Appendix E

Total Future Levels of Service

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	82	0	0	528	81
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	89	0	0	574	88
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	618	331	662			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	618	331	662			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	87	100			
cM capacity (veh/h)	421	665	923			

Direction, Lane #	EB 1	SB 1	SB 2
Volume Total	89	383	279
Volume Left	0	0	0
Volume Right	89	0	88
cSH	665	1700	1700
Volume to Capacity	0.13	0.23	0.16
Queue Length 95th (ft)	12	0	0
Control Delay (s)	11.3	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.3	0.0	
Approach LOS	B		

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	28.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	0	0	66	138	7	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	72	150	8	0

Direction, Lane #	WB 1	NB 1
Volume Total (vph)	222	8
Volume Left (vph)	72	8
Volume Right (vph)	0	0
Hadj (s)	0.10	0.23
Departure Headway (s)	4.0	4.6
Degree Utilization, x	0.25	0.01
Capacity (veh/h)	889	737
Control Delay (s)	8.3	7.7
Approach Delay (s)	8.3	7.7
Approach LOS	A	A

Intersection Summary			
Delay	8.3		
HCM Level of Service	A		
Intersection Capacity Utilization	27.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	11	11	0	13	99	4	0	113	87	117	73	200
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	12	0	14	108	4	0	123	95	127	79	217

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	24	126	217	424
Volume Left (vph)	12	14	0	127
Volume Right (vph)	0	4	95	217
Hadj (s)	0.13	0.04	-0.23	-0.21
Departure Headway (s)	5.7	5.4	4.6	4.4
Degree Utilization, x	0.04	0.19	0.28	0.51
Capacity (veh/h)	542	595	747	795
Control Delay (s)	8.9	9.7	9.3	11.9
Approach Delay (s)	8.9	9.7	9.3	11.9
Approach LOS	A	A	A	B

Intersection Summary			
Delay	10.7		
HCM Level of Service	B		
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	198	0	0	1425	87
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	215	0	0	1549	95
Pedestrians	51					
Lane Width (ft)	12.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	4					
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1647	873	1694			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1647	873	1694			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	23	100			
cM capacity (veh/h)	86	281	357			

Direction, Lane #	EB 1	SB 1	SB 2
Volume Total	215	1033	611
Volume Left	0	0	0
Volume Right	215	0	95
cSH	281	1700	1700
Volume to Capacity	0.77	0.61	0.36
Queue Length 95th (ft)	144	0	0
Control Delay (s)	49.9	0.0	0.0
Lane LOS	E		
Approach Delay (s)	49.9	0.0	
Approach LOS	E		

Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	16	0	7	65	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	17	0	8	71	1
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	79	71	72			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	79	71	72			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	98	100			
cM capacity (veh/h)	924	991	1528			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	17	8	72
Volume Left	0	0	0
Volume Right	17	0	1
cSH	991	1528	1700
Volume to Capacity	0.02	0.00	0.04
Queue Length 95th (ft)	1	0	0
Control Delay (s)	8.7	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.7	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	13.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0	
Lane Util. Factor				1.00	1.00	
Frt				1.00	1.00	
Flt Protected				1.00	0.95	
Satd. Flow (prot)				1862	1770	
Flt Permitted				1.00	0.95	
Satd. Flow (perm)				1862	1770	
Volume (vph)	0	0	2	143	4	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	2	155	4	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	157	4	0
Turn Type			Perm			
Protected Phases				2	4	
Permitted Phases			2			
Actuated Green, G (s)				16.0	16.0	
Effective Green, g (s)				16.0	16.0	
Actuated g/C Ratio				0.40	0.40	
Clearance Time (s)				4.0	4.0	
Lane Grp Cap (vph)				745	708	
v/s Ratio Prot					c0.00	
v/s Ratio Perm				0.08		
v/c Ratio				0.21	0.01	
Uniform Delay, d1				7.9	7.2	
Progression Factor				1.00	1.00	
Incremental Delay, d2				0.6	0.0	
Delay (s)				8.5	7.2	
Level of Service				A	A	
Approach Delay (s)	0.0			8.5	7.2	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	8.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.11		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	17.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		
Lane Util. Factor				1.00		
Frt				1.00		
Flt Protected				1.00		
Satd. Flow (prot)				1862		
Flt Permitted				1.00		
Satd. Flow (perm)				1862		
Volume (vph)	0	0	1	204	0	0
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	1	222	0	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	223	0	0
Turn Type			Perm			
Protected Phases				2	4	
Permitted Phases			2			
Actuated Green, G (s)				16.0		
Effective Green, g (s)				16.0		
Actuated g/C Ratio				0.40		
Clearance Time (s)				4.0		
Lane Grp Cap (vph)				745		
v/s Ratio Prot						
v/s Ratio Perm				0.12		
v/c Ratio				0.30		
Uniform Delay, d1				8.2		
Progression Factor				1.00		
Incremental Delay, d2				1.0		
Delay (s)				9.2		
Level of Service				A		
Approach Delay (s)	0.0			9.2	0.0	
Approach LOS	A			A	A	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	24.0
Intersection Capacity Utilization	14.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	65	0	0	321	78
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	71	0	0	349	85
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	391	217	434			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	391	217	434			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	91	100			
cM capacity (veh/h)	585	788	1122			

