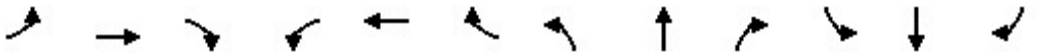


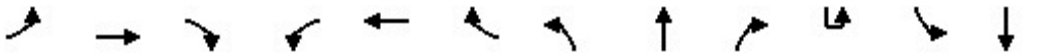
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	675	10	10	830	95	15	10	25	75	5	60
Future Volume (Veh/h)	30	675	10	10	830	95	15	10	25	75	5	60
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	30	675	10	10	830	95	15	10	25	75	5	60
Pedestrians		2			3			3			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)					236							
pX, platoon unblocked	0.91						0.91	0.91		0.91	0.91	0.91
vC, conflicting volume	928			688			1658	1691	686	1621	1601	835
vC1, stage 1 conf vol							743	743		853	853	
vC2, stage 2 conf vol							914	948		768	748	
vCu, unblocked vol	869			688			1674	1711	686	1633	1611	766
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			93	96	94	69	98	84
cM capacity (veh/h)	693			899			200	244	449	243	274	365

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	30	685	840	95	50	140
Volume Left	30	0	10	0	15	75
Volume Right	0	10	0	95	25	60
cSH	693	1700	899	1700	291	285
Volume to Capacity	0.04	0.40	0.01	0.06	0.17	0.49
Queue Length 95th (ft)	3	0	1	0	15	63
Control Delay (s)	10.4	0.0	0.3	0.0	19.9	29.2
Lane LOS	B		A		C	D
Approach Delay (s)	0.4		0.3		19.9	29.2
Approach LOS					C	D

Intersection Summary				
Average Delay	3.1			
Intersection Capacity Utilization	78.2%	ICU Level of Service	D	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	775	0	0	760	175	200
Future Volume (vph)	775	0	0	760	175	200
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Width	12	12	11	11	11	16
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3189			3083	1502	1553
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3189			3083	1502	1553
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	775	0	0	760	175	200
RTOR Reduction (vph)	0	0	0	0	0	45
Lane Group Flow (vph)	775	0	0	760	175	155
Confl. Peds. (#/hr)		2	2			1
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	3%	3%	3%	3%	7%	7%
Bus Blockages (#/hr)	6	6	6	6	0	0
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	147.0			147.0	28.0	28.0
Effective Green, g (s)	147.0			147.0	28.0	28.0
Actuated g/C Ratio	0.75			0.75	0.14	0.14
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2404			2324	215	222
v/s Ratio Prot	0.24			c0.25	c0.12	
v/s Ratio Perm						0.10
v/c Ratio	0.32			0.33	0.81	0.70
Uniform Delay, d1	7.8			7.8	81.0	79.5
Progression Factor	1.00			1.46	1.00	1.00
Incremental Delay, d2	0.4			0.2	20.5	9.1
Delay (s)	8.2			11.7	101.5	88.6
Level of Service	A			B	F	F
Approach Delay (s)	8.2			11.7	94.6	
Approach LOS	A			B	F	

Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	195.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	215	415	345	240	315	150	305	730	60	5	155	1130
Future Volume (vph)	215	415	345	240	315	150	305	730	60	5	155	1130
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	11	11	12	11	12	12	12	12	12	12	12	12
Total Lost time (s)	5.5	8.9	5.5	5.5	8.9		5.5	9.3	9.3		5.5	9.3
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00		1.00	0.95
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.93		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1560	3121	1427	2941	2963		1630	3260	1360		1614	3228
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1560	3121	1427	2941	2963		1630	3260	1360		1614	3228
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	215	415	345	240	315	150	305	730	60	5	155	1130
RTOR Reduction (vph)	0	0	40	0	30	0	0	0	36	0	0	0
Lane Group Flow (vph)	215	415	305	240	435	0	305	730	24	0	160	1130
Confl. Peds. (#/hr)			6			6			33			
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	3%	3%	6%	6%	6%	2%	2%	2%	3%	3%	3%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	Prot	NA
Protected Phases	7	4	5!	3	8		5	2		1	1	6
Permitted Phases			4						2			
Actuated Green, G (s)	28.0	44.4	77.9	20.1	36.5		33.5	77.4	77.4		23.9	67.8
Effective Green, g (s)	28.0	44.4	77.9	20.1	36.5		33.5	77.4	77.4		23.9	67.8
Actuated g/C Ratio	0.14	0.23	0.40	0.10	0.19		0.17	0.40	0.40		0.12	0.35
Clearance Time (s)	5.5	8.9	5.5	5.5	8.9		5.5	9.3	9.3		5.5	9.3
Vehicle Extension (s)	2.5	3.0	2.5	2.5	3.0		2.5	4.0	4.0		2.5	4.0
Lane Grp Cap (vph)	224	710	570	303	554		280	1293	539		197	1122
v/s Ratio Prot	c0.14	0.13	0.09	0.08	c0.15		c0.19	0.22			0.10	c0.35
v/s Ratio Perm			0.12						0.02			
v/c Ratio	0.96	0.58	0.54	0.79	0.79		1.09	0.56	0.04		0.81	1.01
Uniform Delay, d1	82.9	67.1	44.7	85.4	75.5		80.8	45.7	36.1		83.4	63.6
Progression Factor	1.00	0.99	0.77	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	46.8	1.2	0.7	12.8	7.2		79.7	1.8	0.2		21.4	28.6
Delay (s)	129.6	67.8	35.0	98.2	82.7		160.5	47.5	36.2		104.7	92.2
Level of Service	F	E	D	F	F		F	D	D		F	F
Approach Delay (s)		69.8			88.0			78.3				87.2
Approach LOS		E			F			E				F

Intersection Summary			
HCM 2000 Control Delay	81.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	195.0	Sum of lost time (s)	29.2
Intersection Capacity Utilization	108.0%	ICU Level of Service	G
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	140
Future Volume (vph)	140
Ideal Flow (vphpl)	1750
Lane Width	11
Total Lost time (s)	5.5
Lane Util. Factor	1.00
Frpb, ped/bikes	0.99
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1383
Flt Permitted	1.00
Satd. Flow (perm)	1383
Peak-hour factor, PHF	1.00
Adj. Flow (vph)	140
RTOR Reduction (vph)	48
Lane Group Flow (vph)	92
Confl. Peds. (#/hr)	1
Confl. Bikes (#/hr)	
Heavy Vehicles (%)	3%
Turn Type	pm+ov
Protected Phases	7
Permitted Phases	6
Actuated Green, G (s)	95.8
Effective Green, g (s)	95.8
Actuated g/C Ratio	0.49
Clearance Time (s)	5.5
Vehicle Extension (s)	2.5
Lane Grp Cap (vph)	679
v/s Ratio Prot	0.02
v/s Ratio Perm	0.05
v/c Ratio	0.14
Uniform Delay, d1	27.0
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	27.1
Level of Service	C
Approach Delay (s)	
Approach LOS	

Intersection Summary

32: Driveway/32nd Ave S & S 154th St Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	7.8	4.8	2.9	0.0	0.0	3.1	1.8	2.0	0.0	0.0	0.0	2.1
Total Del/Veh (s)	16.7	10.4	8.1	3.6	1.1	64.8	72.5	35.1	145.3	126.9	126.6	18.6

33: SR 518 WB Off-Ramp & S 154th St Performance by movement

Movement	EBT	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.0	1.2	3.7	0.6
Total Del/Veh (s)	29.9	26.2	45.2	28.8	29.8

37: SR 99 & S 154th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Denied Del/Veh (s)	0.1	0.0	0.2	7.5	3.8	4.3	131.5	128.7	116.1	0.0	0.0	0.0
Total Del/Veh (s)	135.3	50.6	40.3	116.6	91.3	53.4	461.8	80.5	16.9	127.6	118.9	94.2

