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	94	310	2008	100	258	1570
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
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)	1687	1509	5036	1509	1687	5036
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1687	1509	5036	1509	1687	5036
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	102	337	2183	109	280	1707
RTOR Reduction (vph)	0	302	0	50	0	0
Lane Group Flow (vph)	102	35	2183	59	280	1707
Heavy Vehicles (%)	7%	7%	3%	7%	7%	3%
Turn Type	Perm		Perm		Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	12.3	12.3	64.7	64.7	29.5	98.7
Effective Green, g (s)	12.3	12.3	64.7	64.7	29.5	98.7
Actuated g/C Ratio	0.10	0.10	0.54	0.54	0.25	0.82
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	173	155	2715	814	415	4142
v/s Ratio Prot	c0.06		c0.43		c0.17	0.34
v/s Ratio Perm		0.02		0.04		
v/c Ratio	0.59	0.22	0.80	0.07	0.67	0.41
Uniform Delay, d1	51.4	49.5	22.5	13.3	40.9	2.9
Progression Factor	1.00	1.00	1.00	1.00	0.95	0.37
Incremental Delay, d2	5.1	0.7	2.6	0.2	2.7	0.2
Delay (s)	56.5	50.2	25.1	13.4	41.6	1.2
Level of Service	E	D	C	B	D	A
Approach Delay (s)	51.7		24.6			6.9
Approach LOS	D		C			A
Intersection Summary						
HCM Average Control Delay			19.7	HCM Level of Service		B
HCM Volume to Capacity ratio			0.74			
Actuated Cycle Length (s)			120.0	Sum of lost time (s)		13.5
Intersection Capacity Utilization			69.5%	ICU Level of Service		C
Analysis Period (min)			15			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

9: CR 52A (Clinton Avenue) & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	401	51	558	48	119	43	589	1681	79	35	1210	430
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.5	6.5	6.5	6.5		5.0	6.5		5.0	6.5	6.5
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00		0.97	0.91		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1788		3433	5004		1770	5036	1583
Flt Permitted	0.95	1.00	1.00	0.72	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1343	1788		3433	5004		1770	5036	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	436	55	607	52	129	47	640	1827	86	38	1315	467
RTOR Reduction (vph)	0	0	303	0	11	0	0	4	0	0	0	307
Lane Group Flow (vph)	436	55	304	52	165	0	640	1909	0	38	1315	160
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot		Perm	Perm			Prot			Prot		Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases			4	8								6
Actuated Green, G (s)	18.1	38.1	38.1	15.5	15.5		26.3	58.3		5.6	37.6	37.6
Effective Green, g (s)	18.1	38.1	38.1	15.5	15.5		26.3	58.3		5.6	37.6	37.6
Actuated g/C Ratio	0.15	0.32	0.32	0.13	0.13		0.22	0.49		0.05	0.31	0.31
Clearance Time (s)	4.5	6.5	6.5	6.5	6.5		5.0	6.5		5.0	6.5	6.5
Vehicle Extension (s)	3.0	6.0	6.0	6.0	6.0		3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	518	592	503	173	231		752	2431		83	1578	496
v/s Ratio Prot	c0.13	0.03			c0.09		c0.19	0.38		0.02	c0.26	
v/s Ratio Perm			0.19	0.04								0.10
v/c Ratio	0.84	0.09	0.60	0.30	0.71		0.85	0.79		0.46	0.83	0.32
Uniform Delay, d1	49.6	28.8	34.6	47.3	50.1		45.0	25.6		55.7	38.3	31.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.59	0.34		1.00	1.00	1.00
Incremental Delay, d2	11.8	0.2	3.6	2.7	14.0		5.8	1.6		4.0	5.3	1.7
Delay (s)	61.4	29.0	38.2	50.1	64.1		32.5	10.3		59.7	43.6	33.2
Level of Service	E	C	D	D	E		C	B		E	D	C
Approach Delay (s)		46.9			60.9			15.9			41.3	
Approach LOS		D			E			B			D	
Intersection Summary												
HCM Average Control Delay			31.8			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			22.5			
Intersection Capacity Utilization			82.5%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Morningside Drive & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	163	28	88	185	30	147	157	1500	154	125	1147	148
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	6.2	4.5	5.8	5.8	5.4	5.8	
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583		1786	1583	1770	5036	1583	1770	4955	
Flt Permitted	0.55	1.00	1.00		0.73	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1029	1863	1583		1369	1583	1770	5036	1583	1770	4955	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	177	30	96	201	33	160	171	1630	167	136	1247	161
RTOR Reduction (vph)	0	0	77	0	0	129	0	0	95	0	27	0
Lane Group Flow (vph)	177	30	19	0	234	31	171	1630	72	136	1381	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)	11.8	11.8	11.8		11.8	11.8	6.5	26.3	26.3	5.6	26.3	
Effective Green, g (s)	11.8	11.8	11.8		11.8	11.8	6.5	26.3	26.3	5.6	26.3	
Actuated g/C Ratio	0.19	0.19	0.19		0.19	0.19	0.11	0.43	0.43	0.09	0.43	
Clearance Time (s)	6.2	6.2	6.2		6.2	6.2	4.5	5.8	5.8	5.4	5.8	
Vehicle Extension (s)	4.0	4.0	4.0		4.0	4.0	3.0	6.0	6.0	4.0	6.0	
Lane Grp Cap (vph)	199	360	306		264	306	188	2168	681	162	2133	
v/s Ratio Prot		0.02					c0.10	c0.32		0.08	0.28	
v/s Ratio Perm	c0.17		0.01		0.17	0.02			0.05			
v/c Ratio	0.89	0.08	0.06		0.89	0.10	0.91	0.75	0.11	0.84	0.65	
Uniform Delay, d1	24.0	20.2	20.1		24.0	20.3	27.0	14.7	10.4	27.3	13.7	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	35.4	0.1	0.1		28.4	0.2	40.5	2.0	0.2	31.0	1.1	
Delay (s)	59.4	20.4	20.2		52.4	20.5	67.5	16.7	10.6	58.3	14.9	
Level of Service	E	C	C		D	C	E	B	B	E	B	
Approach Delay (s)		43.1			39.5			20.6			18.7	
Approach LOS		D			D			C			B	
Intersection Summary												
HCM Average Control Delay			23.3				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.81									
Actuated Cycle Length (s)			61.1				Sum of lost time (s)			16.5		
Intersection Capacity Utilization			68.9%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: SR 533 (US 98 Bypass) & SR 39 (US 301)

2/16/2009

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	580	30	1060	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5			
Lane Util. Factor	0.97	1.00	1.00			
Frt	1.00	0.85	1.00			
Flt Protected	0.95	1.00	1.00			
Satd. Flow (prot)	3367	1553	1845			
Flt Permitted	0.95	1.00	1.00			
Satd. Flow (perm)	3367	1553	1845			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	630	33	1152	0	0	0
RTOR Reduction (vph)	0	26	0	0	0	0
Lane Group Flow (vph)	630	7	1152	0	0	0
Heavy Vehicles (%)	4%	4%	3%	4%	4%	3%
Turn Type	Perm					
Protected Phases	8		2			
Permitted Phases		8				
Actuated Green, G (s)	18.4	18.4	55.3			
Effective Green, g (s)	18.4	18.4	55.3			
Actuated g/C Ratio	0.22	0.22	0.67			
Clearance Time (s)	4.5	4.5	4.5			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	749	346	1234			
v/s Ratio Prot	c0.19		c0.62			
v/s Ratio Perm		0.00				
v/c Ratio	0.84	0.02	0.93			
Uniform Delay, d1	30.8	25.1	12.1			
Progression Factor	1.00	1.00	1.00			
Incremental Delay, d2	8.5	0.0	12.8			
Delay (s)	39.2	25.1	24.8			
Level of Service	D	C	C			
Approach Delay (s)	38.5		24.8		0.0	
Approach LOS	D		C		A	
Intersection Summary						
HCM Average Control Delay			29.8	HCM Level of Service		C
HCM Volume to Capacity ratio			0.91			
Actuated Cycle Length (s)			82.7	Sum of lost time (s)		9.0
Intersection Capacity Utilization			79.8%	ICU Level of Service		D
Analysis Period (min)			15			
c Critical Lane Group						

Arterial Level of Service: NB SR 39 (US 301)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Daugherty Road	I	45	44.7	27.3	72.0	0.51	25.4	D
Townview Square Entr	I	45	34.7	12.6	47.3	0.36	27.2	C
Kossik Road	I	45	51.8	27.4	79.2	0.65	29.4	C
Centennial Road	I	55	131.7	50.9	182.6	2.01	39.7	B
SR 700	I	55	95.8	26.0	121.8	1.46	43.2	A
CR 52A (Clinton Aven	I	50	28.0	10.3	38.3	0.29	27.7	C
Morningside Drive	I	50	73.2	17.6	90.8	1.02	40.3	B
SR 533 (US 98 Bypass	I	45	65.8	27.9	93.7	0.82	31.6	C
Total	I		525.7	200.0	725.7	7.12	35.3	B

Arterial Level of Service: SB SR 39 (US 301)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Morningside Drive	I	45	65.8	15.4	81.2	0.82	36.4	B
CR 52A (Clinton Aven	I	50	73.2	40.9	114.1	1.02	32.1	C
SR 700	I	50	28.0	1.3	29.3	0.29	36.2	B
Centennial Road	I	55	95.8	19.2	115.0	1.46	45.8	A
Kossik Road	I	55	131.7	43.9	175.6	2.01	41.2	B
Townview Square Entr	I	45	51.8	20.2	72.0	0.65	32.4	C
Daugherty Road	I	45	34.7	18.6	53.3	0.36	24.2	D
CR 54 (Eiland Boulev	I	45	44.7	37.7	82.4	0.51	22.2	D
Total	I		525.7	197.2	722.9	7.12	35.5	B

Appendix F

Opening year (2015) Synchro Intersection Analysis Sheets

HCM Signalized Intersection Capacity Analysis

1: CR 54 (Eiland Boulevard) & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	446	123	165	333	220	46	848	269	156	1238	371
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.3		4.5	5.3	5.3	4.5	5.3	5.3	4.5	5.3	5.3
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	0.97		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)	3433	3424		3433	3539	1583	1770	5036	1583	3433	5036	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3424		3433	3539	1583	1770	5036	1583	3433	5036	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	353	485	134	179	362	239	50	922	292	170	1346	403
RTOR Reduction (vph)	0	31	0	0	0	180	0	0	130	0	0	128
Lane Group Flow (vph)	353	588	0	179	362	59	50	922	162	170	1346	275
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	17.7	28.9		7.3	18.5	18.5	7.5	52.8	52.8	11.4	56.7	56.7
Effective Green, g (s)	17.7	28.9		7.3	18.5	18.5	7.5	52.8	52.8	11.4	56.7	56.7
Actuated g/C Ratio	0.15	0.24		0.06	0.15	0.15	0.06	0.44	0.44	0.10	0.47	0.47
Clearance Time (s)	4.5	5.3		4.5	5.3	5.3	4.5	5.3	5.3	4.5	5.3	5.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	506	825		209	546	244	111	2216	697	326	2380	748
v/s Ratio Prot	0.10	c0.17		c0.05	0.10		0.03	c0.18		0.05	c0.27	
v/s Ratio Perm						0.04			0.10			0.17
v/c Ratio	0.70	0.71		0.86	0.66	0.24	0.45	0.42	0.23	0.52	0.57	0.37
Uniform Delay, d1	48.6	41.7		55.8	47.8	44.6	54.3	23.0	21.0	51.7	22.8	20.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.24	0.37	0.11
Incremental Delay, d2	4.2	2.9		27.4	3.0	0.5	2.9	0.6	0.8	1.1	0.7	1.0
Delay (s)	52.8	44.7		83.2	50.8	45.1	57.2	23.6	21.7	65.3	9.1	3.2
Level of Service	D	D		F	D	D	E	C	C	E	A	A
Approach Delay (s)		47.6			56.5			24.5			12.8	
Approach LOS		D			E			C			B	
Intersection Summary												
HCM Average Control Delay			29.6			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			15.1			
Intersection Capacity Utilization			68.2%			ICU Level of Service			C			
Analysis Period (min)			15									

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

2: Daugherty Road & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	49	117	122	121	83	56	65	1262	121	87	1599	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	5.3		4.5	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.91		1.00	0.91	
Frt	1.00	0.92		1.00	0.94		1.00	0.99		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)	1770	1720		1770	1750		1770	4974		1770	5002	
Flt Permitted	0.60	1.00		0.43	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1119	1720		808	1750		1770	4974		1770	5002	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	53	127	133	132	90	61	71	1372	132	95	1738	87
RTOR Reduction (vph)	0	32	0	0	20	0	0	10	0	0	4	0
Lane Group Flow (vph)	53	228	0	132	131	0	71	1494	0	95	1821	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases	4			8			5			2		
Permitted Phases	4			8						6		
Actuated Green, G (s)	35.5	35.5		35.5	35.5		8.1	55.6		14.6	62.1	
Effective Green, g (s)	35.5	35.5		35.5	35.5		8.1	55.6		14.6	62.1	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.07	0.46		0.12	0.52	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	5.3		4.5	5.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)	331	509		239	518		119	2305		215	2589	
v/s Ratio Prot		0.13			0.07		0.04	c0.30		0.05	c0.36	
v/s Ratio Perm	0.05			c0.16								
v/c Ratio	0.16	0.45		0.55	0.25		0.60	0.65		0.44	0.70	
Uniform Delay, d1	31.2	34.3		35.6	32.1		54.4	24.7		48.9	22.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	0.87		0.53	0.19	
Incremental Delay, d2	0.2	0.6		8.9	1.2		7.2	1.3		1.0	1.1	
Delay (s)	31.5	34.9		44.5	33.3		61.7	22.7		27.0	5.3	
Level of Service	C	C		D	C		E	C		C	A	
Approach Delay (s)		34.3			38.5			24.5			6.4	
Approach LOS		C			D			C			A	
Intersection Summary												
HCM Average Control Delay	17.7			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.67											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			15.1					
Intersection Capacity Utilization	76.1%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Spanish Trails Boulevard & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (veh/h)	10	2	7	37	1	29	7	7	1321	40	43	1715
Sign Control		Stop			Stop				Free			Free
Grade		0%			0%				0%			0%
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
Hourly flow rate (vph)	11	2	8	40	1	32	0	8	1436	43	47	1864
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type									None			None
Median storage (veh)												
Upstream signal (ft)									686			1204
pX, platoon unblocked	0.84	0.84	0.73	0.84	0.84	0.78	0.00	0.73			0.78	
vC, conflicting volume	2488	3457	626	2196	3439	500	0	1873			1479	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	374	1522	0	28	1502	0	0	924			640	
tC, single (s)	*8.0	*7.0	6.9	*8.0	*7.0	6.9	0.0	*4.6			*4.6	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			2.2	
p0 queue free %	97	97	99	95	99	96	0	98			93	
cM capacity (veh/h)	400	75	797	745	77	849	0	480			678	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	11	10	40	33	8	574	574	331	47	746	746	382
Volume Left	11	0	40	0	8	0	0	0	47	0	0	0
Volume Right	0	8	0	32	0	0	0	43	0	0	0	9
cSH	400	253	745	636	480	1700	1700	1700	678	1700	1700	1700
Volume to Capacity	0.03	0.04	0.05	0.05	0.02	0.34	0.34	0.19	0.07	0.44	0.44	0.22
Queue Length 95th (ft)	2	3	4	4	1	0	0	0	6	0	0	0
Control Delay (s)	14.2	19.8	10.1	11.0	12.6	0.0	0.0	0.0	10.7	0.0	0.0	0.0
Lane LOS	B	C	B	B	B				B			
Approach Delay (s)	16.9		10.5		0.1				0.3			
Approach LOS	C		B									
Intersection Summary												
Average Delay			0.5									
Intersection Capacity Utilization			51.1%		ICU Level of Service				A			
Analysis Period (min)			15									

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis

3: Spanish Trails Boulevard & SR 39 (US 301)

2/16/2009

Movement	SBR
Approach	
Lane Configurations	
Volume (veh/h)	8
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	9
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis

