

HCM 6th TWSC  
 3: Rochester Road (M-150) & Hickory Lawn Road

Existing Conditions  
 AM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑↑	↑↑	
Traffic Vol, veh/h	0	5	3	1004	1422	0
Future Vol, veh/h	0	5	3	1004	1422	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	87	87	91	91
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	8	3	1154	1563	0

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	2146	782	1563	0	0
Stage 1	1563	-	-	-	-
Stage 2	583	-	-	-	-
Critical Hdwy	6.8	6.9	4.18	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.24	-	-
Pot Cap-1 Maneuver	*257	*539	733	-	-
Stage 1	*457	-	-	-	-
Stage 2	*647	-	-	-	-
Platoon blocked, %	1	1	1	-	-
Mov Cap-1 Maneuver	*256	*539	733	-	-
Mov Cap-2 Maneuver	*354	-	-	-	-
Stage 1	*455	-	-	-	-
Stage 2	*647	-	-	-	-


















Approach	EB	NB	SB
HCM Control Delay, s	11.8	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	733	-	539	-	-
HCM Lane V/C Ratio	0.005	-	0.015	-	-
HCM Control Delay (s)	9.9	-	11.8	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

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

HCM 6th Signalized Intersection Summary  
 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Existing Conditions  
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	623	0	421	0	656	0	0	1111	324
Future Volume (veh/h)	0	0	0	623	0	421	0	656	0	0	1111	324
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No			No			No		
Adj Sat Flow, veh/h/ln				1969	0	1969	0	1938	0	0	1969	1969
Adj Flow Rate, veh/h				670	0	453	0	772	0	0	1221	0
Peak Hour Factor				0.93	0.93	0.93	0.85	0.85	0.85	0.91	0.91	0.91
Percent Heavy Veh, %				2	0	2	0	4	0	0	2	2
Cap, veh/h				783	0	632	0	2568	0	0	2609	
Arrive On Green				0.22	0.00	0.22	0.00	1.00	0.00	0.00	0.23	0.00
Sat Flow, veh/h				3638	0	2937	0	3875	0	0	3839	1668
Grp Volume(v), veh/h				670	0	453	0	772	0	0	1221	0
Grp Sat Flow(s),veh/h/ln				1819	0	1468	0	1841	0	0	1870	1668
Q Serve(g_s), s				24.8	0.0	20.0	0.0	0.0	0.0	0.0	39.4	0.0
Cycle Q Clear(g_c), s				24.8	0.0	20.0	0.0	0.0	0.0	0.0	39.4	0.0
Prop In Lane				1.00		1.00	0.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				783	0	632	0	2568	0	0	2609	
V/C Ratio(X)				0.86	0.00	0.72	0.00	0.30	0.00	0.00	0.47	
Avail Cap(c_a), veh/h				935	0	755	0	2568	0	0	2609	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	1.00	1.00	0.33	0.33
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				52.8	0.0	51.0	0.0	0.0	0.0	0.0	31.5	0.0
Incr Delay (d2), s/veh				6.8	0.0	2.6	0.0	0.3	0.0	0.0	0.6	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				12.2	0.0	7.7	0.0	0.1	0.0	0.0	19.9	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				59.7	0.0	53.6	0.0	0.3	0.0	0.0	32.1	0.0
LnGrp LOS				E	A	D	A	A	A	A	C	
Approach Vol, veh/h					1123			772			1221	
Approach Delay, s/veh					57.2			0.3			32.1	
Approach LOS					E			A			C	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		103.9				103.9		36.1				
Change Period (Y+Rc), s		* 6.2				* 6.2		6.0				
Max Green Setting (Gmax), s		* 92				* 92		36.0				
Max Q Clear Time (g_c+I1), s		2.0				41.4		26.8				
Green Ext Time (p_c), s		5.5				10.5		3.3				