37: SR 99 & S 154th St Performance by movement

Movement	SBR	All
Denied Del/Veh (s)	0.0	37.6
Total Del/Veh (s)	50.7	110.4

Total Network Performance

Denied Del/Veh (s)	167.9
Total Del/Veh (s)	148.4

Queuing and Blocking Report

Intersection: 32: Driveway/32nd Ave S & S 154th St

Movement	EB	EB	WB	WB	NB	SB	B545
Directions Served	L	TR	LT	R	LTR	LTR	T
Maximum Queue (ft)	206	262	81	21	107	234	223
Average Queue (ft)	34	135	6	1	41	155	70
95th Queue (ft)	129	299	40	10	92	277	279
Link Distance (ft)		224	190	190	108	151	499
Upstream Blk Time (%)	0	9	0		4	48	3
Queuing Penalty (veh)	0	0	0		0	0	0
Storage Bay Dist (ft)	200						
Storage Blk Time (%)		10					
Queuing Penalty (veh)		3					

Intersection: 33: SR 518 WB Off-Ramp & S 154th St

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	T	T	T	L	R
Maximum Queue (ft)	226	229	316	202	424	100
Average Queue (ft)	178	185	234	58	191	82
95th Queue (ft)	253	252	351	159	364	127
Link Distance (ft)	190	190	351	351	949	
Upstream Blk Time (%)	16	15	0			
Queuing Penalty (veh)	61	58	0			
Storage Bay Dist (ft)						25
Storage Blk Time (%)					51	39
Queuing Penalty (veh)					101	68

Queuing and Blocking Report

Intersection: 37: SR 99 & S 154th St

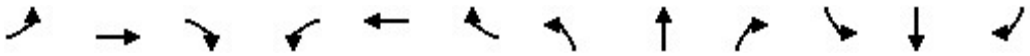
Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	TR	UL	T	T	R
Maximum Queue (ft)	323	399	357	359	224	275	447	420	1011	1018	993	825
Average Queue (ft)	269	266	204	253	136	206	279	245	874	742	660	117
95th Queue (ft)	379	441	335	388	242	307	456	403	1224	1302	1230	605
Link Distance (ft)		351	351	351			416	416	977	977	977	977
Upstream Blk Time (%)		11	0	2			7	2	53	39	3	1
Queuing Penalty (veh)		37	1	8			0	0	0	0	0	0
Storage Bay Dist (ft)	250				200	200						
Storage Blk Time (%)	30	3			1	12	28					
Queuing Penalty (veh)	62	5			2	19	67					

Intersection: 37: SR 99 & S 154th St

Movement	SB	SB	SB	SB	B36	B36
Directions Served	UL	T	T	R	T	T
Maximum Queue (ft)	260	391	392	175	436	433
Average Queue (ft)	209	362	363	100	402	401
95th Queue (ft)	330	378	379	235	419	427
Link Distance (ft)		285	285		383	383
Upstream Blk Time (%)		65	67		70	70
Queuing Penalty (veh)		0	0		0	0
Storage Bay Dist (ft)	200			100		
Storage Blk Time (%)	5	66	66	0		
Queuing Penalty (veh)	29	105	92	0		

Network Summary

Network wide Queuing Penalty: 720



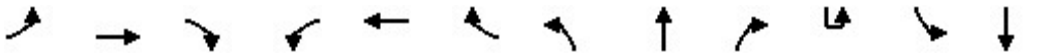
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	695	10	10	855	95	15	10	25	75	5	60
Future Volume (Veh/h)	30	695	10	10	855	95	15	10	25	75	5	60
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	30	695	10	10	855	95	15	10	25	75	5	60
Pedestrians		2			3			3			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)					236							
pX, platoon unblocked	0.90						0.90	0.90		0.90	0.90	0.90
vC, conflicting volume	953			708			1702	1736	706	1666	1646	860
vC1, stage 1 conf vol							763	763		878	878	
vC2, stage 2 conf vol							940	973		788	768	
vCu, unblocked vol	893			708			1725	1762	706	1684	1662	790
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	96			99			92	96	94	68	98	83
cM capacity (veh/h)	675			884			191	235	437	234	265	352

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	30	705	865	95	50	140
Volume Left	30	0	10	0	15	75
Volume Right	0	10	0	95	25	60
cSH	675	1700	884	1700	280	275
Volume to Capacity	0.04	0.41	0.01	0.06	0.18	0.51
Queue Length 95th (ft)	3	0	1	0	16	67
Control Delay (s)	10.6	0.0	0.3	0.0	20.6	31.0
Lane LOS	B		A		C	D
Approach Delay (s)	0.4		0.3		20.6	31.0
Approach LOS					C	D

Intersection Summary				
Average Delay	3.2			
Intersection Capacity Utilization	79.6%	ICU Level of Service	D	
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	795	0	0	755	205	200
Future Volume (vph)	795	0	0	755	205	200
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Width	12	12	11	11	11	16
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3189			3083	1502	1554
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3189			3083	1502	1554
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	795	0	0	755	205	200
RTOR Reduction (vph)	0	0	0	0	0	39
Lane Group Flow (vph)	795	0	0	755	205	161
Confl. Peds. (#/hr)		2	2			1
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	3%	3%	3%	3%	7%	7%
Bus Blockages (#/hr)	6	6	6	6	0	0
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	143.3			143.3	31.7	31.7
Effective Green, g (s)	143.3			143.3	31.7	31.7
Actuated g/C Ratio	0.73			0.73	0.16	0.16
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	2343			2265	244	252
v/s Ratio Prot	c0.25			0.24	c0.14	
v/s Ratio Perm						0.10
v/c Ratio	0.34			0.33	0.84	0.64
Uniform Delay, d1	9.1			9.1	79.2	76.3
Progression Factor	1.00			1.49	1.00	1.00
Incremental Delay, d2	0.4			0.3	22.1	5.5
Delay (s)	9.5			13.8	101.3	81.8
Level of Service	A			B	F	F
Approach Delay (s)	9.5			13.8	91.7	
Approach LOS	A			B	F	

Intersection Summary			
HCM 2000 Control Delay	28.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	195.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	215	425	355	240	325	150	290	750	55	5	155	1170
Future Volume (vph)	215	425	355	240	325	150	290	750	55	5	155	1170
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	11	11	12	11	12	12	12	12	12	12	12	12
Total Lost time (s)	5.5	8.9	5.5	5.5	8.9		5.5	9.3	9.3		5.5	9.3
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00		1.00	0.95
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.93		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1560	3121	1427	2941	2967		1630	3260	1360		1614	3228
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1560	3121	1427	2941	2967		1630	3260	1360		1614	3228
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	215	425	355	240	325	150	290	750	55	5	155	1170
RTOR Reduction (vph)	0	0	40	0	28	0	0	0	33	0	0	0
Lane Group Flow (vph)	215	425	315	240	447	0	290	750	22	0	160	1170
Confl. Peds. (#/hr)			6			6			33			
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	3%	3%	6%	6%	6%	2%	2%	2%	3%	3%	3%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	Prot	NA
Protected Phases	7	4	5!	3	8		5	2		1	1	6
Permitted Phases			4						2			
Actuated Green, G (s)	28.0	44.7	78.2	20.1	36.8		33.5	77.1	77.1		23.9	67.5
Effective Green, g (s)	28.0	44.7	78.2	20.1	36.8		33.5	77.1	77.1		23.9	67.5
Actuated g/C Ratio	0.14	0.23	0.40	0.10	0.19		0.17	0.40	0.40		0.12	0.35
Clearance Time (s)	5.5	8.9	5.5	5.5	8.9		5.5	9.3	9.3		5.5	9.3
Vehicle Extension (s)	2.5	3.0	2.5	2.5	3.0		2.5	4.0	4.0		2.5	4.0
Lane Grp Cap (vph)	224	715	572	303	559		280	1288	537		197	1117
v/s Ratio Prot	c0.14	0.14	0.09	0.08	c0.15		c0.18	0.23			0.10	c0.36
v/s Ratio Perm			0.13						0.02			
v/c Ratio	0.96	0.59	0.55	0.79	0.80		1.04	0.58	0.04		0.81	1.05
Uniform Delay, d1	82.9	67.1	44.9	85.4	75.6		80.8	46.3	36.2		83.4	63.8
Progression Factor	0.99	0.98	0.74	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	46.6	1.3	0.9	12.8	7.8		63.4	1.9	0.1		21.4	40.2
Delay (s)	128.5	67.3	34.2	98.2	83.4		144.1	48.2	36.4		104.7	104.0
Level of Service	F	E	C	F	F		F	D	D		F	F
Approach Delay (s)		68.7			88.4			73.0				96.8
Approach LOS		E			F			E				F