4: Townview Square Entrance & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	99	93	161	160	54	68	162	1018	126	58	1334	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	5.3	5.3	4.5	5.3	
Lane Util. Factor	1.00	1.00		1.00	0.95		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.90		1.00	0.92		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1686		1770	3244		1770	5036	1583	1770	4979	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1686		1770	3244		1770	5036	1583	1770	4979	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	108	101	175	174	59	74	176	1107	137	63	1450	127
RTOR Reduction (vph)	0	59	0	0	68	0	0	0	76	0	8	0
Lane Group Flow (vph)	108	217	0	174	65	0	176	1107	61	63	1569	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot			Prot			Prot			Perm		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	2											
Actuated Green, G (s)	30.0	20.5		19.6	10.1		16.4	53.6	53.6	7.5	44.7	
Effective Green, g (s)	30.0	20.5		19.6	10.1		16.4	53.6	53.6	7.5	44.7	
Actuated g/C Ratio	0.25	0.17		0.16	0.08		0.14	0.45	0.45	0.06	0.37	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	5.3	5.3	4.5	5.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	4.0	4.0	3.0	4.0	
Lane Grp Cap (vph)	443	288		289	273		242	2249	707	111	1855	
v/s Ratio Prot	0.06	c0.13		c0.10	0.02		c0.10	0.22		0.04	c0.32	
v/s Ratio Perm	0.04											
v/c Ratio	0.24	0.75		0.60	0.24		0.73	0.49	0.09	0.57	0.85	
Uniform Delay, d1	35.9	47.3		46.6	51.4		49.7	23.5	19.1	54.7	34.5	
Progression Factor	1.00	1.00		1.00	1.00		0.48	0.31	0.04	0.73	0.67	
Incremental Delay, d2	0.3	10.7		3.5	0.5		8.6	0.6	0.2	6.2	4.8	
Delay (s)	36.2	58.0		50.1	51.8		32.3	7.9	1.1	46.2	28.0	
Level of Service	D	E		D	D		C	A	A	D	C	
Approach Delay (s)	51.9			50.8			10.3			28.7		
Approach LOS	D			D			B			C		
Intersection Summary												
HCM Average Control Delay			25.9	HCM Level of Service			C					
HCM Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			120.0	Sum of lost time (s)			18.8					
Intersection Capacity Utilization			76.7%	ICU Level of Service			D					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Kossik Road & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	167	27	139	52	29	44	79	893	67	82	1126	203
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	7.0	7.0	7.0	4.5	7.0	7.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	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)	3433	1863	1583	3433	1863	1583	1770	5036	1583	1770	5036	1583
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)	3433	1863	1583	3433	1863	1583	1770	5036	1583	1770	5036	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	182	29	151	57	32	48	86	971	73	89	1224	221
RTOR Reduction (vph)	0	0	138	0	0	45	0	0	34	0	0	98
Lane Group Flow (vph)	182	29	13	57	32	3	86	971	39	89	1224	123
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	12.4	10.6	10.6	9.8	8.0	8.0	8.0	64.6	64.6	12.9	67.0	67.0
Effective Green, g (s)	12.4	10.6	10.6	9.8	8.0	8.0	8.0	64.6	64.6	12.9	67.0	67.0
Actuated g/C Ratio	0.10	0.09	0.09	0.08	0.07	0.07	0.07	0.54	0.54	0.11	0.56	0.56
Clearance Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	7.0	7.0	7.0	4.5	7.0	7.0
Vehicle Extension (s)	3.5	3.5	3.5	3.0	3.0	3.0	5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	355	165	140	280	124	106	118	2711	852	190	2812	884
v/s Ratio Prot	c0.05	0.02		0.02	c0.02		0.05	0.19		c0.05	c0.24	
v/s Ratio Perm			0.01			0.00			0.02			0.08
v/c Ratio	0.51	0.18	0.10	0.20	0.26	0.03	0.73	0.36	0.05	0.47	0.44	0.14
Uniform Delay, d1	50.9	50.7	50.3	51.5	53.2	52.4	54.9	15.8	13.1	50.3	15.5	12.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.75	0.29	0.05	1.00	1.00	1.00
Incremental Delay, d2	1.5	0.6	0.4	0.4	1.1	0.1	22.1	0.3	0.1	1.8	0.5	0.3
Delay (s)	52.4	51.3	50.6	51.8	54.3	52.5	63.3	4.9	0.7	52.2	16.0	13.0
Level of Service	D	D	D	D	D	D	E	A	A	D	B	B
Approach Delay (s)		51.6			52.6			9.1			17.6	
Approach LOS		D			D			A			B	
Intersection Summary												
HCM Average Control Delay			20.0				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.43									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			17.6		
Intersection Capacity Utilization			55.1%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Volume (veh/h)	0	0	0	77	0	104	0	1137	58	6	114	1448
Sign Control		Stop			Stop			Free				Free
Grade		0%			0%			0%				0%
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
Hourly flow rate (vph)	0	0	0	84	0	113	0	1236	63	0	124	1574
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None				None
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked										0.00		
vC, conflicting volume	2234	3058	525	2008	3058	412	1574			0	1236	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2234	3058	525	2008	3058	412	1574			0	1236	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			0.0	4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			0.0	2.2	
p0 queue free %	100	100	100	0	100	81	100			0	78	
cM capacity (veh/h)	16	10	497	29	10	589	415			0	559	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	84	113	412	412	412	63	124	630	630	315		
Volume Left	84	0	0	0	0	0	124	0	0	0		
Volume Right	0	113	0	0	0	63	0	0	0	0		
cSH	29	589	1700	1700	1700	1700	559	1700	1700	1700		
Volume to Capacity	2.90	0.19	0.24	0.24	0.24	0.04	0.22	0.37	0.37	0.19		
Queue Length 95th (ft)	250	18	0	0	0	0	21	0	0	0		
Control Delay (s)	1144.5	12.6	0.0	0.0	0.0	0.0	13.3	0.0	0.0	0.0		
Lane LOS	F	B					B					
Approach Delay (s)	494.1		0.0				1.0					
Approach LOS	F											
Intersection Summary												
Average Delay			31.0									
Intersection Capacity Utilization			45.1%			ICU Level of Service			A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 6: Wire Road & SR 39 (US 301)

2/16/2009

Movement	SBR
Left Lane Configurations	
Volume (veh/h)	0
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	0
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis

7: Centennial Road & SR 39 (US 301)

2/16/2009

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Volume (vph)	20	20	20	258	20	170	20	1019	166	255	1257	20		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	5.0	8.0	8.0	5.0	8.0			
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91			
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00			
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1770	1723		1770	1863	1583	1770	5036	1583	1770	5025			
Flt Permitted	0.74	1.00		0.73	1.00	1.00	0.95	1.00	1.00	0.95	1.00			
Satd. Flow (perm)	1384	1723		1357	1863	1583	1770	5036	1583	1770	5025			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92		
Adj. Flow (vph)	22	22	22	280	22	185	22	1108	180	277	1366	22		
RTOR Reduction (vph)	0	16	0	0	0	137	0	0	123	0	2	0		
Lane Group Flow (vph)	22	28	0	280	22	48	22	1108	57	277	1386	0		
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%		
Turn Type	Perm			Perm			Perm		Prot		Perm		Prot	
Protected Phases	4			8			5		2		1		6	
Permitted Phases	4			8			8				2			
Actuated Green, G (s)	19.6	19.6		19.6	19.6	19.6	2.6	23.8	23.8	13.9	35.1			
Effective Green, g (s)	19.6	19.6		19.6	19.6	19.6	2.6	23.8	23.8	13.9	35.1			
Actuated g/C Ratio	0.26	0.26		0.26	0.26	0.26	0.03	0.31	0.31	0.18	0.46			
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	5.0	8.0	8.0	5.0	8.0			
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	4.0	3.0	3.0	4.0	3.0			
Lane Grp Cap (vph)	358	446		351	482	409	61	1581	497	325	2327			
v/s Ratio Prot		0.02			0.01		c0.01	c0.22		c0.16	0.28			
v/s Ratio Perm	0.02			c0.21		0.03			0.04					
v/c Ratio	0.06	0.06		0.80	0.05	0.12	0.36	0.70	0.11	0.85	0.60			
Uniform Delay, d1	21.2	21.2		26.2	21.1	21.5	35.8	22.9	18.5	30.0	15.1			
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	0.1	0.1		11.9	0.0	0.1	4.9	1.4	0.1	19.5	0.4			
Delay (s)	21.2	21.2		38.2	21.1	21.6	40.7	24.3	18.6	49.5	15.5			
Level of Service	C	C		D	C	C	D	C	B	D	B			
Approach Delay (s)		21.2			31.1			23.8			21.2			
Approach LOS		C			C			C			C			
Intersection Summary														
HCM Average Control Delay			23.5	HCM Level of Service			C							
HCM Volume to Capacity ratio			0.83											
Actuated Cycle Length (s)			75.8	Sum of lost time (s)			23.5							
Intersection Capacity Utilization			70.2%	ICU Level of Service			C							
Analysis Period (min)			15											
c Critical Lane Group														

HCM Signalized Intersection Capacity Analysis

8: SR 700 & SR 39 (US 301)

2/16/2009

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			  			  
Volume (vph)	96	216	1116	87	259	1434
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
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)	1687	1509	5036	1509	1687	5036
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1687	1509	5036	1509	1687	5036
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	104	235	1213	95	282	1559
RTOR Reduction (vph)	0	210	0	39	0	0
Lane Group Flow (vph)	104	25	1213	56	282	1559
Heavy Vehicles (%)	7%	7%	3%	7%	7%	3%
Turn Type	Perm		Perm		Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	12.8	12.8	70.2	70.2	23.5	98.2
Effective Green, g (s)	12.8	12.8	70.2	70.2	23.5	98.2
Actuated g/C Ratio	0.11	0.11	0.59	0.59	0.20	0.82
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	180	161	2946	883	330	4121
v/s Ratio Prot	c0.06		c0.24		c0.17	0.31
v/s Ratio Perm		0.02		0.04		
v/c Ratio	0.58	0.16	0.41	0.06	0.85	0.38
Uniform Delay, d1	51.0	48.7	13.6	10.7	46.6	2.9
Progression Factor	1.00	1.00	1.00	1.00	0.80	0.21
Incremental Delay, d2	4.4	0.5	0.4	0.1	14.9	0.2
Delay (s)	55.5	49.1	14.0	10.9	52.3	0.8
Level of Service	E	D	B	B	D	A
Approach Delay (s)	51.1		13.8			8.7
Approach LOS	D		B			A
Intersection Summary						
HCM Average Control Delay			14.7	HCM Level of Service		B
HCM Volume to Capacity ratio			0.53			
Actuated Cycle Length (s)			120.0	Sum of lost time (s)		13.5
Intersection Capacity Utilization			52.5%	ICU Level of Service		A
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

9: CR 52A (Clinton Avenue) & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	400	68	469	34	48	27	419	882	28	33	1198	314
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.5	6.5	4.5	6.5		5.0	6.5		5.0	6.5	6.5
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00		0.97	0.91		1.00	0.91	1.00
Flt	1.00	1.00	0.85	1.00	0.95		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1763		3433	5014		1770	5036	1583
Flt Permitted	0.95	1.00	1.00	0.61	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1129	1763		3433	5014		1770	5036	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	435	74	510	37	52	29	455	959	30	36	1302	341
RTOR Reduction (vph)	0	0	343	0	18	0	0	2	0	0	0	215
Lane Group Flow (vph)	435	74	167	37	63	0	455	987	0	36	1302	126
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot		Perm	pm+pt			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4	8								6
Actuated Green, G (s)	20.2	26.8	26.8	10.8	10.8		23.0	62.0		4.5	43.5	43.5
Effective Green, g (s)	20.2	26.8	26.8	10.8	10.8		23.0	62.0		4.5	43.5	43.5
Actuated g/C Ratio	0.17	0.22	0.22	0.09	0.09		0.19	0.52		0.04	0.36	0.36
Clearance Time (s)	4.5	6.5	6.5	4.5	6.5		5.0	6.5		5.0	6.5	6.5
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0		3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	578	416	354	124	159		658	2591		66	1826	574
v/s Ratio Prot	c0.13	0.04		0.01	c0.04		c0.13	0.20		0.02	c0.26	
v/s Ratio Perm			c0.11	0.02								0.08
v/c Ratio	0.75	0.18	0.47	0.30	0.39		0.69	0.38		0.55	0.71	0.22
Uniform Delay, d1	47.5	37.7	40.4	50.8	51.5		45.2	17.4		56.7	32.9	26.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.75	0.43		1.00	1.00	1.00
Incremental Delay, d2	5.5	0.6	2.8	1.4	4.5		2.9	0.4		8.9	2.4	0.9
Delay (s)	53.0	38.3	43.2	52.1	56.0		37.0	7.9		65.7	35.3	27.4
Level of Service	D	D	D	D	E		D	A		E	D	C
Approach Delay (s)		47.0			54.8			17.1			34.3	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM Average Control Delay			32.1			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.74									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			29.0			
Intersection Capacity Utilization			72.6%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Morningside Drive & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	141	27	110	107	25	121	57	977	135	127	1270	141
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	6.2	4.5	5.8	5.8	5.4	5.8	
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583		1790	1583	1770	5036	1583	1770	4965	
Flt Permitted	0.67	1.00	1.00		0.75	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1240	1863	1583		1391	1583	1770	5036	1583	1770	4965	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	153	29	120	116	27	132	62	1062	147	138	1380	153
RTOR Reduction (vph)	0	0	101	0	0	111	0	0	84	0	19	0
Lane Group Flow (vph)	153	29	19	0	143	21	62	1062	63	138	1514	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)	8.9	8.9	8.9		8.9	8.9	4.0	24.3	24.3	6.2	27.4	
Effective Green, g (s)	8.9	8.9	8.9		8.9	8.9	4.0	24.3	24.3	6.2	27.4	
Actuated g/C Ratio	0.16	0.16	0.16		0.16	0.16	0.07	0.43	0.43	0.11	0.48	
Clearance Time (s)	6.2	6.2	6.2		6.2	6.2	4.5	5.8	5.8	5.4	5.8	
Vehicle Extension (s)	4.0	4.0	4.0		4.0	4.0	3.0	6.0	6.0	4.0	6.0	
Lane Grp Cap (vph)	194	292	248		218	248	125	2154	677	193	2395	
v/s Ratio Prot		0.02					0.04	c0.21		0.08	c0.30	
v/s Ratio Perm	c0.12		0.01		0.10	0.01			0.04			
v/c Ratio	0.79	0.10	0.08		0.66	0.08	0.50	0.49	0.09	0.72	0.63	
Uniform Delay, d1	23.0	20.5	20.4		22.5	20.5	25.4	11.8	9.7	24.4	10.9	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	19.8	0.2	0.2		7.7	0.2	3.1	0.5	0.2	12.7	0.9	
Delay (s)	42.9	20.7	20.6		30.2	20.7	28.5	12.3	9.9	37.1	11.9	
Level of Service	D	C	C		C	C	C	B	A	D	B	
Approach Delay (s)		31.9			25.6			12.8			13.9	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM Average Control Delay			16.0				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			56.8				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			61.7%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: SR 533 (US 98 Bypass) & SR 39 (US 301)

2/16/2009

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	749	23	777	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5			
Lane Util. Factor	0.97	1.00	1.00			
Frt	1.00	0.85	1.00			
Flt Protected	0.95	1.00	1.00			
Satd. Flow (prot)	3367	1553	1845			
Flt Permitted	0.95	1.00	1.00			
Satd. Flow (perm)	3367	1553	1845			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	814	25	845	0	0	0
RTOR Reduction (vph)	0	17	0	0	0	0
Lane Group Flow (vph)	814	8	845	0	0	0
Heavy Vehicles (%)	4%	4%	3%	4%	4%	3%
Turn Type	Perm					
Protected Phases	8		2			
Permitted Phases		8				
Actuated Green, G (s)	16.5	16.5	28.8			
Effective Green, g (s)	16.5	16.5	28.8			
Actuated g/C Ratio	0.30	0.30	0.53			
Clearance Time (s)	4.5	4.5	4.5			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	1023	472	979			
v/s Ratio Prot	c0.24		c0.46			
v/s Ratio Perm		0.00				
v/c Ratio	0.80	0.02	0.86			
Uniform Delay, d1	17.4	13.2	11.0			
Progression Factor	1.00	1.00	1.00			
Incremental Delay, d2	4.4	0.0	8.0			
Delay (s)	21.7	13.2	19.0			
Level of Service	C	B	B			
Approach Delay (s)	21.5		19.0		0.0	
Approach LOS	C		B		A	
Intersection Summary						
HCM Average Control Delay			20.2	HCM Level of Service		C
HCM Volume to Capacity ratio			0.84			
Actuated Cycle Length (s)			54.3	Sum of lost time (s)		9.0
Intersection Capacity Utilization			69.8%	ICU Level of Service		C
Analysis Period (min)			15			
c Critical Lane Group						

Arterial Level of Service: NB SR 39 (US 301)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Daugherty Road	I	45	44.7	22.0	66.7	0.51	27.4	C
Townview Square Entr	I	45	34.7	8.1	42.8	0.36	30.1	C
Kossik Road	I	45	51.8	4.9	56.7	0.65	41.1	B
Centennial Road	I	55	131.7	29.8	161.5	2.01	44.8	A
SR 700	I	55	95.8	14.5	110.3	1.46	47.8	A
CR 52A (Clinton Aven	I	50	28.0	8.1	36.1	0.29	29.4	C
Morningside Drive	I	50	73.2	14.7	87.9	1.02	41.7	B
SR 533 (US 98 Bypass	I	45	65.8	23.2	89.0	0.82	33.2	C
Total	I		525.7	125.3	651.0	7.12	39.4	B