Direction, Lane #	EB 1	SB 1	SB 2
Volume Total	71	233	201
Volume Left	0	0	0
Volume Right	71	0	85
cSH	788	1700	1700
Volume to Capacity	0.09	0.14	0.12
Queue Length 95th (ft)	7	0	0
Control Delay (s)	10.0	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.0	0.0	
Approach LOS	B		

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	22.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	0	0	34	245	7	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	37	266	8	0

Direction, Lane #	WB 1	NB 1
Volume Total (vph)	303	8
Volume Left (vph)	37	8
Volume Right (vph)	0	0
Hadj (s)	0.06	0.23
Departure Headway (s)	4.0	4.8
Degree Utilization, x	0.34	0.01
Capacity (veh/h)	898	701
Control Delay (s)	9.0	7.8
Approach Delay (s)	9.0	7.8
Approach LOS	A	A

Intersection Summary			
Delay	8.9		
HCM Level of Service	A		
Intersection Capacity Utilization	24.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	9	9	0	39	104	5	3	148	103	59	67	170
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)	10	10	0	42	113	5	3	161	112	64	73	185

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	20	161	276	322
Volume Left (vph)	10	42	3	64
Volume Right (vph)	0	5	112	185
Hadj (s)	0.13	0.07	-0.21	-0.27
Departure Headway (s)	5.7	5.4	4.6	4.5
Degree Utilization, x	0.03	0.24	0.35	0.40
Capacity (veh/h)	542	608	750	768
Control Delay (s)	8.9	10.0	10.0	10.4
Approach Delay (s)	8.9	10.0	10.0	10.4
Approach LOS	A	B	B	B

Intersection Summary			
Delay	10.2		
HCM Level of Service	B		
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	155	0	0	545	166
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	168	0	0	592	180
Pedestrians	67			67		
Lane Width (ft)	12.0			0.0		
Walking Speed (ft/s)	4.0			4.0		
Percent Blockage	6			0		
Right turn flare (veh)						
Median type	None					
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	750	520	840			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	750	520	840			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	64	100			
cM capacity (veh/h)	328	473	747			

Direction, Lane #	EB 1	SB 1	SB 2
Volume Total	168	395	378
Volume Left	0	0	0
Volume Right	168	0	180
cSH	473	1700	1700
Volume to Capacity	0.36	0.23	0.22
Queue Length 95th (ft)	40	0	0
Control Delay (s)	16.8	0.0	0.0
Lane LOS	C		
Approach Delay (s)	16.8	0.0	
Approach LOS	C		

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	42.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Volume (veh/h)	0	7	0	7	27	7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	8	0	8	29	8
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	41	33	37			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	41	33	37			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	971	1040	1574			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	8	8	37
Volume Left	0	0	0
Volume Right	8	0	8
cSH	1040	1574	1700
Volume to Capacity	0.01	0.00	0.02
Queue Length 95th (ft)	1	0	0
Control Delay (s)	8.5	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.5	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	9	244	2	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	10	265	2	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			0		285	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		285	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		100	100
cM capacity (veh/h)			1623		701	1085

Direction, Lane #	WB 1	NB 1
Volume Total	275	2
Volume Left	10	2
Volume Right	0	0
cSH	1623	701
Volume to Capacity	0.01	0.00
Queue Length 95th (ft)	0	0
Control Delay (s)	0.3	10.1
Lane LOS	A	B
Approach Delay (s)	0.3	10.1
Approach LOS		B

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	23.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Volume (veh/h)	0	0	4	279	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	4	303	0	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			0		312	0
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			0		312	0
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1623		679	1085

Direction, Lane #	WB 1	NB 1
Volume Total	308	0
Volume Left	4	0
Volume Right	0	0
cSH	1623	1700
Volume to Capacity	0.00	0.00
Queue Length 95th (ft)	0	0
Control Delay (s)	0.1	0.0
Lane LOS	A	A
Approach Delay (s)	0.1	0.0
Approach LOS		A

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	18.2%	ICU Level of Service	A
Analysis Period (min)	15		