Intersection Summary			
HCM 2000 Control Delay	82.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	195.0	Sum of lost time (s)	29.2
Intersection Capacity Utilization	108.6%	ICU Level of Service	G
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	140
Future Volume (vph)	140
Ideal Flow (vphpl)	1750
Lane Width	11
Total Lost time (s)	5.5
Lane Util. Factor	1.00
Frpb, ped/bikes	0.99
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1383
Flt Permitted	1.00
Satd. Flow (perm)	1383
Peak-hour factor, PHF	1.00
Adj. Flow (vph)	140
RTOR Reduction (vph)	48
Lane Group Flow (vph)	92
Confl. Peds. (#/hr)	1
Confl. Bikes (#/hr)	
Heavy Vehicles (%)	3%
Turn Type	pm+ov
Protected Phases	7
Permitted Phases	6
Actuated Green, G (s)	95.5
Effective Green, g (s)	95.5
Actuated g/C Ratio	0.49
Clearance Time (s)	5.5
Vehicle Extension (s)	2.5
Lane Grp Cap (vph)	677
v/s Ratio Prot	0.02
v/s Ratio Perm	0.05
v/c Ratio	0.14
Uniform Delay, d1	27.2
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	27.3
Level of Service	C
Approach Delay (s)	
Approach LOS	

Intersection Summary

32: Driveway/32nd Ave S & S 154th St Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	15.4	12.9	14.2	0.0	0.0	2.8	3.2	3.4	0.0	0.0	0.0	5.5
Total Del/Veh (s)	15.5	13.1	8.6	3.3	1.1	92.4	99.6	68.0	194.4	183.2	179.1	23.2

33: SR 518 WB Off-Ramp & S 154th St Performance by movement

Movement	EBT	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.1	0.0	1.3	3.6	0.6
Total Del/Veh (s)	28.9	26.6	52.3	26.5	30.4

37: SR 99 & S 154th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Denied Del/Veh (s)	0.2	0.0	0.1	6.1	3.9	3.5	72.1	67.5	73.8	0.0	0.0	0.0
Total Del/Veh (s)	144.4	59.5	47.3	117.4	94.4	59.7	427.9	68.0	12.0	136.0	118.6	94.8

37: SR 99 & S 154th St Performance by movement

Movement	SBR	All
Denied Del/Veh (s)	0.0	20.3
Total Del/Veh (s)	51.9	107.4

Total Network Performance

Denied Del/Veh (s)	171.5
Total Del/Veh (s)	149.9

Intersection: 32: Driveway/32nd Ave S & S 154th St

Movement	EB	EB	WB	WB	NB	SB	B545
Directions Served	L	TR	LT	R	LTR	LTR	T
Maximum Queue (ft)	206	263	62	27	116	234	403
Average Queue (ft)	33	162	5	2	51	177	176
95th Queue (ft)	128	315	34	16	105	285	501
Link Distance (ft)		224	187	187	108	151	499
Upstream Blk Time (%)	0	15			8	64	14
Queuing Penalty (veh)	0	0			0	0	0
Storage Bay Dist (ft)	200						
Storage Blk Time (%)		15					
Queuing Penalty (veh)		5					

Intersection: 33: SR 518 WB Off-Ramp & S 154th St

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	T	T	T	L	R
Maximum Queue (ft)	221	221	354	186	516	100
Average Queue (ft)	177	186	248	72	247	77
95th Queue (ft)	242	239	367	173	443	134
Link Distance (ft)	187	187	376	376	903	
Upstream Blk Time (%)	17	20	0			
Queuing Penalty (veh)	67	79	1			
Storage Bay Dist (ft)						25
Storage Blk Time (%)					56	6
Queuing Penalty (veh)					111	13

Queuing and Blocking Report

Intersection: 37: SR 99 & S 154th St

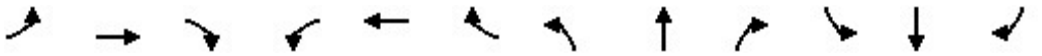
Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	TR	UL	T	T	R
Maximum Queue (ft)	344	405	376	429	234	275	450	424	1007	980	963	666
Average Queue (ft)	282	268	259	299	150	225	297	251	833	664	589	56
95th Queue (ft)	395	436	407	454	246	316	465	412	1184	1226	1145	388
Link Distance (ft)		376	376	376			416	416	973	973	973	973
Upstream Blk Time (%)		8	1	4			8	2	37	28	1	0
Queuing Penalty (veh)		26	2	14			0	0	0	0	0	0
Storage Bay Dist (ft)	270				200	200						
Storage Blk Time (%)	28	4			2	13	33					
Queuing Penalty (veh)	59	9			3	22	79					

Intersection: 37: SR 99 & S 154th St

Movement	SB	SB	SB	SB	B36	B36
Directions Served	UL	T	T	R	T	T
Maximum Queue (ft)	260	395	391	175	436	435
Average Queue (ft)	196	363	363	89	402	402
95th Queue (ft)	324	381	379	226	423	422
Link Distance (ft)		285	285		383	383
Upstream Blk Time (%)		65	67		70	70
Queuing Penalty (veh)		0	0		0	0
Storage Bay Dist (ft)	200			100		
Storage Blk Time (%)	5	66	67	0		
Queuing Penalty (veh)	31	106	93	1		

Network Summary

Network wide Queuing Penalty: 721



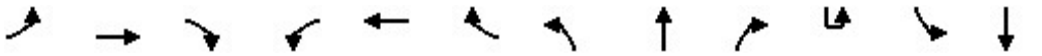
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	35	750	10	10	925	105	15	10	30	85	5	65
Future Volume (Veh/h)	35	750	10	10	925	105	15	10	30	85	5	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	35	750	10	10	925	105	15	10	30	85	5	65
Pedestrians		2			3			3			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)					236							
pX, platoon unblocked	0.82						0.82	0.82		0.82	0.82	0.82
vC, conflicting volume	1033			763			1842	1881	761	1806	1781	930
vC1, stage 1 conf vol							828	828		948	948	
vC2, stage 2 conf vol							1014	1053		858	833	
vCu, unblocked vol	931			763			1918	1965	761	1873	1843	805
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	94			99			90	95	93	58	98	79
cM capacity (veh/h)	595			843			153	199	407	203	234	314

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	35	760	935	105	55	155
Volume Left	35	0	10	0	15	85
Volume Right	0	10	0	105	30	65
cSH	595	1700	843	1700	248	239
Volume to Capacity	0.06	0.45	0.01	0.06	0.22	0.65
Queue Length 95th (ft)	5	0	1	0	21	100
Control Delay (s)	11.4	0.0	0.3	0.0	23.6	44.1
Lane LOS	B		A		C	E
Approach Delay (s)	0.5		0.3		23.6	44.1
Approach LOS					C	E