Arterial Level of Service: SB SR 39 (US 301)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Morningside Drive	I	45	65.8	13.4	79.2	0.82	37.4	B
CR 52A (Clinton Aven	I	50	73.2	33.5	106.7	1.02	34.3	B
SR 700	I	50	28.0	0.8	28.8	0.29	36.9	B
Centennial Road	I	55	95.8	17.2	113.0	1.46	46.6	A
Kossik Road	I	55	131.7	16.7	148.4	2.01	48.8	A
Townview Square Entr	I	45	51.8	27.4	79.2	0.65	29.4	C
Daugherty Road	I	45	34.7	5.3	40.0	0.36	32.2	C
CR 54 (Eiland Boulev	I	45	44.7	9.6	54.3	0.51	33.7	C
Total	I		525.7	123.9	649.6	7.12	39.5	B

HCM Signalized Intersection Capacity Analysis

1: CR 54 (Eiland Boulevard) & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	371	333	46	269	446	156	123	1238	165	220	848	325
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.3		4.5	5.3	5.3	4.5	5.3	5.3	4.5	5.3	5.3
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	0.98		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)	3433	3475		3433	3539	1583	1770	5036	1583	3433	5036	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3475		3433	3539	1583	1770	5036	1583	3433	5036	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	403	362	50	292	485	170	134	1346	179	239	922	353
RTOR Reduction (vph)	0	12	0	0	0	137	0	0	55	0	0	173
Lane Group Flow (vph)	403	400	0	292	485	33	134	1346	124	239	922	180
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	19.8	33.2		10.5	23.9	23.9	8.8	48.2	48.2	13.5	52.9	52.9
Effective Green, g (s)	19.8	33.2		10.5	23.9	23.9	8.8	48.2	48.2	13.5	52.9	52.9
Actuated g/C Ratio	0.16	0.27		0.08	0.19	0.19	0.07	0.39	0.39	0.11	0.42	0.42
Clearance Time (s)	4.5	5.3		4.5	5.3	5.3	4.5	5.3	5.3	4.5	5.3	5.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	544	923		288	677	303	125	1942	610	371	2131	670
v/s Ratio Prot	c0.12	0.12		c0.09	c0.14		c0.08	c0.27		c0.07	0.18	
v/s Ratio Perm						0.02			0.08			0.11
v/c Ratio	0.74	0.43		1.01	0.72	0.11	1.07	0.69	0.20	0.64	0.43	0.27
Uniform Delay, d1	50.2	38.1		57.2	47.4	41.7	58.1	32.2	25.6	53.4	25.5	23.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.94	0.51	1.08
Incremental Delay, d2	5.4	0.3		56.6	3.6	0.2	101.1	2.1	0.8	3.2	0.5	0.8
Delay (s)	55.5	38.4		113.9	51.0	41.9	159.2	34.3	26.4	53.5	13.6	26.2
Level of Service	E	D		F	D	D	F	C	C	D	B	C
Approach Delay (s)		46.9			68.7			43.5			22.9	
Approach LOS		D			E			D			C	
Intersection Summary												
HCM Average Control Delay			42.6			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			125.0			Sum of lost time (s)			23.3			
Intersection Capacity Utilization			69.4%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Daugherty Road & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	83	65	121	117	87	122	1599	121	56	1262	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	5.3		4.5	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.91		1.00	0.91	
Frt	1.00	0.93		1.00	0.94		1.00	0.99		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)	1770	1740		1770	1743		1770	4986		1770	5010	
Flt Permitted	0.46	1.00		0.56	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	852	1740		1048	1743		1770	4986		1770	5010	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	90	71	132	127	95	133	1738	132	61	1372	53
RTOR Reduction (vph)	0	23	0	0	21	0	0	7	0	0	3	0
Lane Group Flow (vph)	87	138	0	132	201	0	133	1863	0	61	1422	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm			Perm			Prot			Prot		
Protected Phases	4			8			5			2		
Permitted Phases	4			8						6		
Actuated Green, G (s)	32.5	32.5		32.5	32.5		14.7	69.0		9.2	63.5	
Effective Green, g (s)	32.5	32.5		32.5	32.5		14.7	69.0		9.2	63.5	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.12	0.55		0.07	0.51	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	5.3		4.5	5.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)	222	452		272	453		208	2752		130	2545	
v/s Ratio Prot		0.08			0.12		0.08	c0.37		0.03	c0.28	
v/s Ratio Perm	0.10			c0.13								
v/c Ratio	0.39	0.31		0.49	0.44		0.64	0.68		0.47	0.56	
Uniform Delay, d1	38.1	37.2		39.2	38.7		52.6	20.0		55.6	21.1	
Progression Factor	1.00	1.00		1.00	1.00		1.03	0.64		0.59	0.34	
Incremental Delay, d2	1.1	0.4		6.1	3.1		5.0	1.1		2.4	0.8	
Delay (s)	39.3	37.6		45.2	41.8		59.0	13.9		35.3	8.1	
Level of Service	D	D		D	D		E	B		D	A	
Approach Delay (s)		38.2			43.1			16.9			9.2	
Approach LOS		D			D			B			A	
Intersection Summary												
HCM Average Control Delay	17.6			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.60											
Actuated Cycle Length (s)	125.0			Sum of lost time (s)			9.8					
Intersection Capacity Utilization	74.9%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Spanish Trails Boulevard & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (veh/h)	8	1	7	40	2	43	7	7	1715	37	29	1321
Sign Control	Stop				Stop				Free			
Grade	0%				0%				0%			
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
Hourly flow rate (vph)	9	1	8	43	2	47	0	8	1864	40	32	1436
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None										None	
Median storage (veh)												
Upstream signal (ft)	686										1204	
pX, platoon unblocked	0.81	0.81	0.86	0.81	0.81	0.74	0.00	0.86			0.74	
vC, conflicting volume	2189	3424	484	2449	3409	641	0	1447			1904	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	486	2015	0	808	1997	0	0	958			987	
tC, single (s)	*8.0	*7.0	6.9	*8.0	*7.0	6.9	0.0	*4.6			*4.6	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			2.2	
p0 queue free %	97	97	99	76	94	94	0	99			93	
cM capacity (veh/h)	296	33	935	180	34	801	0	544			453	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	9	9	43	49	8	746	746	413	32	574	574	298
Volume Left	9	0	43	0	8	0	0	0	32	0	0	0
Volume Right	0	8	0	47	0	0	0	40	0	0	0	11
cSH	296	213	180	401	544	1700	1700	1700	453	1700	1700	1700
Volume to Capacity	0.03	0.04	0.24	0.12	0.01	0.44	0.44	0.24	0.07	0.34	0.34	0.18
Queue Length 95th (ft)	2	3	23	10	1	0	0	0	6	0	0	0
Control Delay (s)	17.5	22.6	31.3	15.2	11.7	0.0	0.0	0.0	13.5	0.0	0.0	0.0
Lane LOS	C	C	D	C	B				B			
Approach Delay (s)	20.1		22.8		0.0				0.3			
Approach LOS	C		C									
Intersection Summary												
Average Delay	0.8											
Intersection Capacity Utilization	49.5%				ICU Level of Service				A			
Analysis Period (min)	15											

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis

3: Spanish Trails Boulevard & SR 39 (US 301)

2/16/2009

Movement	SBR
Approach	
Lane Configurations	
Volume (veh/h)	10
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	11
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis

4: Townview Square Entrance & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	117	54	162	126	93	58	161	1334	160	68	1018	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	5.3	5.3	4.5	5.3	
Lane Util. Factor	1.00	1.00		1.00	0.95		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.89		1.00	0.94		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1653		1770	3335		1770	5036	1583	1770	4973	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1653		1770	3335		1770	5036	1583	1770	4973	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	127	59	176	137	101	63	175	1450	174	74	1107	108
RTOR Reduction (vph)	0	98	0	0	55	0	0	0	83	0	7	0
Lane Group Flow (vph)	127	137	0	137	109	0	175	1450	91	74	1208	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot			Prot			Prot			Perm	Prot	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	2											
Actuated Green, G (s)	13.6	15.9		14.3	16.6		17.0	65.4	65.4	10.6	59.0	
Effective Green, g (s)	13.6	15.9		14.3	16.6		17.0	65.4	65.4	10.6	59.0	
Actuated g/C Ratio	0.11	0.13		0.11	0.13		0.14	0.52	0.52	0.08	0.47	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	5.3	5.3	4.5	5.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	4.0	4.0	3.0	4.0	
Lane Grp Cap (vph)	193	210		202	443		241	2635	828	150	2347	
v/s Ratio Prot	0.07	c0.08		c0.08	0.03		c0.10	c0.29		0.04	0.24	
v/s Ratio Perm	0.06											
v/c Ratio	0.66	0.65		0.68	0.25		0.73	0.55	0.11	0.49	0.51	
Uniform Delay, d1	53.5	51.9		53.1	48.6		51.8	20.0	15.1	54.6	23.0	
Progression Factor	1.00	1.00		1.00	1.00		0.63	0.37	0.25	0.99	0.54	
Incremental Delay, d2	7.9	7.1		8.7	0.3		8.2	0.6	0.2	2.4	0.8	
Delay (s)	61.3	59.0		61.9	48.9		40.7	8.0	4.0	56.3	13.2	
Level of Service	E	E		E	D		D	A	A	E	B	
Approach Delay (s)	59.8			54.8			10.8			15.6		
Approach LOS	E			D			B			B		
Intersection Summary												
HCM Average Control Delay			20.7	HCM Level of Service					C			
HCM Volume to Capacity ratio			0.63									
Actuated Cycle Length (s)			125.0	Sum of lost time (s)					18.8			
Intersection Capacity Utilization			67.1%	ICU Level of Service					C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Kossik Road & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	203	29	79	67	27	82	139	1126	52	44	893	167
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	7.0	7.0	7.0	4.5	7.0	7.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	1.00
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)	3433	1863	1583	3433	1863	1583	1770	5036	1583	1770	5036	1583
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)	3433	1863	1583	3433	1863	1583	1770	5036	1583	1770	5036	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	221	32	86	73	29	89	151	1224	57	48	971	182
RTOR Reduction (vph)	0	0	77	0	0	81	0	0	25	0	0	99
Lane Group Flow (vph)	221	32	9	73	29	8	151	1224	32	48	971	83
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	13.9	13.3	13.3	11.8	11.2	11.2	18.6	70.1	70.1	7.7	56.7	56.7
Effective Green, g (s)	13.9	13.3	13.3	11.8	11.2	11.2	18.6	70.1	70.1	7.7	56.7	56.7
Actuated g/C Ratio	0.11	0.11	0.11	0.09	0.09	0.09	0.15	0.56	0.56	0.06	0.45	0.45
Clearance Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	7.0	7.0	7.0	4.5	7.0	7.0
Vehicle Extension (s)	3.5	3.5	3.5	3.0	3.0	3.0	5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	382	198	168	324	167	142	263	2824	888	109	2284	718
v/s Ratio Prot	c0.06	0.02		c0.02	0.02		c0.09	c0.24		0.03	0.19	
v/s Ratio Perm			0.01			0.01			0.02			0.05
v/c Ratio	0.58	0.16	0.05	0.23	0.17	0.06	0.57	0.43	0.04	0.44	0.43	0.11
Uniform Delay, d1	52.8	50.8	50.2	52.4	52.6	52.1	49.5	15.9	12.3	56.6	23.1	19.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.33	0.28	0.04	1.00	1.00	1.00
Incremental Delay, d2	2.3	0.5	0.2	0.4	0.5	0.2	4.1	0.4	0.1	2.8	0.6	0.3
Delay (s)	55.1	51.2	50.4	52.7	53.1	52.2	70.2	4.9	0.5	59.4	23.7	20.0
Level of Service	E	D	D	D	D	D	E	A	A	E	C	C
Approach Delay (s)		53.5			52.6			11.6			24.6	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM Average Control Delay			23.5				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.42									
Actuated Cycle Length (s)			125.0				Sum of lost time (s)		12.3			
Intersection Capacity Utilization			54.0%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

6: Wire Road & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations								  				  
Volume (veh/h)	0	0	0	58	0	114	0	1448	77	6	104	1137
Sign Control		Stop			Stop			Free				Free
Grade		0%			0%			0%				0%
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
Hourly flow rate (vph)	0	0	0	63	0	124	0	1574	84	0	113	1236
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None				None
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked										0.00		
vC, conflicting volume	1987	3036	412	2212	3036	525	1236			0	1574	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1987	3036	412	2212	3036	525	1236			0	1574	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			0.0	4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			0.0	2.2	
p0 queue free %	100	100	100	0	100	75	100			0	73	
cM capacity (veh/h)	21	9	589	19	9	497	559			0	415	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	63	124	525	525	525	84	113	494	494	247		
Volume Left	63	0	0	0	0	0	113	0	0	0		
Volume Right	0	124	0	0	0	84	0	0	0	0		
cSH	19	497	1700	1700	1700	1700	415	1700	1700	1700		
Volume to Capacity	3.28	0.25	0.31	0.31	0.31	0.05	0.27	0.29	0.29	0.15		
Queue Length 95th (ft)	Err	24	0	0	0	0	27	0	0	0		
Control Delay (s)	Err	14.6	0.0	0.0	0.0	0.0	16.9	0.0	0.0	0.0		
Lane LOS	F	B					C					
Approach Delay (s)	3381.4		0.0				1.4					
Approach LOS	F											
Intersection Summary												
Average Delay			198.6									
Intersection Capacity Utilization			51.1%			ICU Level of Service			A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 6: Wire Road & SR 39 (US 301)

2/16/2009

Movement	SBR
Approach	
Left Lane Configurations	
Volume (veh/h)	0
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	0
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis

7: Centennial Road & SR 39 (US 301)

2/16/2009

														
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations														
Volume (vph)	20	20	20	166	20	255	20	1257	258	170	1019	20		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	5.0	8.0	8.0	5.0	8.0			
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91			
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00			
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00			
Satd. Flow (prot)	1770	1723		1770	1863	1583	1770	5036	1583	1770	5022			
Flt Permitted	0.74	1.00		0.73	1.00	1.00	0.95	1.00	1.00	0.95	1.00			
Satd. Flow (perm)	1384	1723		1357	1863	1583	1770	5036	1583	1770	5022			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92		
Adj. Flow (vph)	22	22	22	180	22	277	22	1366	280	185	1108	22		
RTOR Reduction (vph)	0	17	0	0	0	218	0	0	171	0	2	0		
Lane Group Flow (vph)	22	27	0	180	22	59	22	1366	109	185	1128	0		
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%		
Turn Type	Perm			Perm			Perm		Prot		Perm		Prot	
Protected Phases	4			8			5		2		1		6	
Permitted Phases	4			8			8				2			
Actuated Green, G (s)	14.1	14.1		14.1	14.1	14.1	1.3	25.8	25.8	8.0	32.5			
Effective Green, g (s)	14.1	14.1		14.1	14.1	14.1	1.3	25.8	25.8	8.0	32.5			
Actuated g/C Ratio	0.21	0.21		0.21	0.21	0.21	0.02	0.39	0.39	0.12	0.49			
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	5.0	8.0	8.0	5.0	8.0			
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	4.0	3.0	3.0	4.0	3.0			
Lane Grp Cap (vph)	294	366		288	396	336	35	1957	615	213	2458			
v/s Ratio Prot		0.02			0.01		c0.01	c0.27		c0.10	0.22			
v/s Ratio Perm	0.02			c0.13		0.04			0.07					
v/c Ratio	0.07	0.07		0.62	0.06	0.18	0.63	0.70	0.18	0.87	0.46			
Uniform Delay, d1	20.9	20.9		23.7	20.8	21.4	32.3	17.0	13.3	28.7	11.2			
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	0.1	0.1		4.2	0.1	0.2	33.9	1.1	0.1	29.8	0.1			
Delay (s)	21.0	21.0		27.9	20.9	21.6	66.2	18.1	13.5	58.5	11.3			
Level of Service	C	C		C	C	C	E	B	B	E	B			
Approach Delay (s)		21.0			24.0			18.0			17.9			
Approach LOS		C			C			B			B			
Intersection Summary														
HCM Average Control Delay			18.8	HCM Level of Service			B							
HCM Volume to Capacity ratio			0.79											
Actuated Cycle Length (s)			66.4	Sum of lost time (s)			23.5							
Intersection Capacity Utilization			65.0%	ICU Level of Service			C							
Analysis Period (min)			15											
c Critical Lane Group														

HCM Signalized Intersection Capacity Analysis

8: SR 700 & SR 39 (US 301)

2/16/2009

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			  			  
Volume (vph)	87	259	1434	96	216	1116
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
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)	1687	1509	5036	1509	1687	5036
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1687	1509	5036	1509	1687	5036
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	95	282	1559	104	235	1213
RTOR Reduction (vph)	0	254	0	48	0	0
Lane Group Flow (vph)	95	28	1559	56	235	1213
Heavy Vehicles (%)	7%	7%	3%	7%	7%	3%
Turn Type	Perm		Perm		Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	12.4	12.4	67.6	67.6	31.5	103.6
Effective Green, g (s)	12.4	12.4	67.6	67.6	31.5	103.6
Actuated g/C Ratio	0.10	0.10	0.54	0.54	0.25	0.83
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	167	150	2723	816	425	4174
v/s Ratio Prot	c0.06		c0.31		c0.14	0.24
v/s Ratio Perm		0.02		0.04		
v/c Ratio	0.57	0.19	0.57	0.07	0.55	0.29
Uniform Delay, d1	53.7	51.7	19.1	13.7	40.6	2.4
Progression Factor	1.00	1.00	1.00	1.00	0.92	0.32
Incremental Delay, d2	4.4	0.6	0.9	0.2	1.3	0.1
Delay (s)	58.1	52.3	20.0	13.9	38.6	0.9
Level of Service	E	D	B	B	D	A
Approach Delay (s)	53.8		19.6			7.0
Approach LOS	D		B			A
Intersection Summary						
HCM Average Control Delay	18.1		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.57					
Actuated Cycle Length (s)	125.0		Sum of lost time (s)		13.5	
Intersection Capacity Utilization	55.7%		ICU Level of Service		B	
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