Intersection Summary

HCM 6th Ctrl Delay	33.3
HCM 6th LOS	C

Notes

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

HCM 6th Signalized Intersection Summary  
5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Existing Conditions  
AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	249	0	221	0	0	0	0	600	293	0	1433	0
Future Volume (veh/h)	249	0	221	0	0	0	0	600	293	0	1433	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1906	1906	1906				0	1953	1953	0	1969	0
Adj Flow Rate, veh/h	302	0	72				0	723	0	0	1592	0
Peak Hour Factor	0.93	0.93	0.93				0.83	0.83	0.83	0.90	0.90	0.90
Percent Heavy Veh, %	6	6	6				0	3	3	0	2	0
Cap, veh/h	377	0	168				0	3002		0	3026	0
Arrive On Green	0.10	0.00	0.10				0.00	0.81	0.00	0.00	1.00	0.00
Sat Flow, veh/h	3631	0	1616				0	3809	1655	0	3938	0
Grp Volume(v), veh/h	302	0	72				0	723	0	0	1592	0
Grp Sat Flow(s),veh/h/ln	1816	0	1616				0	1856	1655	0	1870	0
Q Serve(g_s), s	11.4	0.0	5.9				0.0	6.5	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	11.4	0.0	5.9				0.0	6.5	0.0	0.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	377	0	168				0	3002		0	3026	0
V/C Ratio(X)	0.80	0.00	0.43				0.00	0.24		0.00	0.53	0.00
Avail Cap(c_a), veh/h	726	0	323				0	3002		0	3026	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	61.3	0.0	58.8				0.0	3.2	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	4.0	0.0	1.7				0.0	0.2	0.0	0.0	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.5	0.0	2.5				0.0	1.7	0.0	0.0	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.3	0.0	60.6				0.0	3.4	0.0	0.0	0.7	0.0
LnGrp LOS	E	A	E				A	A		A	A	A
Approach Vol, veh/h		374						723			1592	
Approach Delay, s/veh		64.4						3.4			0.7	
Approach LOS		E						A			A	
Timer - Assigned Phs		2		4			6					
Phs Duration (G+Y+Rc), s		119.5		20.5			119.5					
Change Period (Y+Rc), s		* 6.2		6.0			* 6.2					
Max Green Setting (Gmax), s		* 1E2		28.0			* 1E2					
Max Q Clear Time (g_c+I1), s		8.5		13.4			2.0					
Green Ext Time (p_c), s		5.0		1.2			18.1					
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			10.2									
HCM 6th LOS			B									
<b>Notes</b>												
User approved volume balancing among the lanes for turning movement.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 6th Signalized Intersection Summary  
 1: Rochester Road (M-150) & Auburn Road