Intersection Summary				
Average Delay	4.3			
Intersection Capacity Utilization	84.7%	ICU Level of Service		E
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	865	0	0	845	195	220
Future Volume (vph)	865	0	0	845	195	220
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Width	12	12	11	11	11	16
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3189			3083	1502	1555
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3189			3083	1502	1555
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	865	0	0	845	195	220
RTOR Reduction (vph)	0	0	0	0	0	35
Lane Group Flow (vph)	865	0	0	845	195	185
Confl. Peds. (#/hr)		2	2			1
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	3%	3%	3%	3%	7%	7%
Bus Blockages (#/hr)	6	6	6	6	0	0
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	110.0			110.0	65.0	65.0
Effective Green, g (s)	110.0			110.0	65.0	65.0
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1798			1739	500	518
v/s Ratio Prot	0.27			c0.27	c0.13	
v/s Ratio Perm						0.12
v/c Ratio	0.48			0.49	0.39	0.36
Uniform Delay, d1	25.4			25.5	49.8	49.2
Progression Factor	1.00			0.91	1.00	1.00
Incremental Delay, d2	0.9			0.5	2.3	1.9
Delay (s)	26.4			23.7	52.1	51.1
Level of Service	C			C	D	D
Approach Delay (s)	26.4			23.7	51.6	
Approach LOS	C			C	D	

Intersection Summary			
HCM 2000 Control Delay	30.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	195.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	240	465	380	265	350	165	340	805	60	5	170	1255
Future Volume (vph)	240	465	380	265	350	165	340	805	60	5	170	1255
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	11	11	12	11	12	12	12	12	12	12	12	12
Total Lost time (s)	5.5	8.9	5.5	5.5	8.9		5.5	9.3	9.3		5.5	9.3
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00		1.00	0.95
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.93		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1560	3121	1427	2941	2965		1630	3260	1360		1614	3228
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1560	3121	1427	2941	2965		1630	3260	1360		1614	3228
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	240	465	380	265	350	165	340	805	60	5	170	1255
RTOR Reduction (vph)	0	0	39	0	30	0	0	0	37	0	0	0
Lane Group Flow (vph)	240	465	341	265	485	0	340	805	23	0	175	1255
Confl. Peds. (#/hr)			6			6			33			
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	3%	3%	6%	6%	6%	2%	2%	2%	3%	3%	3%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	Prot	NA
Protected Phases	7	4	5!	3	8		5	2		1	1	6
Permitted Phases			4						2			
Actuated Green, G (s)	28.5	45.1	78.6	21.1	37.7		33.5	74.3	74.3		25.3	66.1
Effective Green, g (s)	28.5	45.1	78.6	21.1	37.7		33.5	74.3	74.3		25.3	66.1
Actuated g/C Ratio	0.15	0.23	0.40	0.11	0.19		0.17	0.38	0.38		0.13	0.34
Clearance Time (s)	5.5	8.9	5.5	5.5	8.9		5.5	9.3	9.3		5.5	9.3
Vehicle Extension (s)	2.5	3.0	2.5	2.5	3.0		2.5	3.0	3.0		2.5	3.0
Lane Grp Cap (vph)	228	721	575	318	573		280	1242	518		209	1094
v/s Ratio Prot	c0.15	0.15	0.10	0.09	c0.16		c0.21	0.25			0.11	c0.39
v/s Ratio Perm			0.14						0.02			
v/c Ratio	1.05	0.64	0.59	0.83	0.85		1.21	0.65	0.04		0.84	1.15
Uniform Delay, d1	83.2	67.7	45.6	85.2	75.9		80.8	49.6	38.0		82.8	64.5
Progression Factor	0.96	0.96	1.53	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	71.3	1.8	1.2	16.6	11.1		124.6	2.6	0.2		23.9	77.2
Delay (s)	150.8	66.6	71.2	101.8	87.0		205.4	52.2	38.2		106.7	141.7
Level of Service	F	E	E	F	F		F	D	D		F	F
Approach Delay (s)		86.8			92.0			94.7				126.7
Approach LOS		F			F			F				F

Intersection Summary			
HCM 2000 Control Delay	103.3	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	195.0	Sum of lost time (s)	29.2
Intersection Capacity Utilization	116.7%	ICU Level of Service	H
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	155
Future Volume (vph)	155
Ideal Flow (vphpl)	1750
Lane Width	11
Total Lost time (s)	5.5
Lane Util. Factor	1.00
Frpb, ped/bikes	0.99
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1383
Flt Permitted	1.00
Satd. Flow (perm)	1383
Peak-hour factor, PHF	1.00
Adj. Flow (vph)	155
RTOR Reduction (vph)	49
Lane Group Flow (vph)	106
Confl. Peds. (#/hr)	1
Confl. Bikes (#/hr)	
Heavy Vehicles (%)	3%
Turn Type	pm+ov
Protected Phases	7
Permitted Phases	6
Actuated Green, G (s)	94.6
Effective Green, g (s)	94.6
Actuated g/C Ratio	0.49
Clearance Time (s)	5.5
Vehicle Extension (s)	2.5
Lane Grp Cap (vph)	670
v/s Ratio Prot	0.02
v/s Ratio Perm	0.05
v/c Ratio	0.16
Uniform Delay, d1	28.0
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	28.1
Level of Service	C
Approach Delay (s)	
Approach LOS	

Intersection Summary

32: Driveway/32nd Ave S & S 154th St Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	128.4	135.2	136.0	0.0	0.0	37.1	55.7	40.8	0.0	0.0	0.0	60.0
Total Del/Veh (s)	25.9	24.9	19.7	4.7	1.1	128.9	154.0	126.6	224.0	184.7	190.3	31.8

33: SR 518 WB Off-Ramp & S 154th St Performance by movement

Movement	EBT	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.3	0.0	1.4	3.7	0.7
Total Del/Veh (s)	39.4	36.5	59.2	34.0	39.8

37: SR 99 & S 154th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Denied Del/Veh (s)	4.7	0.6	1.6	49.7	48.8	49.1	279.9	275.8	284.6	0.0	0.0	0.0
Total Del/Veh (s)	208.6	83.5	33.1	147.7	128.8	98.9	533.0	112.3	36.9	166.7	117.8	96.1

37: SR 99 & S 154th St Performance by movement

Movement	SBR	All
Denied Del/Veh (s)	0.0	91.6
Total Del/Veh (s)	51.3	136.9

Total Zone Performance

Denied Del/Veh (s)	315.1
Total Del/Veh (s)	531.1

Queuing and Blocking Report

Intersection: 32: Driveway/32nd Ave S & S 154th St

Movement	EB	EB	WB	WB	NB	SB	B545
Directions Served	L	TR	LT	R	LTR	LTR	T
Maximum Queue (ft)	223	276	108	48	121	239	438
Average Queue (ft)	61	202	10	3	66	194	202
95th Queue (ft)	200	338	57	23	130	280	541
Link Distance (ft)		224	180	180	108	151	499
Upstream Blk Time (%)	0	39	0		23	74	22
Queuing Penalty (veh)	0	0	0		0	0	0
Storage Bay Dist (ft)	200						
Storage Blk Time (%)		39					
Queuing Penalty (veh)		14					

Intersection: 33: SR 518 WB Off-Ramp & S 154th St

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	T	T	T	L	R
Maximum Queue (ft)	212	211	334	215	620	100
Average Queue (ft)	182	186	263	103	280	78
95th Queue (ft)	228	228	324	210	558	134
Link Distance (ft)	180	180	381	381	1087	
Upstream Blk Time (%)	30	29				
Queuing Penalty (veh)	131	127				
Storage Bay Dist (ft)						25
Storage Blk Time (%)					56	14
Queuing Penalty (veh)					122	28