9: CR 52A (Clinton Avenue) & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	314	48	419	28	68	33	469	1198	34	27	882	400
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.5	6.5	4.5	6.5		5.0	6.5		5.0	6.5	6.5
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00		0.97	0.91		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1771		3433	5016		1770	5036	1583
Flt Permitted	0.95	1.00	1.00	0.40	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	753	1771		3433	5016		1770	5036	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	341	52	455	30	74	36	510	1302	37	29	959	435
RTOR Reduction (vph)	0	0	349	0	15	0	0	2	0	0	0	293
Lane Group Flow (vph)	341	52	106	30	95	0	510	1337	0	29	959	142
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot		Perm	pm+pt			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4	8								6
Actuated Green, G (s)	19.0	29.2	29.2	14.7	14.7		28.0	64.2		4.6	40.8	40.8
Effective Green, g (s)	19.0	29.2	29.2	14.7	14.7		28.0	64.2		4.6	40.8	40.8
Actuated g/C Ratio	0.15	0.23	0.23	0.12	0.12		0.22	0.51		0.04	0.33	0.33
Clearance Time (s)	4.5	6.5	6.5	4.5	6.5		5.0	6.5		5.0	6.5	6.5
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0		3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	522	435	370	125	208		769	2576		65	1644	517
v/s Ratio Prot	c0.10	0.03		0.01	c0.05		c0.15	0.27		0.02	c0.19	
v/s Ratio Perm			0.07	0.02								0.09
v/c Ratio	0.65	0.12	0.29	0.24	0.46		0.66	0.52		0.45	0.58	0.27
Uniform Delay, d1	49.9	37.8	39.4	49.6	51.4		44.2	20.2		59.0	35.0	31.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.64	0.26		1.00	1.00	1.00
Incremental Delay, d2	2.9	0.3	1.2	1.0	4.4		1.8	0.6		4.8	1.5	1.3
Delay (s)	52.8	38.1	40.6	50.6	55.9		30.2	5.9		63.8	36.5	32.5
Level of Service	D	D	D	D	E		C	A		E	D	C
Approach Delay (s)		45.3			54.7			12.6			35.9	
Approach LOS		D			D			B			D	
Intersection Summary												
HCM Average Control Delay			28.3			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.60									
Actuated Cycle Length (s)			125.0			Sum of lost time (s)				22.5		
Intersection Capacity Utilization			63.4%			ICU Level of Service				B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Morningside Drive & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	141	25	57	135	27	127	110	1270	107	121	977	141
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	6.2	4.5	5.8	5.8	5.4	5.8	
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583		1788	1583	1770	5036	1583	1770	4947	
Flt Permitted	0.65	1.00	1.00		0.74	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1204	1863	1583		1383	1583	1770	5036	1583	1770	4947	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	153	27	62	147	29	138	120	1380	116	132	1062	153
RTOR Reduction (vph)	0	0	50	0	0	111	0	0	69	0	31	0
Lane Group Flow (vph)	153	27	12	0	176	27	120	1380	47	132	1184	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)	11.5	11.5	11.5		11.5	11.5	5.6	23.5	23.5	5.8	24.6	
Effective Green, g (s)	11.5	11.5	11.5		11.5	11.5	5.6	23.5	23.5	5.8	24.6	
Actuated g/C Ratio	0.20	0.20	0.20		0.20	0.20	0.10	0.40	0.40	0.10	0.42	
Clearance Time (s)	6.2	6.2	6.2		6.2	6.2	4.5	5.8	5.8	5.4	5.8	
Vehicle Extension (s)	4.0	4.0	4.0		4.0	4.0	3.0	6.0	6.0	4.0	6.0	
Lane Grp Cap (vph)	238	368	313		273	313	170	2033	639	176	2091	
v/s Ratio Prot		0.01					0.07	c0.27		0.07	c0.24	
v/s Ratio Perm	0.13		0.01		c0.13	0.02			0.03			
v/c Ratio	0.64	0.07	0.04		0.64	0.09	0.71	0.68	0.07	0.75	0.57	
Uniform Delay, d1	21.5	19.0	18.9		21.5	19.1	25.5	14.3	10.7	25.5	12.8	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.5	0.1	0.1		5.7	0.2	12.5	1.4	0.1	17.3	0.7	
Delay (s)	28.0	19.1	19.0		27.2	19.2	38.0	15.7	10.8	42.8	13.5	
Level of Service	C	B	B		C	B	D	B	B	D	B	
Approach Delay (s)		24.7			23.7			17.0			16.4	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM Average Control Delay			17.9				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.70									
Actuated Cycle Length (s)			58.2				Sum of lost time (s)			17.8		
Intersection Capacity Utilization			61.3%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: SR 533 (US 98 Bypass) & SR 39 (US 301)

2/16/2009

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	553	23	950	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5			
Lane Util. Factor	0.97	1.00	1.00			
Frt	1.00	0.85	1.00			
Flt Protected	0.95	1.00	1.00			
Satd. Flow (prot)	3367	1553	1845			
Flt Permitted	0.95	1.00	1.00			
Satd. Flow (perm)	3367	1553	1845			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	601	25	1033	0	0	0
RTOR Reduction (vph)	0	19	0	0	0	0
Lane Group Flow (vph)	601	6	1033	0	0	0
Heavy Vehicles (%)	4%	4%	3%	4%	4%	3%
Turn Type	Perm					
Protected Phases	8		2			
Permitted Phases		8				
Actuated Green, G (s)	14.6	14.6	39.1			
Effective Green, g (s)	14.6	14.6	39.1			
Actuated g/C Ratio	0.23	0.23	0.62			
Clearance Time (s)	4.5	4.5	4.5			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	784	362	1151			
v/s Ratio Prot	c0.18		c0.56			
v/s Ratio Perm		0.00				
v/c Ratio	0.77	0.02	0.90			
Uniform Delay, d1	22.5	18.5	10.1			
Progression Factor	1.00	1.00	1.00			
Incremental Delay, d2	4.5	0.0	9.4			
Delay (s)	27.0	18.5	19.5			
Level of Service	C	B	B			
Approach Delay (s)	26.6		19.5		0.0	
Approach LOS	C		B		A	
Intersection Summary						
HCM Average Control Delay			22.2	HCM Level of Service		C
HCM Volume to Capacity ratio			0.86			
Actuated Cycle Length (s)			62.7	Sum of lost time (s)		9.0
Intersection Capacity Utilization			73.3%	ICU Level of Service		D
Analysis Period (min)			15			
c Critical Lane Group						

Arterial Level of Service: NB SR 39 (US 301)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Daugherty Road	I	45	44.7	14.0	58.7	0.51	31.2	C
Townview Square Entr	I	45	34.7	8.8	43.5	0.36	29.6	C
Kossik Road	I	45	51.8	4.9	56.7	0.65	41.1	B
Centennial Road	I	55	131.7	23.2	154.9	2.01	46.8	A
SR 700	I	55	95.8	20.6	116.4	1.46	45.2	A
CR 52A (Clinton Aven	I	50	28.0	5.6	33.6	0.29	31.6	C
Morningside Drive	I	50	73.2	16.5	89.7	1.02	40.8	B
SR 533 (US 98 Bypass	I	45	65.8	23.4	89.2	0.82	33.2	C
Total	I		525.7	117.0	642.7	7.12	39.9	B

Arterial Level of Service: SB SR 39 (US 301)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Morningside Drive	I	45	65.8	13.6	79.4	0.82	37.3	B
CR 52A (Clinton Aven	I	50	73.2	34.2	107.4	1.02	34.1	B
SR 700	I	50	28.0	1.0	29.0	0.29	36.6	B
Centennial Road	I	55	95.8	11.6	107.4	1.46	49.0	A
Kossik Road	I	55	131.7	24.0	155.7	2.01	46.5	A
Townview Square Entr	I	45	51.8	13.6	65.4	0.65	35.6	B
Daugherty Road	I	45	34.7	8.3	43.0	0.36	30.0	C
CR 54 (Eiland Boulev	I	45	44.7	14.4	59.1	0.51	30.9	C
Total	I		525.7	120.7	646.4	7.12	39.7	B

Appendix G

Interim year (2025) Synchro Intersection Analysis Sheets

HCM Signalized Intersection Capacity Analysis

1: CR 54 (Eiland Boulevard) & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	370	466	127	175	381	281	55	1024	301	199	1480	436
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.3		4.5	5.3	5.3	4.5	5.3	5.3	4.5	5.3	5.3
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	0.97		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)	3433	3426		3433	3539	1583	1770	5036	1583	3433	5036	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3426		3433	3539	1583	1770	5036	1583	3433	5036	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	402	507	138	190	414	305	60	1113	327	216	1609	474
RTOR Reduction (vph)	0	28	0	0	0	251	0	0	132	0	0	140
Lane Group Flow (vph)	402	617	0	190	414	54	60	1113	195	216	1609	334
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	22.6	35.9		7.8	21.1	21.1	6.3	43.9	43.9	12.8	50.4	50.4
Effective Green, g (s)	22.6	35.9		7.8	21.1	21.1	6.3	43.9	43.9	12.8	50.4	50.4
Actuated g/C Ratio	0.19	0.30		0.06	0.18	0.18	0.05	0.37	0.37	0.11	0.42	0.42
Clearance Time (s)	4.5	5.3		4.5	5.3	5.3	4.5	5.3	5.3	4.5	5.3	5.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	647	1025		223	622	278	93	1842	579	366	2115	665
v/s Ratio Prot	0.12	c0.18		c0.06	c0.12		0.03	c0.22		0.06	c0.32	
v/s Ratio Perm						0.03			0.12			0.21
v/c Ratio	0.62	0.60		0.85	0.67	0.20	0.65	0.60	0.34	0.59	0.76	0.50
Uniform Delay, d1	44.8	35.9		55.5	46.2	42.2	55.8	31.0	27.5	51.1	29.7	25.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.13	0.44	0.18
Incremental Delay, d2	1.9	1.0		25.5	2.7	0.3	14.3	1.5	1.6	1.5	1.6	1.6
Delay (s)	46.6	36.9		81.1	48.9	42.6	70.1	32.5	29.1	59.3	14.7	6.3
Level of Service	D	D		F	D	D	E	C	C	E	B	A
Approach Delay (s)		40.7			53.5			33.2			17.2	
Approach LOS		D			D			C			B	
Intersection Summary												
HCM Average Control Delay			31.4			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			9.8			
Intersection Capacity Utilization			73.5%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Daugherty Road & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	125	142	126	93	63	74	1498	129	92	1898	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	5.3		4.5	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.91		1.00	0.91	
Frt	1.00	0.92		1.00	0.94		1.00	0.99		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)	1770	1714		1770	1750		1770	4980		1770	5004	
Flt Permitted	0.57	1.00		0.38	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1058	1714		710	1750		1770	4980		1770	5004	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	64	136	154	137	101	68	80	1628	140	100	2063	98
RTOR Reduction (vph)	0	34	0	0	20	0	0	8	0	0	4	0
Lane Group Flow (vph)	64	256	0	137	149	0	80	1760	0	100	2157	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm			Prot			Prot			
Protected Phases	4		8			5		2	1		6	
Permitted Phases	4		8									
Actuated Green, G (s)	34.5	34.5		34.5	34.5		7.5	56.5		14.7	63.7	
Effective Green, g (s)	34.5	34.5		34.5	34.5		7.5	56.5		14.7	63.7	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.06	0.47		0.12	0.53	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	5.3		4.5	5.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)	304	493		204	503		111	2345		217	2656	
v/s Ratio Prot		0.15			0.09		0.05	c0.35		0.06	c0.43	
v/s Ratio Perm	0.06			c0.19								
v/c Ratio	0.21	0.52		0.67	0.30		0.72	0.75		0.46	0.81	
Uniform Delay, d1	32.4	35.8		37.7	33.3		55.2	26.0		49.0	23.2	
Progression Factor	1.00	1.00		1.00	1.00		1.17	0.81		0.61	0.33	
Incremental Delay, d2	0.3	0.9		16.3	1.5		17.5	1.9		0.9	1.6	
Delay (s)	32.8	36.7		54.0	34.8		82.0	23.0		30.8	9.2	
Level of Service	C	D		D	C		F	C		C	A	
Approach Delay (s)		36.0			43.4			25.6			10.2	
Approach LOS		D			D			C			B	
Intersection Summary												
HCM Average Control Delay	20.2			HCM Level of Service			C					
HCM Volume to Capacity ratio	0.78											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			15.1					
Intersection Capacity Utilization	83.8%			ICU Level of Service			E					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Spanish Trails Boulevard & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (veh/h)	11	4	8	44	2	34	7	7	1568	45	51	2013
Sign Control		Stop			Stop				Free			Free
Grade		0%			0%				0%			0%
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
Hourly flow rate (vph)	12	4	9	48	2	37	0	8	1704	49	55	2188
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type									None			None
Median storage (veh)												
Upstream signal (ft)									686			1204
pX, platoon unblocked	0.80	0.80	0.66	0.80	0.80	0.72	0.00	0.66			0.72	
vC, conflicting volume	2926	4073	735	2595	4054	593	0	2199			1753	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	190	1616	0	0	1592	0	0	1035			683	
tC, single (s)	*8.0	*7.0	6.9	*8.0	*7.0	6.9	0.0	*4.6			*4.6	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			2.2	
p0 queue free %	98	93	99	93	96	95	0	98			91	
cM capacity (veh/h)	502	60	720	703	62	780	0	388			598	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	12	13	48	39	8	682	682	390	55	875	875	448
Volume Left	12	0	48	0	8	0	0	0	55	0	0	0
Volume Right	0	9	0	37	0	0	0	49	0	0	0	11
cSH	502	154	703	475	388	1700	1700	1700	598	1700	1700	1700
Volume to Capacity	0.02	0.08	0.07	0.08	0.02	0.40	0.40	0.23	0.09	0.51	0.51	0.26
Queue Length 95th (ft)	2	7	5	7	1	0	0	0	8	0	0	0
Control Delay (s)	12.3	30.6	10.5	13.3	14.5	0.0	0.0	0.0	11.6	0.0	0.0	0.0
Lane LOS	B	D	B	B	B				B			
Approach Delay (s)	21.8		11.7		0.1				0.3			
Approach LOS	C		B									
Intersection Summary												
Average Delay			0.6									
Intersection Capacity Utilization			58.2%		ICU Level of Service				B			
Analysis Period (min)			15									

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis

3: Spanish Trails Boulevard & SR 39 (US 301)

2/16/2009

Movement	SBR
Approach	
Lane Configurations	
Volume (veh/h)	10
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	11
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis

4: Townview Square Entrance & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	101	94	166	184	56	78	182	1217	128	65	1582	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	5.3	5.3	4.5	5.3	
Lane Util. Factor	1.00	1.00		1.00	0.95		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.90		1.00	0.91		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1684		1770	3230		1770	5036	1583	1770	4983	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1684		1770	3230		1770	5036	1583	1770	4983	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	110	102	180	200	61	85	198	1323	139	71	1720	140
RTOR Reduction (vph)	0	60	0	0	78	0	0	0	75	0	7	0
Lane Group Flow (vph)	110	222	0	200	68	0	198	1323	64	71	1853	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot			Prot			Prot		Perm		Prot	
Protected Phases	7	4		3	8		5	2			1	6
Permitted Phases									2			
Actuated Green, G (s)	27.5	20.8		16.9	10.2		17.4	55.1	55.1	8.4	46.1	
Effective Green, g (s)	27.5	20.8		16.9	10.2		17.4	55.1	55.1	8.4	46.1	
Actuated g/C Ratio	0.23	0.17		0.14	0.08		0.14	0.46	0.46	0.07	0.38	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	5.3	5.3	4.5	5.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	4.0	4.0	3.0	4.0	
Lane Grp Cap (vph)	406	292		249	275		257	2312	727	124	1914	
v/s Ratio Prot	0.06	c0.13		c0.11	0.02		c0.11	0.26		0.04	c0.37	
v/s Ratio Perm									0.04			
v/c Ratio	0.27	0.76		0.80	0.25		0.77	0.57	0.09	0.57	0.97	
Uniform Delay, d1	38.0	47.2		49.9	51.3		49.4	23.8	18.3	54.1	36.2	
Progression Factor	1.00	1.00		1.00	1.00		0.60	0.57	0.64	1.13	0.62	
Incremental Delay, d2	0.4	10.8		16.9	0.5		9.9	0.7	0.2	5.9	13.7	
Delay (s)	38.4	58.0		66.8	51.8		39.4	14.4	12.0	66.8	36.1	
Level of Service	D	E		E	D		D	B	B	E	D	
Approach Delay (s)		52.5			60.5			17.2			37.3	
Approach LOS		D			E			B			D	
Intersection Summary												
HCM Average Control Delay			32.8			HCM Level of Service			C			
HCM Volume to Capacity ratio			0.86									
Actuated Cycle Length (s)			120.0			Sum of lost time (s)			18.8			
Intersection Capacity Utilization			84.5%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Kossik Road & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑	↗	↔↔	↑	↗	↗	↑↑↑	↗	↗	↑↑↑	↗
Volume (vph)	209	66	189	126	69	107	84	947	162	200	1191	228
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	7.0	7.0	7.0	4.5	7.0	7.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	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)	3433	1863	1583	3433	1863	1583	1770	5036	1583	1770	5036	1583
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)	3433	1863	1583	3433	1863	1583	1770	5036	1583	1770	5036	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	227	72	205	137	75	116	91	1029	176	217	1295	248
RTOR Reduction (vph)	0	0	186	0	0	105	0	0	98	0	0	121
Lane Group Flow (vph)	227	72	19	137	75	11	91	1029	78	217	1295	127
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	13.8	11.4	11.4	13.6	11.2	11.2	9.0	53.4	53.4	19.5	61.4	61.4
Effective Green, g (s)	13.8	11.4	11.4	13.6	11.2	11.2	9.0	53.4	53.4	19.5	61.4	61.4
Actuated g/C Ratio	0.12	0.10	0.10	0.11	0.09	0.09	0.08	0.44	0.44	0.16	0.51	0.51
Clearance Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	7.0	7.0	7.0	4.5	7.0	7.0
Vehicle Extension (s)	3.5	3.5	3.5	3.0	3.0	3.0	5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	395	177	150	389	174	148	133	2241	704	288	2577	810
v/s Ratio Prot	c0.07	0.04		0.04	c0.04		0.05	0.20		c0.12	c0.26	
v/s Ratio Perm			0.01			0.01			0.05			0.08
v/c Ratio	0.57	0.41	0.13	0.35	0.43	0.07	0.68	0.46	0.11	0.75	0.50	0.16
Uniform Delay, d1	50.3	51.1	49.8	49.1	51.4	49.7	54.1	23.2	19.4	48.0	19.3	15.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.83	0.28	0.05	1.00	1.00	1.00
Incremental Delay, d2	2.2	1.8	0.5	0.6	1.7	0.2	15.1	0.6	0.3	10.6	0.7	0.4
Delay (s)	52.5	52.9	50.2	49.7	53.1	49.9	60.1	7.2	1.2	58.6	20.0	16.0
Level of Service	D	D	D	D	D	D	E	A	A	E	B	B
Approach Delay (s)		51.6			50.5			10.1			24.2	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM Average Control Delay			25.2				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			120.0				Sum of lost time (s)			16.8		
Intersection Capacity Utilization			57.6%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

6: Wire Road & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations								  				  
Volume (veh/h)	0	0	0	109	0	124	0	1391	81	7	126	1775
Sign Control		Stop			Stop			Free				Free
Grade		0%			0%			0%				0%
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
Hourly flow rate (vph)	0	0	0	118	0	135	0	1512	88	0	137	1929
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None				None
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked										0.00		
vC, conflicting volume	2707	3715	643	2429	3715	504	1929			0	1512	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	2707	3715	643	2429	3715	504	1929			0	1512	
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			0.0	4.1	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			0.0	2.2	
p0 queue free %	100	100	100	0	100	74	100			0	69	
cM capacity (veh/h)	6	3	416	13	3	513	302			0	438	
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4		
Volume Total	118	135	504	504	504	88	137	772	772	386		
Volume Left	118	0	0	0	0	0	137	0	0	0		
Volume Right	0	135	0	0	0	88	0	0	0	0		
cSH	13	513	1700	1700	1700	1700	438	1700	1700	1700		
Volume to Capacity	9.45	0.26	0.30	0.30	0.30	0.05	0.31	0.45	0.45	0.23		
Queue Length 95th (ft)	Err	26	0	0	0	0	33	0	0	0		
Control Delay (s)	Err	14.5	0.0	0.0	0.0	0.0	16.9	0.0	0.0	0.0		
Lane LOS	F	B					C					
Approach Delay (s)	4685.4		0.0				1.1					
Approach LOS	F											
Intersection Summary												
Average Delay			303.3									
Intersection Capacity Utilization			51.9%			ICU Level of Service			A			
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 6: Wire Road & SR 39 (US 301)

2/16/2009

Movement	SBR
Approach	
Left Lane Configurations	
Volume (veh/h)	0
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	0
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis

7: Centennial Road & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	40	40	320	40	205	40	1223	208	294	1521	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	5.0	8.0	8.0	5.0	8.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1723		1770	1863	1583	1770	5036	1583	1770	5018	
Flt Permitted	0.73	1.00		0.70	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1358	1723		1306	1863	1583	1770	5036	1583	1770	5018	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	43	43	348	43	223	43	1329	226	320	1653	43
RTOR Reduction (vph)	0	31	0	0	0	159	0	0	161	0	3	0
Lane Group Flow (vph)	43	55	0	348	43	64	43	1329	65	320	1693	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm			Perm			Prot	Perm			Prot	
Protected Phases	4			8			5	2	1			6
Permitted Phases	4			8			8	2				
Actuated Green, G (s)	25.8	25.8		25.8	25.8	25.8	4.1	25.8	25.8	19.8	41.5	
Effective Green, g (s)	25.8	25.8		25.8	25.8	25.8	4.1	25.8	25.8	19.8	41.5	
Actuated g/C Ratio	0.29	0.29		0.29	0.29	0.29	0.05	0.29	0.29	0.22	0.46	
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	5.0	8.0	8.0	5.0	8.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	4.0	3.0	3.0	4.0	3.0	
Lane Grp Cap (vph)	390	494		375	535	454	81	1445	454	390	2316	
v/s Ratio Prot		0.03			0.02		0.02	c0.26		c0.18	0.34	
v/s Ratio Perm	0.03			c0.27		0.04			0.04			
v/c Ratio	0.11	0.11		0.93	0.08	0.14	0.53	0.92	0.14	0.82	0.73	
Uniform Delay, d1	23.6	23.6		31.1	23.4	23.8	42.0	31.0	23.8	33.4	19.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.1		28.6	0.1	0.1	8.3	9.6	0.1	13.5	1.2	
Delay (s)	23.7	23.7		59.8	23.5	24.0	50.2	40.7	24.0	46.9	20.9	
Level of Service	C	C		E	C	C	D	D	C	D	C	
Approach Delay (s)		23.7			44.2			38.6			25.0	
Approach LOS		C			D			D			C	
Intersection Summary												
HCM Average Control Delay			32.7	HCM Level of Service					C			
HCM Volume to Capacity ratio			0.90									
Actuated Cycle Length (s)			89.9	Sum of lost time (s)					18.5			
Intersection Capacity Utilization			79.7%	ICU Level of Service					D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

8: SR 700 & SR 39 (US 301)

2/16/2009

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			  			  
Volume (vph)	98	237	1343	91	284	1721
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
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)	1687	1509	5036	1509	1687	5036
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1687	1509	5036	1509	1687	5036
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	107	258	1460	99	309	1871
RTOR Reduction (vph)	0	221	0	52	0	0
Lane Group Flow (vph)	107	37	1460	47	309	1871
Heavy Vehicles (%)	7%	7%	3%	7%	7%	3%
Turn Type	Perm		Perm		Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	9.4	9.4	30.6	30.6	11.5	46.6
Effective Green, g (s)	9.4	9.4	30.6	30.6	11.5	46.6
Actuated g/C Ratio	0.14	0.14	0.47	0.47	0.18	0.72
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	244	218	2371	710	298	3610
v/s Ratio Prot	c0.06		c0.29		c0.18	0.37
v/s Ratio Perm		0.02		0.03		
v/c Ratio	0.44	0.17	0.62	0.07	1.04	0.52
Uniform Delay, d1	25.4	24.4	12.8	9.4	26.8	4.1
Progression Factor	1.00	1.00	1.00	1.00	1.42	0.56
Incremental Delay, d2	1.3	0.4	1.2	0.2	49.3	0.3
Delay (s)	26.7	24.8	14.0	9.6	87.2	2.6
Level of Service	C	C	B	A	F	A
Approach Delay (s)	25.3		13.7			14.6
Approach LOS	C		B			B
Intersection Summary						
HCM Average Control Delay			15.2	HCM Level of Service		B
HCM Volume to Capacity ratio			0.68			
Actuated Cycle Length (s)			65.0	Sum of lost time (s)		13.5
Intersection Capacity Utilization			58.4%	ICU Level of Service		B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

9: CR 52A (Clinton Avenue) & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	415	93	529	56	50	31	488	1046	38	38	1440	357
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.5	6.5	4.5	6.5		5.0	6.5		5.0	6.5	6.5
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00		0.97	0.91		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.94		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1755		3433	5011		1770	5036	1583
Flt Permitted	0.95	1.00	1.00	0.69	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1288	1755		3433	5011		1770	5036	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	451	101	575	61	54	34	530	1137	41	41	1565	388
RTOR Reduction (vph)	0	0	313	0	18	0	0	3	0	0	0	195
Lane Group Flow (vph)	451	101	262	61	70	0	530	1175	0	41	1565	193
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot		Perm	pm+pt			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4	8								6
Actuated Green, G (s)	19.9	30.1	30.1	21.4	15.8		23.9	64.5		7.3	47.9	47.9
Effective Green, g (s)	19.9	30.1	30.1	21.4	15.8		23.9	64.5		7.3	47.9	47.9
Actuated g/C Ratio	0.15	0.23	0.23	0.16	0.12		0.18	0.50		0.06	0.37	0.37
Clearance Time (s)	4.5	6.5	6.5	4.5	6.5		5.0	6.5		5.0	6.5	6.5
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0		3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	526	431	367	233	213		631	2486		99	1856	583
v/s Ratio Prot	c0.13	0.05		0.01	0.04		c0.15	0.23		0.02	c0.31	
v/s Ratio Perm			c0.17	0.03								0.12
v/c Ratio	0.86	0.23	0.71	0.26	0.33		0.84	0.47		0.41	0.84	0.33
Uniform Delay, d1	53.7	40.6	46.0	47.0	52.3		51.2	21.6		59.3	37.6	29.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.94	0.82		1.00	1.00	1.00
Incremental Delay, d2	13.0	0.8	9.2	0.6	2.6		8.0	0.5		2.8	4.9	1.5
Delay (s)	66.7	41.4	55.2	47.6	54.8		56.0	18.3		62.1	42.5	31.1
Level of Service	E	D	E	D	D		E	B		E	D	C
Approach Delay (s)		58.5			51.9			30.0			40.7	
Approach LOS		E			D			C			D	
Intersection Summary												
HCM Average Control Delay			41.4			HCM Level of Service				D		
HCM Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			130.0			Sum of lost time (s)			16.0			
Intersection Capacity Utilization			81.0%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Morningside Drive & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	29	133	131	27	123	72	1062	160	137	1385	152
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	6.2	4.5	5.8	5.8	5.4	5.8	
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583		1788	1583	1770	5036	1583	1770	4966	
Flt Permitted	0.65	1.00	1.00		0.74	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1209	1863	1583		1378	1583	1770	5036	1583	1770	4966	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	158	32	145	142	29	134	78	1154	174	149	1505	165
RTOR Reduction (vph)	0	0	119	0	0	110	0	0	106	0	21	0
Lane Group Flow (vph)	158	32	26	0	171	24	78	1154	68	149	1649	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)	10.7	10.7	10.7		10.7	10.7	4.0	23.2	23.2	8.0	28.1	
Effective Green, g (s)	10.7	10.7	10.7		10.7	10.7	4.0	23.2	23.2	8.0	28.1	
Actuated g/C Ratio	0.18	0.18	0.18		0.18	0.18	0.07	0.39	0.39	0.13	0.47	
Clearance Time (s)	6.2	6.2	6.2		6.2	6.2	4.5	5.8	5.8	5.4	5.8	
Vehicle Extension (s)	4.0	4.0	4.0		4.0	4.0	3.0	6.0	6.0	4.0	6.0	
Lane Grp Cap (vph)	218	336	286		249	286	119	1970	619	239	2353	
v/s Ratio Prot		0.02					0.04	c0.23		0.08	c0.33	
v/s Ratio Perm	c0.13		0.02		0.12	0.02			0.04			
v/c Ratio	0.72	0.10	0.09		0.69	0.08	0.66	0.59	0.11	0.62	0.70	
Uniform Delay, d1	22.9	20.3	20.2		22.7	20.2	27.0	14.3	11.5	24.2	12.3	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.0	0.2	0.2		8.3	0.2	12.3	0.9	0.2	5.6	1.4	
Delay (s)	35.0	20.4	20.4		31.0	20.4	39.2	15.1	11.7	29.9	13.7	
Level of Service	C	C	C		C	C	D	B	B	C	B	
Approach Delay (s)		27.3			26.3			16.0			15.0	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM Average Control Delay			17.4				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.75									
Actuated Cycle Length (s)			59.3				Sum of lost time (s)			17.8		
Intersection Capacity Utilization			65.1%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: SR 533 (US 98 Bypass) & SR 39 (US 301)

2/16/2009

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	760	26	814	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5			
Lane Util. Factor	0.97	1.00	1.00			
Frt	1.00	0.85	1.00			
Flt Protected	0.95	1.00	1.00			
Satd. Flow (prot)	3367	1553	1845			
Flt Permitted	0.95	1.00	1.00			
Satd. Flow (perm)	3367	1553	1845			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	826	28	885	0	0	0
RTOR Reduction (vph)	0	20	0	0	0	0
Lane Group Flow (vph)	826	8	885	0	0	0
Heavy Vehicles (%)	4%	4%	3%	4%	4%	3%
Turn Type	Perm					
Protected Phases	8		2			
Permitted Phases		8				
Actuated Green, G (s)	16.5	16.5	30.1			
Effective Green, g (s)	16.5	16.5	30.1			
Actuated g/C Ratio	0.30	0.30	0.54			
Clearance Time (s)	4.5	4.5	4.5			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	999	461	999			
v/s Ratio Prot	c0.25		c0.48			
v/s Ratio Perm		0.01				
v/c Ratio	0.83	0.02	0.89			
Uniform Delay, d1	18.2	13.8	11.2			
Progression Factor	1.00	1.00	1.00			
Incremental Delay, d2	5.7	0.0	9.5			
Delay (s)	23.9	13.8	20.8			
Level of Service	C	B	C			
Approach Delay (s)	23.6		20.8		0.0	
Approach LOS	C		C		A	
Intersection Summary						
HCM Average Control Delay			22.2	HCM Level of Service		C
HCM Volume to Capacity ratio			0.87			
Actuated Cycle Length (s)			55.6	Sum of lost time (s)		9.0
Intersection Capacity Utilization			72.0%	ICU Level of Service		C
Analysis Period (min)			15			
c Critical Lane Group						

Arterial Level of Service: NB SR 39 (US 301)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Daugherty Road	I	45	44.7	22.3	67.0	0.51	27.3	C
Townview Square Entr	I	45	34.7	15.5	50.2	0.36	25.7	D
Kossik Road	I	45	51.8	7.4	59.2	0.65	39.4	B
Centennial Road	I	55	131.7	39.8	171.5	2.01	42.2	A
SR 700	I	55	95.8	14.8	110.6	1.46	47.6	A
CR 52A (Clinton Aven	I	50	28.0	18.5	46.5	0.29	22.8	D
Morningside Drive	I	50	73.2	15.7	88.9	1.02	41.2	B
SR 533 (US 98 Bypass	I	45	65.8	24.9	90.7	0.82	32.6	C
Total	I		525.7	158.9	684.6	7.12	37.5	B

Arterial Level of Service: SB SR 39 (US 301)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Morningside Drive	I	45	65.8	13.9	79.7	0.82	37.1	B
CR 52A (Clinton Aven	I	50	73.2	40.9	114.1	1.02	32.1	C
SR 700	I	50	28.0	2.8	30.8	0.29	34.5	B
Centennial Road	I	55	95.8	22.1	117.9	1.46	44.7	A
Kossik Road	I	55	131.7	20.6	152.3	2.01	47.6	A
Townview Square Entr	I	45	51.8	35.6	87.4	0.65	26.7	D
Daugherty Road	I	45	34.7	9.2	43.9	0.36	29.4	C
CR 54 (Eiland Boulev	I	45	44.7	15.6	60.3	0.51	30.3	C
Total	I		525.7	160.7	686.4	7.12	37.4	B