Queuing and Blocking Report

Intersection: 37: SR 99 & S 154th St

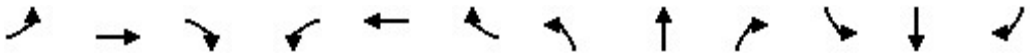
Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	TR	UL	T	T	R
Maximum Queue (ft)	345	433	414	440	237	275	458	455	1071	1063	1055	1044
Average Queue (ft)	315	350	300	265	154	240	373	340	993	917	849	276
95th Queue (ft)	407	499	464	469	265	337	528	499	1219	1366	1341	990
Link Distance (ft)		381	381	381			416	416	1028	1028	1028	1028
Upstream Blk Time (%)		24	7	6			32	17	67	51	13	5
Queuing Penalty (veh)		88	24	23			0	0	0	0	0	0
Storage Bay Dist (ft)	270				200	200						
Storage Blk Time (%)	63	14			4	21	55					
Queuing Penalty (veh)	146	33			7	36	146					

Intersection: 37: SR 99 & S 154th St

Movement	SB	SB	SB	SB	B36	B36
Directions Served	UL	T	T	R	T	T
Maximum Queue (ft)	260	388	393	175	437	438
Average Queue (ft)	196	361	363	89	403	403
95th Queue (ft)	325	375	380	227	421	422
Link Distance (ft)		285	285		383	383
Upstream Blk Time (%)		66	68		71	72
Queuing Penalty (veh)		0	0		0	0
Storage Bay Dist (ft)	200			100		
Storage Blk Time (%)	4	66	67	0		
Queuing Penalty (veh)	26	115	103	1		

Zone Summary

Zone wide Queuing Penalty: 1172



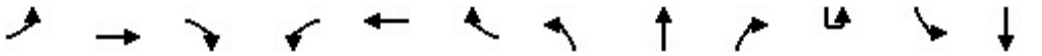
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	30	775	10	10	950	105	15	10	30	85	5	65
Future Volume (Veh/h)	30	775	10	10	950	105	15	10	30	85	5	65
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	30	775	10	10	950	105	15	10	30	85	5	65
Pedestrians		2			3			3			3	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		TWLTL			None							
Median storage veh)		2										
Upstream signal (ft)					236							
pX, platoon unblocked	0.82						0.82	0.82		0.82	0.82	0.82
vC, conflicting volume	1058			788			1882	1921	786	1846	1821	955
vC1, stage 1 conf vol							843	843		973	973	
vC2, stage 2 conf vol							1040	1078		873	848	
vCu, unblocked vol	962			788			1966	2012	786	1921	1891	837
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	95			99			90	95	92	57	98	78
cM capacity (veh/h)	580			825			149	196	393	197	228	301

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	30	785	960	105	55	155
Volume Left	30	0	10	0	15	85
Volume Right	0	10	0	105	30	65
cSH	580	1700	825	1700	241	232
Volume to Capacity	0.05	0.46	0.01	0.06	0.23	0.67
Queue Length 95th (ft)	4	0	1	0	21	105
Control Delay (s)	11.5	0.0	0.4	0.0	24.3	47.3
Lane LOS	B		A		C	E
Approach Delay (s)	0.4		0.3		24.3	47.3
Approach LOS					C	E

Intersection Summary				
Average Delay	4.5			
Intersection Capacity Utilization	86.1%	ICU Level of Service		E
Analysis Period (min)	15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	890	0	0	840	225	220
Future Volume (vph)	890	0	0	840	225	220
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750
Lane Width	12	12	11	11	11	16
Total Lost time (s)	5.0			5.0	5.0	5.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frpb, ped/bikes	1.00			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	1.00			1.00	1.00	0.85
Flt Protected	1.00			1.00	0.95	1.00
Satd. Flow (prot)	3189			3083	1502	1555
Flt Permitted	1.00			1.00	0.95	1.00
Satd. Flow (perm)	3189			3083	1502	1555
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	890	0	0	840	225	220
RTOR Reduction (vph)	0	0	0	0	0	31
Lane Group Flow (vph)	890	0	0	840	225	189
Confl. Peds. (#/hr)		2	2			1
Confl. Bikes (#/hr)		1				
Heavy Vehicles (%)	3%	3%	3%	3%	7%	7%
Bus Blockages (#/hr)	6	6	6	6	0	0
Turn Type	NA			NA	Prot	Perm
Protected Phases	4			8	2	
Permitted Phases						2
Actuated Green, G (s)	110.0			110.0	65.0	65.0
Effective Green, g (s)	110.0			110.0	65.0	65.0
Actuated g/C Ratio	0.56			0.56	0.33	0.33
Clearance Time (s)	5.0			5.0	5.0	5.0
Vehicle Extension (s)	3.0			3.0	3.0	3.0
Lane Grp Cap (vph)	1798			1739	500	518
v/s Ratio Prot	c0.28			0.27	c0.15	
v/s Ratio Perm						0.12
v/c Ratio	0.49			0.48	0.45	0.37
Uniform Delay, d1	25.7			25.5	51.0	49.3
Progression Factor	1.00			0.92	1.00	1.00
Incremental Delay, d2	1.0			0.5	2.9	2.0
Delay (s)	26.7			23.9	53.9	51.3
Level of Service	C			C	D	D
Approach Delay (s)	26.7			23.9	52.6	
Approach LOS	C			C	D	

Intersection Summary			
HCM 2000 Control Delay	30.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	195.0	Sum of lost time (s)	15.0
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Lane Configurations												
Traffic Volume (vph)	245	475	390	265	360	165	325	830	65	5	170	1300
Future Volume (vph)	245	475	390	265	360	165	325	830	65	5	170	1300
Ideal Flow (vphpl)	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750	1750
Lane Width	11	11	12	11	12	12	12	12	12	12	12	12
Total Lost time (s)	5.5	8.9	5.5	5.5	8.9		5.5	9.3	9.3		5.5	9.3
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		1.00	0.95	1.00		1.00	0.95
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.93		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85		1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1560	3121	1427	2941	2968		1630	3260	1360		1614	3228
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1560	3121	1427	2941	2968		1630	3260	1360		1614	3228
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	245	475	390	265	360	165	325	830	65	5	170	1300
RTOR Reduction (vph)	0	0	40	0	28	0	0	0	40	0	0	0
Lane Group Flow (vph)	245	475	350	265	497	0	325	830	25	0	175	1300
Confl. Peds. (#/hr)			6			6			33			
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	3%	3%	6%	6%	6%	2%	2%	2%	3%	3%	3%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA	Perm	Prot	Prot	NA
Protected Phases	7	4	5!	3	8		5	2		1	1	6
Permitted Phases			4						2			
Actuated Green, G (s)	26.5	43.4	76.9	21.1	38.0		33.5	76.0	76.0		25.3	67.8
Effective Green, g (s)	26.5	43.4	76.9	21.1	38.0		33.5	76.0	76.0		25.3	67.8
Actuated g/C Ratio	0.14	0.22	0.39	0.11	0.19		0.17	0.39	0.39		0.13	0.35
Clearance Time (s)	5.5	8.9	5.5	5.5	8.9		5.5	9.3	9.3		5.5	9.3
Vehicle Extension (s)	2.5	3.0	2.5	2.5	3.0		2.5	3.0	3.0		2.5	3.0
Lane Grp Cap (vph)	212	694	562	318	578		280	1270	530		209	1122
v/s Ratio Prot	c0.16	c0.15	0.11	0.09	c0.17		c0.20	0.25			0.11	c0.40
v/s Ratio Perm			0.14						0.02			
v/c Ratio	1.16	0.68	0.62	0.83	0.86		1.16	0.65	0.05		0.84	1.16
Uniform Delay, d1	84.2	69.5	47.4	85.2	75.9		80.8	48.7	37.0		82.8	63.6
Progression Factor	0.95	0.96	1.49	1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	107.2	2.5	1.7	16.6	12.1		104.5	2.6	0.2		23.9	81.6
Delay (s)	187.6	69.2	72.4	101.8	88.1		185.2	51.3	37.2		106.7	145.2
Level of Service	F	E	E	F	F		F	D	D		F	F
Approach Delay (s)		96.4			92.7			86.3				130.0
Approach LOS		F			F			F				F

Intersection Summary			
HCM 2000 Control Delay	104.7	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	195.0	Sum of lost time (s)	29.2
Intersection Capacity Utilization	117.7%	ICU Level of Service	H
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

Movement	SBR
Lane Configurations	
Traffic Volume (vph)	155
Future Volume (vph)	155
Ideal Flow (vphpl)	1750
Lane Width	11
Total Lost time (s)	5.5
Lane Util. Factor	1.00
Frpb, ped/bikes	0.99
Flpb, ped/bikes	1.00
Frt	0.85
Flt Protected	1.00
Satd. Flow (prot)	1383
Flt Permitted	1.00
Satd. Flow (perm)	1383
Peak-hour factor, PHF	1.00
Adj. Flow (vph)	155
RTOR Reduction (vph)	49
Lane Group Flow (vph)	106
Confl. Peds. (#/hr)	1
Confl. Bikes (#/hr)	
Heavy Vehicles (%)	3%
Turn Type	pm+ov
Protected Phases	7
Permitted Phases	6
Actuated Green, G (s)	94.3
Effective Green, g (s)	94.3
Actuated g/C Ratio	0.48
Clearance Time (s)	5.5
Vehicle Extension (s)	2.5
Lane Grp Cap (vph)	668
v/s Ratio Prot	0.02
v/s Ratio Perm	0.06
v/c Ratio	0.16
Uniform Delay, d1	28.2
Progression Factor	1.00
Incremental Delay, d2	0.1
Delay (s)	28.2
Level of Service	C
Approach Delay (s)	
Approach LOS	

Intersection Summary

32: Driveway/32nd Ave S & S 154th St Performance by movement

Movement	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	365.9	369.8	362.4	0.0	0.0	214.9	188.9	190.8	0.0	0.0	0.0	165.1
Total Del/Veh (s)	30.9	38.8	26.3	4.4	1.0	189.0	144.3	245.7	280.4	273.3	244.2	40.8

33: SR 518 WB Off-Ramp & S 154th St Performance by movement

Movement	EBT	WBT	NBL	NBR	All
Denied Del/Veh (s)	0.5	0.1	1.6	3.7	0.9
Total Del/Veh (s)	56.2	36.5	49.9	28.5	44.4

37: SR 99 & S 154th St Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT
Denied Del/Veh (s)	6.2	0.6	1.4	95.0	95.1	96.0	336.0	343.4	330.3	0.0	0.0	0.0
Total Del/Veh (s)	254.1	95.5	36.1	163.3	140.1	106.2	458.7	79.7	16.7	106.8	117.5	93.8

37: SR 99 & S 154th St Performance by movement

Movement	SBR	All
Denied Del/Veh (s)	0.0	123.2
Total Del/Veh (s)	49.9	131.1

Total Zone Performance

Denied Del/Veh (s)	374.8
Total Del/Veh (s)	536.0

Intersection: 32: Driveway/32nd Ave S & S 154th St

Movement	EB	EB	WB	WB	NB	SB	B545
Directions Served	L	TR	T	R	LTR	LTR	T
Maximum Queue (ft)	224	270	137	53	120	238	526
Average Queue (ft)	59	227	14	5	80	206	325
95th Queue (ft)	200	318	70	28	145	273	672
Link Distance (ft)		224	181	181	108	151	499
Upstream Blk Time (%)	0	59	0		40	85	42
Queuing Penalty (veh)	0	0	0		0	0	0
Storage Bay Dist (ft)	200						
Storage Blk Time (%)	0	58					
Queuing Penalty (veh)	0	17					

Intersection: 33: SR 518 WB Off-Ramp & S 154th St

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	T	T	T	L	R
Maximum Queue (ft)	210	216	332	218	602	100
Average Queue (ft)	188	190	264	100	286	75
95th Queue (ft)	220	223	321	209	537	138
Link Distance (ft)	181	181	376	376	948	
Upstream Blk Time (%)	40	39			0	
Queuing Penalty (veh)	178	172			0	
Storage Bay Dist (ft)						25
Storage Blk Time (%)					51	7
Queuing Penalty (veh)					112	16

Intersection: 37: SR 99 & S 154th St

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	L	T	TR	UL	T	T	R
Maximum Queue (ft)	345	432	410	433	237	275	465	448	866	861	843	802
Average Queue (ft)	334	380	324	269	162	247	390	359	823	782	678	118
95th Queue (ft)	377	474	466	484	268	337	527	509	921	1031	1027	560
Link Distance (ft)		376	376	376			416	416	822	822	822	822
Upstream Blk Time (%)		31	9	8			44	21	75	51	4	1
Queuing Penalty (veh)		116	34	30			0	0	0	0	0	0
Storage Bay Dist (ft)	270				200	200						
Storage Blk Time (%)	72	19			5	23	61					
Queuing Penalty (veh)	170	47			9	41	161					

Intersection: 37: SR 99 & S 154th St

Movement	SB	SB	SB	SB	B36	B36
Directions Served	UL	T	T	R	T	T
Maximum Queue (ft)	260	389	389	175	435	432
Average Queue (ft)	196	362	363	94	403	403
95th Queue (ft)	326	376	377	233	421	420
Link Distance (ft)		285	285		383	383
Upstream Blk Time (%)		65	68		70	72
Queuing Penalty (veh)		0	0		0	0
Storage Bay Dist (ft)	200			100		
Storage Blk Time (%)	5	66	66	0		
Queuing Penalty (veh)	31	115	102	0		

Zone Summary

Zone wide Queuing Penalty: 1350

LANE SUMMARY

Site: 33 [33-S 154th St @ SR 518 WB Off Ramp (Site Folder: 2032 NA Mit)]

Network: N101 [2032 NA MIT Network 3 (Network Folder: Network 3)]

S 154th St @ SR 518 WB Off Ramp
Site Category: 2032 No Action
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: SR 518 WB Off Ramp															
Lane 1[d]	375	7.0	375	7.0	289	1.300	100	190.2	LOS F	40.0	1057.3	Full	1600	-28.0[N3]	0.0
Approach	375	7.0	375	7.0		1.300		190.2	LOS F	40.0	1057.3				
East: S 154th St															
Lane 1[d]	760	3.0	752	3.0	931	0.808	100	21.9	LOS C	16.6	425.2	Full	475	0.0	1.8
Approach	760	3.0	752[N1]	3.0		0.808		21.9	LOS C	16.6	425.2				
West: S 154th St															
Lane 1[d]	775	3.0	747	3.1	678	1.101	100	86.8	LOS F	24.3[N4]	621.3[N4]	Full	250	-42.2[N3]	49.9
Approach	775	3.0	747[N1]	3.1		1.101		86.8	LOS F	24.3	621.3				
Intersection	1910	3.8	1874[N1]	3.9		1.300		81.4	LOS F	40.0	1057.3				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.
N4 Average back of queue has been restricted to the available queue storage space.