HCM Signalized Intersection Capacity Analysis

1: CR 54 (Eiland Boulevard) & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	436	381	55	301	466	199	127	1480	175	281	1024	370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	5.3		4.5	5.3	5.3	4.5	5.3	5.3	4.5	5.3	5.3
Lane Util. Factor	0.97	0.95		0.97	0.95	1.00	1.00	0.91	1.00	0.97	0.91	1.00
Frt	1.00	0.98		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)	3433	3472		3433	3539	1583	1770	5036	1583	3433	5036	1583
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	3472		3433	3539	1583	1770	5036	1583	3433	5036	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	474	414	60	327	507	216	138	1609	190	305	1113	402
RTOR Reduction (vph)	0	12	0	0	0	173	0	0	51	0	0	173
Lane Group Flow (vph)	474	462	0	327	507	43	138	1609	139	305	1113	229
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8			2			6
Actuated Green, G (s)	22.6	36.4		11.1	24.9	24.9	10.6	46.3	46.3	11.6	47.3	47.3
Effective Green, g (s)	22.6	36.4		11.1	24.9	24.9	10.6	46.3	46.3	11.6	47.3	47.3
Actuated g/C Ratio	0.18	0.29		0.09	0.20	0.20	0.08	0.37	0.37	0.09	0.38	0.38
Clearance Time (s)	4.5	5.3		4.5	5.3	5.3	4.5	5.3	5.3	4.5	5.3	5.3
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	4.0	4.0	3.0	4.0	4.0
Lane Grp Cap (vph)	621	1011		305	705	315	150	1865	586	319	1906	599
v/s Ratio Prot	c0.14	0.13		c0.10	c0.14		0.08	c0.32		c0.09	0.22	
v/s Ratio Perm						0.03			0.09			0.14
v/c Ratio	0.76	0.46		1.07	0.72	0.14	0.92	0.86	0.24	0.96	0.58	0.38
Uniform Delay, d1	48.7	36.2		57.0	46.8	41.2	56.8	36.4	27.2	56.4	31.0	28.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.64	1.06
Incremental Delay, d2	5.5	0.3		72.0	3.5	0.2	50.2	5.6	1.0	32.3	1.0	1.4
Delay (s)	54.2	36.5		129.0	50.3	41.4	107.0	42.0	28.1	87.4	20.7	31.4
Level of Service	D	D		F	D	D	F	D	C	F	C	C
Approach Delay (s)		45.4			73.0			45.2			34.3	
Approach LOS		D			E			D			C	
Intersection Summary												
HCM Average Control Delay			46.9			HCM Level of Service				D		
HCM Volume to Capacity ratio			0.80									
Actuated Cycle Length (s)			125.0			Sum of lost time (s)			14.3			
Intersection Capacity Utilization			78.3%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

2: Daugherty Road & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	93	74	129	125	92	142	1898	126	63	1498	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	5.3		4.5	5.3	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.91		1.00	0.91	
Frt	1.00	0.93		1.00	0.94		1.00	0.99		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)	1770	1739		1770	1744		1770	4992		1770	5009	
Flt Permitted	0.43	1.00		0.52	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	798	1739		976	1744		1770	4992		1770	5009	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	101	80	140	136	100	154	2063	137	68	1628	64
RTOR Reduction (vph)	0	23	0	0	21	0	0	6	0	0	3	0
Lane Group Flow (vph)	98	158	0	140	215	0	154	2194	0	68	1689	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm			Prot			Prot			
Protected Phases	4		8			5		2	1		6	
Permitted Phases	4		8									
Actuated Green, G (s)	31.9	31.9		31.9	31.9		16.1	70.1		8.7	62.7	
Effective Green, g (s)	31.9	31.9		31.9	31.9		16.1	70.1		8.7	62.7	
Actuated g/C Ratio	0.26	0.26		0.26	0.26		0.13	0.56		0.07	0.50	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	5.3		4.5	5.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	4.0		3.0	4.0	
Lane Grp Cap (vph)	204	444		249	445		228	2800		123	2513	
v/s Ratio Prot		0.09			0.12		0.09	c0.44		0.04	c0.34	
v/s Ratio Perm	0.12			c0.14								
v/c Ratio	0.48	0.36		0.56	0.48		0.68	0.78		0.55	0.67	
Uniform Delay, d1	39.5	38.1		40.5	39.6		52.0	21.5		56.3	23.4	
Progression Factor	1.00	1.00		1.00	1.00		1.15	0.58		0.63	0.30	
Incremental Delay, d2	1.8	0.5		8.9	3.7		4.9	1.4		4.6	1.3	
Delay (s)	41.3	38.6		49.4	43.3		64.5	13.9		40.1	8.2	
Level of Service	D	D		D	D		E	B		D	A	
Approach Delay (s)		39.6			45.5			17.2			9.5	
Approach LOS		D			D			B			A	
Intersection Summary												
HCM Average Control Delay	17.9			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	125.0			Sum of lost time (s)			9.8					
Intersection Capacity Utilization	81.5%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

3: Spanish Trails Boulevard & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBL	SBT
Lane Configurations												
Volume (veh/h)	10	2	7	45	4	51	7	8	2013	44	34	1568
Sign Control		Stop			Stop				Free			Free
Grade		0%			0%				0%			0%
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
Hourly flow rate (vph)	11	2	8	49	4	55	0	9	2188	48	37	1704
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type									None			None
Median storage (veh)												
Upstream signal (ft)									686			1204
pX, platoon unblocked	0.74	0.74	0.83	0.74	0.74	0.66	0.00	0.83			0.66	
vC, conflicting volume	2589	4038	574	2880	4020	753	0	1716			2236	
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	377	2335	0	771	2310	0	0	1150			1047	
tC, single (s)	*8.0	*7.0	6.9	*8.0	*7.0	6.9	0.0	*4.6			*4.6	
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	0.0	2.2			2.2	
p0 queue free %	96	88	99	69	76	92	0	98			90	
cM capacity (veh/h)	270	18	901	159	18	711	0	433			379	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	11	10	49	60	9	875	875	485	37	682	682	353
Volume Left	11	0	49	0	9	0	0	0	37	0	0	0
Volume Right	0	8	0	55	0	0	0	48	0	0	0	12
cSH	270	74	159	190	433	1700	1700	1700	379	1700	1700	1700
Volume to Capacity	0.04	0.13	0.31	0.32	0.02	0.51	0.51	0.29	0.10	0.40	0.40	0.21
Queue Length 95th (ft)	3	11	31	32	2	0	0	0	8	0	0	0
Control Delay (s)	18.9	60.8	37.3	32.5	13.5	0.0	0.0	0.0	15.5	0.0	0.0	0.0
Lane LOS	C	F	E	D	B				C			
Approach Delay (s)	38.7		34.7		0.1				0.3			
Approach LOS	E		D									
Intersection Summary												
Average Delay			1.3									
Intersection Capacity Utilization			55.7%		ICU Level of Service				B			
Analysis Period (min)			15									

* User Entered Value

HCM Unsignalized Intersection Capacity Analysis

3: Spanish Trails Boulevard & SR 39 (US 301)

2/16/2009

Movement	SBR
Approach	
Volume (veh/h)	11
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	12
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis

4: Townview Square Entrance & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	129	56	182	128	94	65	166	1582	184	78	1217	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5		4.5	4.5		4.5	5.3	5.3	4.5	5.3	
Lane Util. Factor	1.00	1.00		1.00	0.95		1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.89		1.00	0.94		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1649		1770	3321		1770	5036	1583	1770	4982	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1770	1649		1770	3321		1770	5036	1583	1770	4982	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	140	61	198	139	102	71	180	1720	200	85	1323	110
RTOR Reduction (vph)	0	105	0	0	62	0	0	0	93	0	6	0
Lane Group Flow (vph)	140	154	0	139	111	0	180	1720	107	85	1427	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot			Prot			Prot			Perm		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases										2		
Actuated Green, G (s)	14.9	17.0		14.1	16.2		10.5	63.8	63.8	11.3	64.6	
Effective Green, g (s)	14.9	17.0		14.1	16.2		10.5	63.8	63.8	11.3	64.6	
Actuated g/C Ratio	0.12	0.14		0.11	0.13		0.08	0.51	0.51	0.09	0.52	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	5.3	5.3	4.5	5.3	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	4.0	4.0	3.0	4.0	
Lane Grp Cap (vph)	211	224		200	430		149	2570	808	160	2575	
v/s Ratio Prot	c0.08	c0.09		0.08	0.03		c0.10	c0.34		0.05	c0.29	
v/s Ratio Perm										0.07		
v/c Ratio	0.66	0.69		0.70	0.26		1.21	0.67	0.13	0.53	0.55	
Uniform Delay, d1	52.7	51.5		53.4	49.0		57.2	22.8	16.1	54.3	20.4	
Progression Factor	1.00	1.00		1.00	1.00		0.57	0.33	0.13	0.71	0.61	
Incremental Delay, d2	7.6	8.4		10.0	0.3		127.9	0.9	0.2	3.2	0.8	
Delay (s)	60.3	59.9		63.4	49.3		160.6	8.4	2.2	42.0	13.3	
Level of Service	E	E		E	D		F	A	A	D	B	
Approach Delay (s)	60.0			55.6			20.8			14.9		
Approach LOS	E			E			C			B		
Intersection Summary												
HCM Average Control Delay			24.9	HCM Level of Service			C					
HCM Volume to Capacity ratio			0.72									
Actuated Cycle Length (s)			125.0	Sum of lost time (s)			19.6					
Intersection Capacity Utilization			73.3%	ICU Level of Service			D					
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: Kossik Road & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	228	69	84	162	66	200	189	1191	126	107	947	209
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	7.0	7.0	7.0	4.5	7.0	7.0
Lane Util. Factor	0.97	1.00	1.00	0.97	1.00	1.00	1.00	0.91	1.00	1.00	0.91	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)	3433	1863	1583	3433	1863	1583	1770	5036	1583	1770	5036	1583
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)	3433	1863	1583	3433	1863	1583	1770	5036	1583	1770	5036	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	248	75	91	176	72	217	205	1295	137	116	1029	227
RTOR Reduction (vph)	0	0	82	0	0	197	0	0	67	0	0	121
Lane Group Flow (vph)	248	75	9	176	72	20	205	1295	70	116	1029	106
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	14.9	11.7	11.7	14.5	11.3	11.3	15.8	62.9	62.9	13.8	58.4	58.4
Effective Green, g (s)	14.9	11.7	11.7	14.5	11.3	11.3	15.8	62.9	62.9	13.8	58.4	58.4
Actuated g/C Ratio	0.12	0.09	0.09	0.12	0.09	0.09	0.13	0.50	0.50	0.11	0.47	0.47
Clearance Time (s)	5.3	5.3	5.3	5.3	5.3	5.3	7.0	7.0	7.0	4.5	7.0	7.0
Vehicle Extension (s)	3.5	3.5	3.5	3.0	3.0	3.0	5.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	409	174	148	398	168	143	224	2534	797	195	2353	740
v/s Ratio Prot	c0.07	c0.04		0.05	0.04		c0.12	c0.26		c0.07	0.20	
v/s Ratio Perm			0.01			0.01			0.04			0.07
v/c Ratio	0.61	0.43	0.06	0.44	0.43	0.14	0.92	0.51	0.09	0.59	0.44	0.14
Uniform Delay, d1	52.3	53.5	51.6	51.5	53.8	52.4	53.9	20.8	16.1	52.9	22.3	19.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.74	0.34	0.45	1.00	1.00	1.00
Incremental Delay, d2	2.7	2.0	0.2	0.8	1.8	0.4	32.5	0.6	0.2	4.8	0.6	0.4
Delay (s)	54.9	55.5	51.8	52.3	55.6	52.8	72.2	7.6	7.4	57.7	22.9	19.4
Level of Service	D	E	D	D	E	D	E	A	A	E	C	B
Approach Delay (s)		54.4			53.0			15.7			25.3	
Approach LOS		D			D			B			C	
Intersection Summary												
HCM Average Control Delay			27.7				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.59									
Actuated Cycle Length (s)			125.0				Sum of lost time (s)		23.8			
Intersection Capacity Utilization			58.0%				ICU Level of Service		B			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

6: Wire Road & SR 39 (US 301)

2/16/2009

																			
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT							
Lane Configurations								  				 							
Volume (veh/h)	0	0	0	81	0	126	0	1775	109	7	124	1391							
Sign Control	Stop			Stop			Free			Free									
Grade	0%			0%			0%			0%									
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							
Hourly flow rate (vph)	0	0	0	88	0	137	0	1929	118	0	135	1512							
Pedestrians																			
Lane Width (ft)																			
Walking Speed (ft/s)																			
Percent Blockage																			
Right turn flare (veh)																			
Median type							None			None									
Median storage (veh)																			
Upstream signal (ft)																			
pX, platoon unblocked										0.00									
vC, conflicting volume	2425	3711	504	2703	3711	643	1512				0	1929							
vC1, stage 1 conf vol																			
vC2, stage 2 conf vol																			
vCu, unblocked vol	2425	3711	504	2703	3711	643	1512				0	1929							
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1				0.0	4.1							
tC, 2 stage (s)																			
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2				0.0	2.2							
p0 queue free %	100	100	100	0	100	67	100				0	55							
cM capacity (veh/h)	7	2	513	7	2	416	438				0	302							
Direction, Lane #	WB 1	WB 2	NB 1	NB 2	NB 3	NB 4	SB 1	SB 2	SB 3	SB 4									
Volume Total	88	137	643	643	643	118	135	605	605	302									
Volume Left	88	0	0	0	0	0	135	0	0	0									
Volume Right	0	137	0	0	0	118	0	0	0	0									
cSH	7	416	1700	1700	1700	1700	302	1700	1700	1700									
Volume to Capacity	13.38	0.33	0.38	0.38	0.38	0.07	0.45	0.36	0.36	0.18									
Queue Length 95th (ft)	Err	35	0	0	0	0	55	0	0	0									
Control Delay (s)	Err	17.8	0.0	0.0	0.0	0.0	26.2	0.0	0.0	0.0									
Lane LOS	F	C					D												
Approach Delay (s)	3923.5			0.0				2.1											
Approach LOS	F																		
Intersection Summary																			
Average Delay				226.1															
Intersection Capacity Utilization				59.4%	ICU Level of Service				B										
Analysis Period (min)				15															

HCM Unsignalized Intersection Capacity Analysis

6: Wire Road & SR 39 (US 301)

2/16/2009

Movement	SBR
Approach	
Volume (veh/h)	0
Sign Control	
Grade	
Peak Hour Factor	0.92
Hourly flow rate (vph)	0
Pedestrians	
Lane Width (ft)	
Walking Speed (ft/s)	
Percent Blockage	
Right turn flare (veh)	
Median type	
Median storage veh)	
Upstream signal (ft)	
pX, platoon unblocked	
vC, conflicting volume	
vC1, stage 1 conf vol	
vC2, stage 2 conf vol	
vCu, unblocked vol	
tC, single (s)	
tC, 2 stage (s)	
tF (s)	
p0 queue free %	
cM capacity (veh/h)	
Direction, Lane #	

HCM Signalized Intersection Capacity Analysis

7: Centennial Road & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	40	40	208	40	294	40	1521	320	205	1223	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.5	5.5		5.5	5.5	5.5	5.0	8.0	8.0	5.0	8.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91	1.00	1.00	0.91	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1723		1770	1863	1583	1770	5036	1583	1770	5014	
Flt Permitted	0.73	1.00		0.70	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1358	1723		1306	1863	1583	1770	5036	1583	1770	5014	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	43	43	226	43	320	43	1653	348	223	1329	43
RTOR Reduction (vph)	0	33	0	0	0	245	0	0	189	0	3	0
Lane Group Flow (vph)	43	53	0	226	43	75	43	1653	159	223	1369	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm			Perm			Prot	Perm			Prot	
Protected Phases	4			8			5	2	1			6
Permitted Phases	4			8			8		2		6	
Actuated Green, G (s)	19.1	19.1		19.1	19.1	19.1	5.5	31.4	31.4	12.9	38.8	
Effective Green, g (s)	19.1	19.1		19.1	19.1	19.1	5.5	31.4	31.4	12.9	38.8	
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.07	0.38	0.38	0.16	0.47	
Clearance Time (s)	5.5	5.5		5.5	5.5	5.5	5.0	8.0	8.0	5.0	8.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	4.0	3.0	3.0	4.0	3.0	
Lane Grp Cap (vph)	317	402		305	434	369	119	1931	607	279	2375	
v/s Ratio Prot		0.03			0.02		0.02	c0.33		c0.13	0.27	
v/s Ratio Perm	0.03			c0.17		0.05			0.10			
v/c Ratio	0.14	0.13		0.74	0.10	0.20	0.36	0.86	0.26	0.80	0.58	
Uniform Delay, d1	24.9	24.8		29.1	24.6	25.3	36.5	23.2	17.3	33.3	15.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.1		9.3	0.1	0.3	2.5	4.0	0.2	15.5	0.3	
Delay (s)	25.1	25.0		38.4	24.7	25.5	39.1	27.1	17.5	48.7	15.9	
Level of Service	C	C		D	C	C	D	C	B	D	B	
Approach Delay (s)		25.0			30.4			25.8			20.5	
Approach LOS		C			C			C			C	
Intersection Summary												
HCM Average Control Delay	24.5			HCM Level of Service			C					
HCM Volume to Capacity ratio	0.81											
Actuated Cycle Length (s)	81.9			Sum of lost time (s)			18.5					
Intersection Capacity Utilization	74.4%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

8: SR 700 & SR 39 (US 301)

2/16/2009

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			  			  
Volume (vph)	91	284	1721	98	237	1343
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	0.91	1.00	1.00	0.91
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)	1687	1509	5036	1509	1687	5036
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1687	1509	5036	1509	1687	5036
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	309	1871	107	258	1460
RTOR Reduction (vph)	0	278	0	49	0	0
Lane Group Flow (vph)	99	31	1871	58	258	1460
Heavy Vehicles (%)	7%	7%	3%	7%	7%	3%
Turn Type	Perm		Perm		Prot	
Protected Phases	8		2		1	6
Permitted Phases		8		2		
Actuated Green, G (s)	12.7	12.7	68.3	68.3	30.5	103.3
Effective Green, g (s)	12.7	12.7	68.3	68.3	30.5	103.3
Actuated g/C Ratio	0.10	0.10	0.55	0.55	0.24	0.83
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	171	153	2752	825	412	4162
v/s Ratio Prot	c0.06		c0.37		c0.15	0.29
v/s Ratio Perm		0.02		0.04		
v/c Ratio	0.58	0.21	0.68	0.07	0.63	0.35
Uniform Delay, d1	53.6	51.5	20.5	13.4	42.2	2.7
Progression Factor	1.00	1.00	1.00	1.00	0.93	0.34
Incremental Delay, d2	4.7	0.7	1.4	0.2	2.2	0.2
Delay (s)	58.3	52.2	21.8	13.5	41.4	1.1
Level of Service	E	D	C	B	D	A
Approach Delay (s)	53.7		21.4			7.1
Approach LOS	D		C			A
Intersection Summary						
HCM Average Control Delay			18.6	HCM Level of Service		B
HCM Volume to Capacity ratio			0.65			
Actuated Cycle Length (s)			125.0	Sum of lost time (s)		13.5
Intersection Capacity Utilization			62.7%	ICU Level of Service		B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis

9: CR 52A (Clinton Avenue) & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔↔	↑	↗	↗	↖		↗↗	↑↑↑		↗	↑↑↑	↗
Volume (vph)	357	50	488	38	93	38	529	1440	56	31	1046	415
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.5	6.5	4.5	6.5		5.0	6.5		5.0	6.5	6.5
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00		0.97	0.91		1.00	0.91	1.00
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1863	1583	1770	1782		3433	5009		1770	5036	1583
Flt Permitted	0.95	1.00	1.00	0.42	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	776	1782		3433	5009		1770	5036	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	388	54	530	41	101	41	575	1565	61	34	1137	451
RTOR Reduction (vph)	0	0	385	0	11	0	0	3	0	0	0	311
Lane Group Flow (vph)	388	54	145	41	131	0	575	1623	0	34	1137	140
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot		Perm	pm+pt			Prot			Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4	8								6
Actuated Green, G (s)	19.7	29.3	29.3	15.2	15.2		28.9	63.1		4.5	38.7	38.7
Effective Green, g (s)	19.7	29.3	29.3	15.2	15.2		28.9	63.1		4.5	38.7	38.7
Actuated g/C Ratio	0.16	0.23	0.23	0.12	0.12		0.23	0.50		0.04	0.31	0.31
Clearance Time (s)	4.5	6.5	6.5	4.5	6.5		5.0	6.5		5.0	6.5	6.5
Vehicle Extension (s)	3.0	6.0	6.0	3.0	6.0		3.0	5.0		3.0	5.0	5.0
Lane Grp Cap (vph)	541	437	371	139	217		794	2529		64	1559	490
v/s Ratio Prot	c0.11	0.03		0.01	c0.07		c0.17	0.32		0.02	c0.23	
v/s Ratio Perm			0.09	0.02								0.09
v/c Ratio	0.72	0.12	0.39	0.29	0.60		0.72	0.64		0.53	0.73	0.28
Uniform Delay, d1	50.0	37.7	40.3	49.5	52.0		44.4	22.7		59.2	38.5	32.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.61	0.29		1.00	1.00	1.00
Incremental Delay, d2	4.5	0.4	1.9	1.2	8.2		2.5	0.9		8.2	3.0	1.5
Delay (s)	54.5	38.1	42.2	50.6	60.2		29.6	7.5		67.4	41.5	34.1
Level of Service	D	D	D	D	E		C	A		E	D	C
Approach Delay (s)		46.9			58.0			13.3			40.0	
Approach LOS		D			E			B			D	
Intersection Summary												
HCM Average Control Delay			30.2			HCM Level of Service				C		
HCM Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			125.0			Sum of lost time (s)			22.5			
Intersection Capacity Utilization			72.6%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Morningside Drive & SR 39 (US 301)

2/16/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	152	27	72	160	29	137	133	1385	131	123	1062	145
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	6.2	4.5	5.8	5.8	5.4	5.8	
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00	1.00	0.91	1.00	1.00	0.91	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00	1.00		0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	1863	1583		1787	1583	1770	5036	1583	1770	4951	
Flt Permitted	0.63	1.00	1.00		0.74	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1171	1863	1583		1376	1583	1770	5036	1583	1770	4951	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	165	29	78	174	32	149	145	1505	142	134	1154	158
RTOR Reduction (vph)	0	0	62	0	0	119	0	0	84	0	29	0
Lane Group Flow (vph)	165	29	16	0	206	30	145	1505	58	134	1283	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm		Prot	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			
Actuated Green, G (s)	11.8	11.8	11.8		11.8	11.8	5.7	23.7	23.7	5.5	24.4	
Effective Green, g (s)	11.8	11.8	11.8		11.8	11.8	5.7	23.7	23.7	5.5	24.4	
Actuated g/C Ratio	0.20	0.20	0.20		0.20	0.20	0.10	0.41	0.41	0.09	0.42	
Clearance Time (s)	6.2	6.2	6.2		6.2	6.2	4.5	5.8	5.8	5.4	5.8	
Vehicle Extension (s)	4.0	4.0	4.0		4.0	4.0	3.0	6.0	6.0	4.0	6.0	
Lane Grp Cap (vph)	237	376	320		278	320	173	2044	642	167	2069	
v/s Ratio Prot		0.02					0.08	c0.30		0.08	c0.26	
v/s Ratio Perm	0.14		0.01		c0.15	0.02			0.04			
v/c Ratio	0.70	0.08	0.05		0.74	0.09	0.84	0.74	0.09	0.80	0.62	
Uniform Delay, d1	21.6	18.9	18.8		21.9	19.0	25.9	14.7	10.7	25.9	13.4	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.2	0.1	0.1		10.8	0.2	28.3	1.9	0.2	24.7	1.0	
Delay (s)	30.9	19.0	18.9		32.7	19.1	54.2	16.7	10.9	50.6	14.4	
Level of Service	C	B	B		C	B	D	B	B	D	B	
Approach Delay (s)		26.2			27.0			19.2			17.7	
Approach LOS		C			C			B			B	
Intersection Summary												
HCM Average Control Delay			19.9				HCM Level of Service			B		
HCM Volume to Capacity ratio			0.77									
Actuated Cycle Length (s)			58.4				Sum of lost time (s)			17.8		
Intersection Capacity Utilization			65.1%				ICU Level of Service			C		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: SR 533 (US 98 Bypass) & SR 39 (US 301)

2/16/2009

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	566	26	1005	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5			
Lane Util. Factor	0.97	1.00	1.00			
Frt	1.00	0.85	1.00			
Flt Protected	0.95	1.00	1.00			
Satd. Flow (prot)	3367	1553	1845			
Flt Permitted	0.95	1.00	1.00			
Satd. Flow (perm)	3367	1553	1845			
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	615	28	1092	0	0	0
RTOR Reduction (vph)	0	22	0	0	0	0
Lane Group Flow (vph)	615	6	1092	0	0	0
Heavy Vehicles (%)	4%	4%	3%	4%	4%	3%
Turn Type	Perm					
Protected Phases	8		2			
Permitted Phases		8				
Actuated Green, G (s)	15.6	15.6	44.5			
Effective Green, g (s)	15.6	15.6	44.5			
Actuated g/C Ratio	0.23	0.23	0.64			
Clearance Time (s)	4.5	4.5	4.5			
Vehicle Extension (s)	3.0	3.0	3.0			
Lane Grp Cap (vph)	760	351	1188			
v/s Ratio Prot	c0.18		c0.59			
v/s Ratio Perm		0.00				
v/c Ratio	0.81	0.02	0.92			
Uniform Delay, d1	25.3	20.8	10.7			
Progression Factor	1.00	1.00	1.00			
Incremental Delay, d2	6.4	0.0	11.3			
Delay (s)	31.7	20.8	22.0			
Level of Service	C	C	C			
Approach Delay (s)	31.2		22.0		0.0	
Approach LOS	C		C		A	
Intersection Summary						
HCM Average Control Delay			25.4	HCM Level of Service		C
HCM Volume to Capacity ratio			0.89			
Actuated Cycle Length (s)			69.1	Sum of lost time (s)		9.0
Intersection Capacity Utilization			76.5%	ICU Level of Service		D
Analysis Period (min)			15			
c Critical Lane Group						

Arterial Level of Service: NB SR 39 (US 301)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Daugherty Road	I	45	44.7	13.9	58.6	0.51	31.2	C
Townview Square Entr	I	45	34.7	9.3	44.0	0.36	29.3	C
Kossik Road	I	45	51.8	8.1	59.9	0.65	38.9	B
Centennial Road	I	55	131.7	33.3	165.0	2.01	43.9	A
SR 700	I	55	95.8	22.6	118.4	1.46	44.5	A
CR 52A (Clinton Aven	I	50	28.0	7.3	35.3	0.29	30.1	C
Morningside Drive	I	50	73.2	17.5	90.7	1.02	40.4	B
SR 533 (US 98 Bypass	I	45	65.8	25.4	91.2	0.82	32.4	C
Total	I		525.7	137.4	663.1	7.12	38.7	B

Arterial Level of Service: SB SR 39 (US 301)

Cross Street	Arterial Class	Flow Speed	Running Time	Signal Delay	Travel Time (s)	Dist (mi)	Arterial Speed	Arterial LOS
Morningside Drive	I	45	65.8	14.5	80.3	0.82	36.9	B
CR 52A (Clinton Aven	I	50	73.2	39.3	112.5	1.02	32.5	C
SR 700	I	50	28.0	1.2	29.2	0.29	36.4	B
Centennial Road	I	55	95.8	18.3	114.1	1.46	46.2	A
Kossik Road	I	55	131.7	23.6	155.3	2.01	46.6	A
Townview Square Entr	I	45	51.8	14.1	65.9	0.65	35.4	B
Daugherty Road	I	45	34.7	8.5	43.2	0.36	29.8	C
CR 54 (Eiland Boulev	I	45	44.7	21.8	66.5	0.51	27.5	C
Total	I		525.7	141.3	667.0	7.12	38.4	B

Appendix H

TSM 2035 Synchro Intersection Analysis Sheets and LOS and Control Delay Summary Tables

TSM 2035 US 301 Intersection Level of Service Summary

Cross-Street	Level of Service (LOS)				
	US 301 NB Mainline AM / PM	US 301 SB Mainline AM / PM	EB AM / PM	WB AM / PM	Overall AM / PM
Centennial Road	D / D	D / C	F / F	E / D	D / D
CR 52A	C / C	E / D	D / C	F / F	D / D
Morningside Drive	B / C	B / B	D / D	D / D	C / C
US 98 Bypass	B / B	B / A		D / D	C / B

TSM 2035 US 301 Intersection Control Delay Summary

Cross-Street	HCM Average Control Delay (sec/veh)				
	US 301 NB Mainline AM / PM	US 301 SB Mainline AM / PM	EB AM / PM	WB AM / PM	Overall AM / PM
Centennial Road	36.8 / 36.8	46.7 / 34.8	129.3 / 131.7	64.6 / 41.1	48.2 / 39.6
CR 52A	29.0 / 23.8	60.5 / 47.4	51.4 / 32.7	218.9 / 101.7	52.6 / 36.2
Morningside Drive	17.0 / 22.1	18.2 / 19.0	42.1 / 43.6	43.8 / 46.8	21.8 / 24.8
US 98 Bypass	19.0 / 13.6	11.7 / 7.9		41.5 / 41.1	22.0 / 17.1

HCM Signalized Intersection Capacity Analysis

7: Centennial Road & SR 39 (US 301)

10/2/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	50	50	381	50	241	50	1426	251	333	1785	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5	5.5	5.5	4.0	5.0	8.0	8.0	5.0	8.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98	1.00	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1817	1583	1681	1704	1583	1770	3505	1583	3433	3492	
Flt Permitted		0.98	1.00	0.95	0.96	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1817	1583	1681	1704	1583	1770	3505	1583	3433	3492	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	54	54	414	54	262	54	1550	273	362	1940	54
RTOR Reduction (vph)	0	0	51	0	0	0	0	0	74	0	1	0
Lane Group Flow (vph)	0	108	3	232	236	262	54	1550	199	362	1993	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Split		Perm	Split		Free	Prot		Perm	Prot		
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			Free			2			
Actuated Green, G (s)		8.5	8.5	21.6	21.6	146.1	5.4	74.3	74.3	17.7	86.6	
Effective Green, g (s)		8.5	8.5	21.6	21.6	146.1	5.4	74.3	74.3	17.7	86.6	
Actuated g/C Ratio		0.06	0.06	0.15	0.15	1.00	0.04	0.51	0.51	0.12	0.59	
Clearance Time (s)		5.5	5.5	5.5	5.5		5.0	8.0	8.0	5.0	8.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0		4.0	3.0	3.0	4.0	3.0	
Lane Grp Cap (vph)		106	92	249	252	1583	65	1782	805	416	2070	
v/s Ratio Prot		c0.06		0.14	c0.14		0.03	0.44		c0.11	c0.57	
v/s Ratio Perm			0.00			0.17			0.13			
v/c Ratio		1.02	0.03	0.93	0.94	0.17	0.83	0.87	0.25	0.87	0.96	
Uniform Delay, d1		68.8	64.9	61.5	61.6	0.0	69.9	31.6	20.2	63.1	28.2	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		92.6	0.2	38.7	39.4	0.2	58.6	4.8	0.2	18.1	12.2	
Delay (s)		161.4	65.1	100.3	100.9	0.2	128.5	36.5	20.3	81.2	40.4	
Level of Service		F	E	F	F	A	F	D	C	F	D	
Approach Delay (s)		129.3			64.6			36.8			46.7	
Approach LOS		F			E			D			D	
Intersection Summary												
HCM Average Control Delay	48.2			HCM Level of Service					D			
HCM Volume to Capacity ratio	0.98											
Actuated Cycle Length (s)	146.1			Sum of lost time (s)					24.0			
Intersection Capacity Utilization	90.7%			ICU Level of Service					E			
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

8: SR 700 & SR 39 (US 301)

10/2/2009



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	100	258	1570	94	310	2008
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.0	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	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)	1687	1509	3505	1509	1687	3505
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1687	1509	3505	1509	1687	3505
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	109	280	1707	102	337	2183
RTOR Reduction (vph)	0	0	0	39	0	0
Lane Group Flow (vph)	109	280	1707	63	337	2183
Heavy Vehicles (%)	7%	7%	3%	7%	7%	3%
Turn Type	Free		Perm		Prot	
Protected Phases	8		2		1	6
Permitted Phases		Free		2		
Actuated Green, G (s)	14.0	150.0	85.0	85.0	37.5	127.0
Effective Green, g (s)	14.0	150.0	85.0	85.0	37.5	127.0
Actuated g/C Ratio	0.09	1.00	0.57	0.57	0.25	0.85
Clearance Time (s)	4.5		4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	157	1509	1986	855	422	2968
v/s Ratio Prot	c0.06		c0.49		c0.20	0.62
v/s Ratio Perm		0.19		0.04		
v/c Ratio	0.69	0.19	0.86	0.07	0.80	0.74
Uniform Delay, d1	65.9	0.0	27.5	14.7	52.7	4.7
Progression Factor	1.00	1.00	1.00	1.00	0.88	0.52
Incremental Delay, d2	12.5	0.3	5.1	0.2	4.8	0.8
Delay (s)	78.4	0.3	32.6	14.9	51.4	3.2
Level of Service	E	A	C	B	D	A
Approach Delay (s)	22.2		31.6			9.6
Approach LOS	C		C			A

Intersection Summary

HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

9: CR 52A (Clinton Avenue) & SR 39 (US 301)