Approach Lane Flows (veh/h)

South: SR 518 WB Off Ramp

Mov. From S To Exit:	L2 W	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	175	200	375	7.0	289	1.300	100	NA	NA
Approach	175	200	375	7.0		1.300			

East: S 154th St

Mov. From E To Exit:	T1 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	752	752	3.0	931	0.808	100	NA	NA
Approach	752	752	3.0		0.808			

West: S 154th St

Mov. From W To Exit:	T1 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	747	747	3.1	678	1.101	100	NA	NA
Approach	747	747	3.1		1.101			

	Total	%HV	Deg.Satn (v/c)
Intersection	1874	3.9	1.300

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
East Exit: S 154th St Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
West Exit: S 154th St Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

LANE SUMMARY

Site: 33 [33-S 154th St @ SR 518 WB Off Ramp (Site Folder: 2032 PA Mit)]

Network: N101 [2032 PA MIT Network 3 (Network Folder: Network 3)]

Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: SR 518 WB Off Ramp															
Lane 1[d]	405	7.0	405	7.0	287	1.410	100	235.2	LOS F	50.2	1325.7	Full	1600	-24.2[N3]	0.0
Approach	405	7.0	405	7.0		1.410		235.2	LOS F	50.2	1325.7				
East: S 154th St															
Lane 1[d]	755	3.0	755	3.0	921	0.820	100	23.0	LOS C	18.4	470.7	Full	475	0.0	4.7
Approach	755	3.0	755	3.0		0.820		23.0	LOS C	18.4	470.7				
West: S 154th St															
Lane 1[d]	795	3.0	764	3.1	712	1.073	100	76.5	LOS F	24.3[N4]	621.3[N4]	Full	250	-39.3[N3]	49.9
Approach	795	3.0	764[N1]	3.1		1.073		76.5	LOS E	24.3	621.3				
Intersection	1955	3.8	1924[N1]	3.9		1.410		88.9	LOS F	50.2	1325.7				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.
N4 Average back of queue has been restricted to the available queue storage space.

Approach Lane Flows (veh/h)

South: SR 518 WB Off Ramp

Mov. From S To Exit:	L2 W	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	205	200	405	7.0	287	1.410	100	NA	NA
Approach	205	200	405	7.0		1.410			

East: S 154th St

Mov. From E To Exit:	T1 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	755	755	3.0	921	0.820	100	NA	NA
Approach	755	755	3.0		0.820			

West: S 154th St

Mov. From W To Exit:	T1 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	764	764	3.1	712	1.073	100	NA	NA
Approach	764	764	3.1		1.073			

	Total	%HV	Deg.Satn (v/c)
Intersection	1924	3.9	1.410

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
East Exit: S 154th St Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
West Exit: S 154th St Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

LANE SUMMARY

Site: 33 [33-S 154th St @ SR 518 WB Off Ramp (Site Folder: 2037 NA Mit)]

Network: N101 [2037 NA MIT Network 3 (Network Folder: Network 3)]

S 154th St @ SR 518 WB Off Ramp
Site Category: 2037 No Action
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: SR 518 WB Off Ramp															
Lane 1[d]	415	7.0	415	7.0	325	1.279	100	176.6	LOS F	41.7	1100.2	Full	1600	-34.6[N3]	0.0
Approach	415	7.0	415	7.0		1.279		176.6	LOS F	41.7	1100.2				
East: S 154th St															
Lane 1[d]	845	3.0	796	3.0	1022	0.779	100	18.6	LOS B	13.9	355.0	Full	475	0.0	0.0
Approach	845	3.0	796[N1]	3.0		0.779		18.6	LOS B	13.9	355.0				
West: S 154th St															
Lane 1[d]	865	3.0	818	3.1	645	1.268	100	150.9	LOS F	24.2[N4]	621.3[N4]	Full	250	-50.0[N3]	49.9
Approach	865	3.0	818[N1]	3.1		1.268		150.9	LOS F	24.2	621.3				
Intersection	2125	3.8	2029[N1]	4.0		1.279		104.2	LOS F	41.7	1100.2				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.
N4 Average back of queue has been restricted to the available queue storage space.

Approach Lane Flows (veh/h)

South: SR 518 WB Off Ramp

Mov. From S To Exit:	L2 W	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	195	220	415	7.0	325	1.279	100	NA	NA
Approach	195	220	415	7.0		1.279			

East: S 154th St

Mov. From E To Exit:	T1 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	796	796	3.0	1022	0.779	100	NA	NA
Approach	796	796	3.0		0.779			

West: S 154th St

Mov. From W To Exit:	T1 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	818	818	3.1	645	1.268	100	NA	NA
Approach	818	818	3.1		1.268			

	Total	%HV	Deg.Satn (v/c)
Intersection	2029	4.0	1.279

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
East Exit: S 154th St Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
West Exit: S 154th St Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

LANE SUMMARY

Site: 33 [33-S 154th St @ SR 518 WB Off Ramp (Site Folder: 2037 PA Mit)]

Network: N101 [2037 PA MIT Network 3 (Network Folder: Network 3)]

Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	ARRIVAL FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: SR 518 WB Off Ramp															
Lane 1[d]	445	7.0	445	7.0	332	1.339	100	199.7	LOS F	48.9	1291.0	Full	1600	-33.1[N3]	0.0
Approach	445	7.0	445	7.0		1.339		199.7	LOS F	48.9	1291.0				
East: S 154th St															
Lane 1[d]	840	3.0	786	3.0	1005	0.782	100	19.0	LOS B	14.7	376.9	Full	475	0.0	0.0
Approach	840	3.0	786[N1]	3.0		0.782		19.0	LOS B	14.7	376.9				
West: S 154th St															
Lane 1[d]	890	3.0	840	3.1	645	1.303	100	165.0	LOS F	24.2[N4]	621.3[N4]	Full	250	-50.0[N3]	49.9
Approach	890	3.0	840[N1]	3.1		1.303		165.0	LOS F	24.2	621.3				
Intersection	2175	3.8	2071[N1]	4.0		1.339		117.1	LOS F	48.9	1291.0				

Site Level of Service (LOS) Method: Delay & Degree of Saturation (SIDRA). Site LOS Method is specified in the Network Data dialog (Network tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach
N1 Arrival Flow value is reduced due to capacity constraint at oversaturated upstream lanes.
N3 Capacity Adjustment due to downstream lane blockage determined by the program.
N4 Average back of queue has been restricted to the available queue storage space.

Approach Lane Flows (veh/h)

South: SR 518 WB Off Ramp

Mov. From S To Exit:	L2 W	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	225	220	445	7.0	332	1.339	100	NA	NA
Approach	225	220	445	7.0		1.339			

East: S 154th St

Mov. From E To Exit:	T1 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	786	786	3.0	1005	0.782	100	NA	NA
Approach	786	786	3.0		0.782			

West: S 154th St

Mov. From W To Exit:	T1 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.

Lane 1	840	840	3.1		645	1.303	100	NA	NA
Approach	840	840	3.1			1.303			

	Total	%HV	Deg.Satn (v/c)
Intersection	2071	4.0	1.339

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h	Opposing Flow Rate pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
East Exit: S 154th St Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										
West Exit: S 154th St Merge Type: **Not Applied**												
Full Length Lane	1	Merge Analysis not applied.										