10/2/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	430	119	589	79	51	35	558	1210	48	43	1681	401
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.5	4.0	6.5	6.5		5.0	6.5	6.5	5.0	6.5	6.5
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.94		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)	3433	1863	1583	1770	1749		3433	3505	1583	1770	3505	1583
Flt Permitted	0.95	1.00	1.00	0.67	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1256	1749		3433	3505	1583	1770	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	467	129	640	86	55	38	607	1315	52	47	1827	436
RTOR Reduction (vph)	0	0	0	0	16	0	0	0	20	0	0	117
Lane Group Flow (vph)	467	129	640	86	77	0	607	1315	32	47	1827	319
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot		Free	Perm			Prot		Perm	Prot		Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases			Free	8					2			6
Actuated Green, G (s)	19.5	31.5	150.0	7.5	7.5		25.0	93.5	93.5	7.0	75.5	75.5
Effective Green, g (s)	19.5	31.5	150.0	7.5	7.5		25.0	93.5	93.5	7.0	75.5	75.5
Actuated g/C Ratio	0.13	0.21	1.00	0.05	0.05		0.17	0.62	0.62	0.05	0.50	0.50
Clearance Time (s)	4.5	6.5		6.5	6.5		5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)	3.0	6.0		6.0	6.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	446	391	1583	63	87		572	2185	987	83	1764	797
v/s Ratio Prot	c0.14	0.07			0.04		c0.18	0.38		0.03	c0.52	
v/s Ratio Perm			0.40	c0.07					0.02			0.20
v/c Ratio	1.05	0.33	0.40	1.37	0.88		1.06	0.60	0.03	0.57	1.04	0.40
Uniform Delay, d1	65.2	50.3	0.0	71.2	70.8		62.5	17.0	10.9	70.0	37.2	23.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.67	0.09	0.00	1.00	1.00	1.00
Incremental Delay, d2	55.5	1.4	0.8	238.0	64.4		47.3	0.8	0.0	8.6	31.3	1.5
Delay (s)	120.7	51.7	0.8	309.3	135.2		89.4	2.3	0.0	78.6	68.5	24.7
Level of Service	F	D	A	F	F		F	A	A	E	E	C
Approach Delay (s)		51.4			218.9			29.0			60.5	
Approach LOS		D			F			C			E	
Intersection Summary												
HCM Average Control Delay			52.6			HCM Level of Service				D		
HCM Volume to Capacity ratio			1.06									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			22.5			
Intersection Capacity Utilization			96.3%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Morningside Drive & SR 39 (US 301)

10/2/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	148	30	157	154	28	125	88	1147	185	147	1500	163
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	6.2	6.2	4.5	5.8	5.8	5.4	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	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)	1770	1863	1583	1770	1863	1583	3433	3505	1583	3433	3505	1583
Flt Permitted	0.74	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1374	1863	1583	1370	1863	1583	3433	3505	1583	3433	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	161	33	171	167	30	136	96	1247	201	160	1630	177
RTOR Reduction (vph)	0	0	126	0	0	113	0	0	86	0	0	69
Lane Group Flow (vph)	161	33	45	167	30	23	96	1247	115	160	1630	108
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	16.6	16.6	16.6	16.6	16.6	16.6	6.1	57.1	57.1	8.9	60.8	60.8
Effective Green, g (s)	16.6	16.6	16.6	16.6	16.6	16.6	6.1	57.1	57.1	8.9	60.8	60.8
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17	0.17	0.06	0.57	0.57	0.09	0.61	0.61
Clearance Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	4.5	5.8	5.8	5.4	5.8	5.8
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	6.0	6.0	4.0	6.0	6.0
Lane Grp Cap (vph)	228	309	263	227	309	263	209	2001	904	306	2131	962
v/s Ratio Prot		0.02			0.02		0.03	0.36		c0.05	c0.47	
v/s Ratio Perm	0.12		0.03	c0.12		0.01			0.07			0.07
v/c Ratio	0.71	0.11	0.17	0.74	0.10	0.09	0.46	0.62	0.13	0.52	0.76	0.11
Uniform Delay, d1	39.4	35.4	35.8	39.6	35.3	35.3	45.4	14.3	9.9	43.5	14.4	8.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.84	0.99	2.18
Incremental Delay, d2	10.2	0.2	0.4	12.4	0.2	0.2	1.6	1.5	0.3	1.6	2.0	0.2
Delay (s)	49.6	35.6	36.2	52.0	35.5	35.5	47.0	15.8	10.2	38.1	16.2	18.1
Level of Service	D	D	D	D	D	D	D	B	B	D	B	B
Approach Delay (s)		42.1			43.8			17.0			18.2	
Approach LOS		D			D			B			B	
Intersection Summary												
HCM Average Control Delay			21.8				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			100.0				Sum of lost time (s)			17.4		
Intersection Capacity Utilization			76.2%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: SR 533 (US 98 Bypass) & SR 39 (US 301)

10/2/2009



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↰	↰	↰	↰↰		↰↰
Volume (vph)	770	30	850	610	0	1090
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.0		4.5
Lane Util. Factor	0.97	1.00	1.00	0.88		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)	3367	1553	1845	2733		3505
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3367	1553	1845	2733		3505
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	837	33	924	663	0	1185
RTOR Reduction (vph)	0	24	0	0	0	0
Lane Group Flow (vph)	837	9	924	663	0	1185
Heavy Vehicles (%)	4%	4%	3%	4%	4%	3%
Turn Type	Perm		Free			
Protected Phases	8		2			6
Permitted Phases		8		Free		
Actuated Green, G (s)	28.7	28.7	62.3	100.0		62.3
Effective Green, g (s)	28.7	28.7	62.3	100.0		62.3
Actuated g/C Ratio	0.29	0.29	0.62	1.00		0.62
Clearance Time (s)	4.5	4.5	4.5			4.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	966	446	1149	2733		2184
v/s Ratio Prot	c0.25		c0.50			0.34
v/s Ratio Perm		0.01		0.24		
v/c Ratio	0.87	0.02	0.80	0.24		0.54
Uniform Delay, d1	33.8	25.6	14.2	0.0		10.7
Progression Factor	1.00	1.00	1.93	1.00		1.00
Incremental Delay, d2	8.2	0.0	5.0	0.2		1.0
Delay (s)	42.1	25.6	32.5	0.2		11.7
Level of Service	D	C	C	A		B
Approach Delay (s)	41.5		19.0			11.7
Approach LOS	D		B			B

Intersection Summary

HCM Average Control Delay	22.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	74.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

7: Centennial Road & SR 39 (US 301)

10/2/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔	↔	↔	↔	↔	↕	↔	↔	↕	↔
Volume (vph)	50	50	50	251	50	333	50	1785	381	241	1426	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		5.5	5.5	5.5	5.5	4.0	5.0	8.0	8.0	5.0	8.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	0.95	1.00	0.97	0.95	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	
Flt Protected		0.98	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1817	1583	1681	1712	1583	1770	3505	1583	3433	3488	
Flt Permitted		0.98	1.00	0.95	0.97	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1817	1583	1681	1712	1583	1770	3505	1583	3433	3488	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	54	54	54	273	54	362	54	1940	414	262	1550	54
RTOR Reduction (vph)	0	0	51	0	0	0	0	0	88	0	2	0
Lane Group Flow (vph)	0	108	3	161	166	362	54	1940	326	262	1602	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Split		Perm	Split		Free	Prot		Perm		Prot	
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases			4			Free			2			
Actuated Green, G (s)		8.5	8.5	17.2	17.2	146.8	9.2	85.1	85.1	12.0	87.9	
Effective Green, g (s)		8.5	8.5	17.2	17.2	146.8	9.2	85.1	85.1	12.0	87.9	
Actuated g/C Ratio		0.06	0.06	0.12	0.12	1.00	0.06	0.58	0.58	0.08	0.60	
Clearance Time (s)		5.5	5.5	5.5	5.5		5.0	8.0	8.0	5.0	8.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0		4.0	3.0	3.0	4.0	3.0	
Lane Grp Cap (vph)		105	92	197	201	1583	111	2032	918	281	2089	
v/s Ratio Prot		c0.06		0.10	c0.10		0.03	c0.55		c0.08	0.46	
v/s Ratio Perm			0.00			c0.23			0.21			
v/c Ratio		1.03	0.03	0.82	0.83	0.23	0.49	0.95	0.36	0.93	0.77	
Uniform Delay, d1		69.2	65.3	63.3	63.3	0.0	66.5	29.0	16.3	67.0	21.9	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		95.7	0.2	22.4	23.3	0.3	4.5	11.1	0.2	36.3	1.7	
Delay (s)		164.9	65.4	85.6	86.6	0.3	71.0	40.2	16.6	103.3	23.6	
Level of Service		F	E	F	F	A	E	D	B	F	C	
Approach Delay (s)		131.7			41.1			36.8			34.8	
Approach LOS		F			D			D			C	
Intersection Summary												
HCM Average Control Delay			39.6			HCM Level of Service				D		
HCM Volume to Capacity ratio			0.94									
Actuated Cycle Length (s)			146.8			Sum of lost time (s)			24.0			
Intersection Capacity Utilization			86.6%			ICU Level of Service			E			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

8: SR 700 & SR 39 (US 301)

10/2/2009



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	94	310	2008	100	258	1570
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.0	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	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)	1687	1509	3505	1509	1687	3505
Flt Permitted	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (perm)	1687	1509	3505	1509	1687	3505
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	102	337	2183	109	280	1707
RTOR Reduction (vph)	0	0	0	34	0	0
Lane Group Flow (vph)	102	337	2183	75	280	1707
Heavy Vehicles (%)	7%	7%	3%	7%	7%	3%
Turn Type	Free		Perm		Prot	
Protected Phases	8		2		1	6
Permitted Phases		Free		2		
Actuated Green, G (s)	13.2	140.0	89.8	89.8	23.5	117.8
Effective Green, g (s)	13.2	140.0	89.8	89.8	23.5	117.8
Actuated g/C Ratio	0.09	1.00	0.64	0.64	0.17	0.84
Clearance Time (s)	4.5		4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	159	1509	2248	968	283	2949
v/s Ratio Prot	c0.06		c0.62		c0.17	0.49
v/s Ratio Perm		0.22		0.05		
v/c Ratio	0.64	0.22	0.97	0.08	0.99	0.58
Uniform Delay, d1	61.1	0.0	23.9	9.5	58.1	3.4
Progression Factor	1.00	1.00	1.00	1.00	0.75	0.34
Incremental Delay, d2	8.5	0.3	13.3	0.2	40.3	0.6
Delay (s)	69.7	0.3	37.2	9.6	84.1	1.7
Level of Service	E	A	D	A	F	A
Approach Delay (s)	16.4		35.9			13.3
Approach LOS	B		D			B

Intersection Summary

HCM Average Control Delay	24.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

9: CR 52A (Clinton Avenue) & SR 39 (US 301)

10/2/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	401	51	558	48	119	43	589	1681	79	35	1210	430
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.5	4.0	6.5	6.5		5.0	6.5	6.5	5.0	6.5	6.5
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	1.00
Flt	1.00	1.00	0.85	1.00	0.96		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)	3433	1863	1583	1770	1788		3433	3505	1583	1770	3505	1583
Flt Permitted	0.95	1.00	1.00	0.72	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3433	1863	1583	1343	1788		3433	3505	1583	1770	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	436	55	607	52	129	47	640	1827	86	38	1315	467
RTOR Reduction (vph)	0	0	0	0	9	0	0	0	25	0	0	186
Lane Group Flow (vph)	436	55	607	52	167	0	640	1827	61	38	1315	281
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Prot		Free	Perm			Prot		Perm	Prot		Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases			Free	8					2			6
Actuated Green, G (s)	20.0	38.5	140.0	14.0	14.0		27.0	77.9	77.9	5.6	56.5	56.5
Effective Green, g (s)	20.0	38.5	140.0	14.0	14.0		27.0	77.9	77.9	5.6	56.5	56.5
Actuated g/C Ratio	0.14	0.28	1.00	0.10	0.10		0.19	0.56	0.56	0.04	0.40	0.40
Clearance Time (s)	4.5	6.5		6.5	6.5		5.0	6.5	6.5	5.0	6.5	6.5
Vehicle Extension (s)	3.0	6.0		6.0	6.0		3.0	5.0	5.0	3.0	5.0	5.0
Lane Grp Cap (vph)	490	512	1583	134	179		662	1950	881	71	1415	639
v/s Ratio Prot	c0.13	0.03			c0.09		0.19	c0.52		0.02	c0.38	
v/s Ratio Perm			0.38	0.04					0.04			0.18
v/c Ratio	0.89	0.11	0.38	0.39	0.93		0.97	0.94	0.07	0.54	0.93	0.44
Uniform Delay, d1	58.9	37.9	0.0	59.0	62.5		56.1	28.8	14.3	65.9	39.8	30.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.67	0.30	0.07	1.00	1.00	1.00
Incremental Delay, d2	17.7	0.3	0.7	5.2	50.3		16.8	5.5	0.1	7.6	12.1	2.2
Delay (s)	76.6	38.2	0.7	64.2	112.8		54.2	14.2	1.1	73.5	52.0	32.5
Level of Service	E	D	A	E	F		D	B	A	E	D	C
Approach Delay (s)		32.7			101.7			23.8			47.4	
Approach LOS		C			F			C			D	
Intersection Summary												
HCM Average Control Delay			36.2			HCM Level of Service			D			
HCM Volume to Capacity ratio			0.96									
Actuated Cycle Length (s)			140.0			Sum of lost time (s)			24.0			
Intersection Capacity Utilization			91.4%			ICU Level of Service			F			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

10: Morningside Drive & SR 39 (US 301)

10/2/2009

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	163	28	88	185	30	147	157	1500	154	125	1147	148
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	6.2	6.2	4.5	5.8	5.8	5.4	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.95	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)	1770	1863	1583	1770	1863	1583	3433	3505	1583	3433	3505	1583
Flt Permitted	0.74	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1370	1863	1583	1374	1863	1583	3433	3505	1583	3433	3505	1583
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	177	30	96	201	33	160	171	1630	167	136	1247	161
RTOR Reduction (vph)	0	0	78	0	0	115	0	0	70	0	0	70
Lane Group Flow (vph)	177	30	18	201	33	45	171	1630	97	136	1247	91
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%	3%	2%
Turn Type	Perm		Perm	Perm		Perm	Prot		Perm	Prot		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8		8			2			6
Actuated Green, G (s)	20.0	20.0	20.0	20.0	20.0	20.0	9.7	62.0	62.0	7.6	60.8	60.8
Effective Green, g (s)	20.0	20.0	20.0	20.0	20.0	20.0	9.7	62.0	62.0	7.6	60.8	60.8
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19	0.19	0.09	0.58	0.58	0.07	0.57	0.57
Clearance Time (s)	6.2	6.2	6.2	6.2	6.2	6.2	4.5	5.8	5.8	5.4	5.8	5.8
Vehicle Extension (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.0	6.0	6.0	4.0	6.0	6.0
Lane Grp Cap (vph)	256	348	296	257	348	296	311	2031	917	244	1992	899
v/s Ratio Prot		0.02			0.02		c0.05	c0.47		0.04	0.36	
v/s Ratio Perm	0.13		0.01	c0.15		0.03			0.06			0.06
v/c Ratio	0.69	0.09	0.06	0.78	0.09	0.15	0.55	0.80	0.11	0.56	0.63	0.10
Uniform Delay, d1	40.6	35.9	35.8	41.4	36.0	36.4	46.6	17.7	10.1	48.1	15.5	10.6
Progression Factor	1.00	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	8.4	0.1	0.1	15.1	0.2	0.3	2.0	2.9	0.1	3.4	1.1	0.1
Delay (s)	49.0	36.1	35.9	56.5	36.2	36.7	48.5	20.6	10.2	51.5	16.5	10.7
Level of Service	D	D	D	E	D	D	D	C	B	D	B	B
Approach Delay (s)		43.6			46.8			22.1			19.0	
Approach LOS		D			D			C			B	
Intersection Summary												
HCM Average Control Delay			24.8				HCM Level of Service			C		
HCM Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			107.0				Sum of lost time (s)			10.7		
Intersection Capacity Utilization			78.7%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

11: SR 533 (US 98 Bypass) & SR 39 (US 301)

10/2/2009



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↰↰	↰	↰	↰↰		↰↰
Volume (vph)	580	30	1060	800	0	880
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.0		4.5
Lane Util. Factor	0.97	1.00	1.00	0.88		*0.68
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)	3367	1553	1845	2733		2509
Flt Permitted	0.95	1.00	1.00	1.00		1.00
Satd. Flow (perm)	3367	1553	1845	2733		2509
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	630	33	1152	870	0	957
RTOR Reduction (vph)	0	26	0	0	0	0
Lane Group Flow (vph)	630	7	1152	870	0	957
Heavy Vehicles (%)	4%	4%	3%	4%	4%	3%
Turn Type	Perm		Free			
Protected Phases	8		2			6
Permitted Phases		8		Free		
Actuated Green, G (s)	19.8	19.8	60.4	89.2		60.4
Effective Green, g (s)	19.8	19.8	60.4	89.2		60.4
Actuated g/C Ratio	0.22	0.22	0.68	1.00		0.68
Clearance Time (s)	4.5	4.5	4.5			4.5
Vehicle Extension (s)	3.0	3.0	3.0			3.0
Lane Grp Cap (vph)	747	345	1249	2733		1699
v/s Ratio Prot	c0.19		c0.62			0.38
v/s Ratio Perm		0.00		0.32		
v/c Ratio	0.84	0.02	0.92	0.32		0.56
Uniform Delay, d1	33.2	27.1	12.4	0.0		7.5
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	8.6	0.0	11.3	0.3		0.4
Delay (s)	41.8	27.2	23.7	0.3		7.9
Level of Service	D	C	C	A		A
Approach Delay (s)	41.1		13.6			7.9
Approach LOS	D		B			A

Intersection Summary

HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	89.2	Sum of lost time (s)	9.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group