LANE SUMMARY

Site: 33 [33-S 154th St @ SR 518 WB Off Ramp (Site Folder: 2032 NA Mit)]

S 154th St @ SR 518 WB Off Ramp
Site Category: 2032 No Action
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: SR 518 WB Off Ramp													
Lane 1[d]	375	7.0	471	0.796	100	32.5	LOS C	10.0	264.6	Full	1600	0.0	0.0
Approach	375	7.0		0.796		32.5	LOS C	10.0	264.6				
East: S 154th St													
Lane 1[d]	760	3.0	897	0.847	100	11.6	LOS B	17.0	436.4	Full	475	0.0	2.6
Approach	760	3.0		0.847		11.6	LOS B	17.0	436.4				
West: S 154th St													
Lane 1[d]	775	3.0	1174	0.660	100	2.6	LOS A	0.0	0.0	Full	250	0.0	0.0
Approach	775	3.0		0.660		2.6	LOS A	0.0	0.0				
Intersection	1910	3.8		0.847		12.1	LOS B	17.0	436.4				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: SR 518 WB Off Ramp

Mov. From S To Exit:	L2 W	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	175	200	375	7.0	471	0.796	100	NA	NA
Approach	175	200	375	7.0		0.796			

East: S 154th St

Mov. From E To Exit:	T1 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	760	760	3.0	897	0.847	100	NA	NA
Approach	760	760	3.0		0.847			

West: S 154th St

Mov. From W To Exit:	T1 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	775	775	3.0	1174	0.660	100	NA	NA
Approach	775	775	3.0		0.660			

	Total	%HV	Deg.Satn (v/c)
Intersection	1910	3.8	0.847

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
East Exit: S 154th St Merge Type: **Not Applied**											
Full Length Lane	1	Merge Analysis not applied.									
West Exit: S 154th St Merge Type: **Not Applied**											
Full Length Lane	1	Merge Analysis not applied.									

LANE SUMMARY

Site: 33 [33-S 154th St @ SR 518 WB Off Ramp (Site Folder: 2032 PA Mit)]

Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: SR 518 WB Off Ramp													
Lane 1[d]	405	7.0	462	0.877	100	42.6	LOS D	13.7	361.0	Full	1600	0.0	0.0
Approach	405	7.0		0.877		42.6	LOS D	13.7	361.0				
East: S 154th St													
Lane 1[d]	755	3.0	862	0.875	100	14.7	LOS B	19.2	490.7	Full	475	0.0	6.0
Approach	755	3.0		0.875		14.7	LOS B	19.2	490.7				
West: S 154th St													
Lane 1[d]	795	3.0	1174	0.677	100	2.6	LOS A	0.0	0.0	Full	250	0.0	0.0
Approach	795	3.0		0.677		2.6	LOS A	0.0	0.0				
Intersection	1955	3.8		0.877		15.6	LOS B	19.2	490.7				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: SR 518 WB Off Ramp

Mov. From S To Exit:	L2 W	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	205	200	405	7.0	462	0.877	100	NA	NA
Approach	205	200	405	7.0		0.877			

East: S 154th St

Mov. From E To Exit:	T1 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	755	755	3.0	862	0.875	100	NA	NA
Approach	755	755	3.0		0.875			

West: S 154th St

Mov. From W To Exit:	T1 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	795	795	3.0	1174	0.677	100	NA	NA
Approach	795	795	3.0		0.677			

	Total	%HV	Deg.Satn (v/c)
Intersection	1955	3.8	0.877

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
East Exit: S 154th St Merge Type: **Not Applied**											
Full Length Lane	1	Merge Analysis not applied.									
West Exit: S 154th St Merge Type: **Not Applied**											
Full Length Lane	1	Merge Analysis not applied.									

LANE SUMMARY

Site: 33 [33-S 154th St @ SR 518 WB Off Ramp (Site Folder: 2037 NA Mit)]

S 154th St @ SR 518 WB Off Ramp
Site Category: 2037 No Action
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: SR 518 WB Off Ramp													
Lane 1[d]	415	7.0	511	0.811	100	34.8	LOS C	11.5	303.0	Full	1600	0.0	0.0
Approach	415	7.0		0.811		34.8	LOS C	11.5	303.0				
East: S 154th St													
Lane 1[d]	845	3.0	985	0.858	100	11.4	LOS B	18.0	460.9	Full	475	0.0	4.1
Approach	845	3.0		0.858		11.4	LOS B	18.0	460.9				
West: S 154th St													
Lane 1[d]	865	3.0	1292	0.670	100	2.6	LOS A	0.0	0.0	Full	250	0.0	0.0
Approach	865	3.0		0.670		2.6	LOS A	0.0	0.0				
Intersection	2125	3.8		0.858		12.4	LOS B	18.0	460.9				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: SR 518 WB Off Ramp

Mov. From S To Exit:	L2 W	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	195	220	415	7.0	511	0.811	100	NA	NA
Approach	195	220	415	7.0		0.811			

East: S 154th St

Mov. From E To Exit:	T1 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	845	845	3.0	985	0.858	100	NA	NA
Approach	845	845	3.0		0.858			

West: S 154th St

Mov. From W To Exit:	T1 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	865	865	3.0	1292	0.670	100	NA	NA
Approach	865	865	3.0		0.670			

	Total	%HV	Deg.Satn (v/c)
Intersection	2125	3.8	0.858

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
East Exit: S 154th St Merge Type: **Not Applied**											
Full Length Lane	1	Merge Analysis not applied.									
West Exit: S 154th St Merge Type: **Not Applied**											
Full Length Lane	1	Merge Analysis not applied.									

LANE SUMMARY

Site: 33 [33-S 154th St @ SR 518 WB Off Ramp (Site Folder: 2037 PA Mit)]

Site Category: (None)
Roundabout

Lane Use and Performance

	DEMAND FLOWS [Total veh/h	HV] %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh	Dist] ft	Lane Config	Lane Length ft	Cap. Adj. %	Prob. Block. %
South: SR 518 WB Off Ramp													
Lane 1[d]	445	7.0	499	0.893	100	46.5	LOS D	15.8	417.7	Full	1600	0.0	0.0
Approach	445	7.0		0.893		46.5	LOS D	15.8	417.7				
East: S 154th St													
Lane 1[d]	840	3.0	951	0.883	100	14.2	LOS B	20.1	513.9	Full	475	0.0	7.4
Approach	840	3.0		0.883		14.2	LOS B	20.1	513.9				
West: S 154th St													
Lane 1[d]	890	3.0	1292	0.689	100	2.6	LOS A	0.0	0.0	Full	250	0.0	0.0
Approach	890	3.0		0.689		2.6	LOS A	0.0	0.0				
Intersection	2175	3.8		0.893		16.1	LOS B	20.1	513.9				

Site Level of Service (LOS) Method: Delay & v/c (HCM 6). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: Same as Signalised Intersections.
Lane LOS values are based on average delay and v/c ratio (degree of saturation) per lane.
LOS F will result if v/c > 1 irrespective of lane delay value (does not apply for approaches and intersection).
Intersection and Approach LOS values are based on average delay for all lanes (v/c not used as specified in HCM 6).
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: HCM Queue Formula.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

d Dominant lane on roundabout approach

Approach Lane Flows (veh/h)

South: SR 518 WB Off Ramp

Mov. From S To Exit:	L2 W	R2 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	225	220	445	7.0	499	0.893	100	NA	NA
Approach	225	220	445	7.0		0.893			

East: S 154th St

Mov. From E To Exit:	T1 W	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	840	840	3.0	951	0.883	100	NA	NA
Approach	840	840	3.0		0.883			

West: S 154th St

Mov. From W To Exit:	T1 E	Total	%HV	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Prob. SL Ov. %	Ov. Lane No.
Lane 1	890	890	3.0	1292	0.689	100	NA	NA
Approach	890	890	3.0		0.689			

	Total	%HV	Deg.Satn (v/c)
Intersection	2175	3.8	0.893

Lane flow rates given in this report are based on the arrival flow rates subject to upstream capacity constraint where applicable.

Merge Analysis

	Exit Lane Number	Short Lane Length ft	Percent Opng in Lane %	Opposing Flow Rate veh/h pcu/h	Critical Gap sec	Follow-up Headway sec	Lane Flow Rate veh/h	Capacity veh/h	Deg. Satn v/c	Min. Delay sec	Merge Delay sec
East Exit: S 154th St Merge Type: **Not Applied**											
Full Length Lane	1	Merge Analysis not applied.									
West Exit: S 154th St Merge Type: **Not Applied**											
Full Length Lane	1	Merge Analysis not applied.									