Existing Conditions  
 PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	197	403	136	209	295	120	138	1280	173	174	1227	150
Future Volume (veh/h)	197	403	136	209	295	120	138	1280	173	174	1227	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984
Adj Flow Rate, veh/h	216	443	149	258	364	148	147	1362	184	187	1319	161
Peak Hour Factor	0.91	0.91	0.91	0.81	0.81	0.81	0.94	0.94	0.94	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	242	525	234	275	593	264	167	1651	736	167	1651	736
Arrive On Green	0.13	0.14	0.14	0.15	0.16	0.16	0.18	0.88	0.88	0.09	0.44	0.44
Sat Flow, veh/h	1890	3770	1682	1890	3770	1682	1890	3770	1682	1890	3770	1682
Grp Volume(v), veh/h	216	443	149	258	364	148	147	1362	184	187	1319	161
Grp Sat Flow(s),veh/h/ln	1890	1885	1682	1890	1885	1682	1890	1885	1682	1890	1885	1682
Q Serve(g_s), s	15.8	16.0	11.7	18.9	12.6	11.4	10.6	22.6	2.4	12.4	42.3	8.3
Cycle Q Clear(g_c), s	15.8	16.0	11.7	18.9	12.6	11.4	10.6	22.6	2.4	12.4	42.3	8.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	242	525	234	275	593	264	167	1651	736	167	1651	736
V/C Ratio(X)	0.89	0.84	0.64	0.94	0.61	0.56	0.88	0.83	0.25	1.12	0.80	0.22
Avail Cap(c_a), veh/h	275	630	281	275	630	281	167	1651	736	167	1651	736
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.1	58.8	56.9	59.2	55.0	54.5	56.9	6.3	5.0	63.8	34.0	24.5
Incr Delay (d2), s/veh	26.7	8.8	3.5	37.6	1.6	2.2	37.3	4.8	0.8	104.5	4.1	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.1	8.1	5.1	11.7	6.0	4.9	6.3	4.1	0.9	10.7	19.3	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	86.8	67.5	60.4	96.8	56.7	56.7	94.2	11.1	5.9	168.3	38.2	25.1
LnGrp LOS	F	E	E	F	E	E	F	B	A	F	D	C
Approach Vol, veh/h		808			770			1693			1667	
Approach Delay, s/veh		71.4			70.1			17.8			51.5	
Approach LOS		E			E			B			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	67.9	27.0	26.1	19.0	67.9	24.5	28.6				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 12	* 57	* 20	* 23	* 12	* 57	* 20	* 23				
Max Q Clear Time (g_c+I1), s	14.4	24.6	20.9	18.0	12.6	44.3	17.8	14.6				
Green Ext Time (p_c), s	0.0	12.3	0.0	1.5	0.0	7.3	0.1	1.7				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			46.1									
HCM 6th LOS			D									
<b>Notes</b>												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary  
 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Existing Conditions  
 PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	
Traffic Volume (veh/h)	5	1	7	145	1	61	9	1608	89	64	1540	8
Future Volume (veh/h)	5	1	7	145	1	61	9	1608	89	64	1540	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	2000	2000	2000	1984	1984	1984	1984	1984	1984	1969	1969	1969
Adj Flow Rate, veh/h	8	2	7	159	1	43	9	1693	75	68	1638	9
Peak Hour Factor	0.60	0.60	0.60	0.91	0.91	0.91	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	1	1	1	1	1	1	2	2	2
Cap, veh/h	203	52	182	234	5	219	290	2937	1310	262	2972	16
Arrive On Green	0.13	0.13	0.13	0.13	0.13	0.13	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	1384	390	1365	1417	38	1649	306	3770	1682	270	3814	21
Grp Volume(v), veh/h	8	0	9	159	0	44	9	1693	75	68	803	844
Grp Sat Flow(s),veh/h/ln	1384	0	1754	1417	0	1688	306	1885	1682	270	1870	1965
Q Serve(g_s), s	0.7	0.0	0.6	15.4	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	4.0	0.0	0.6	16.0	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.78	1.00		0.98	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	203	0	233	234	0	225	290	2937	1310	262	1457	1531
V/C Ratio(X)	0.04	0.00	0.04	0.68	0.00	0.20	0.03	0.58	0.06	0.26	0.55	0.55
Avail Cap(c_a), veh/h	355	0	426	389	0	410	290	2937	1310	262	1457	1531
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.8	0.0	52.9	59.9	0.0	54.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.1	3.5	0.0	0.4	0.2	0.8	0.1	2.4	1.5	1.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.3	5.8	0.0	1.4	0.0	0.3	0.0	0.2	0.6	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.9	0.0	52.9	63.3	0.0	54.4	0.2	0.8	0.1	2.4	1.5	1.4
LnGrp LOS	E	A	D	E	A	D	A	A	A	A	A	A
Approach Vol, veh/h	17			203			1777			1715		
Approach Delay, s/veh	54.3			61.4			0.8			1.5		
Approach LOS	D			E			A			A		
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	115.4		24.6		115.4		24.6					
Change Period (Y+Rc), s	* 6.3		6.0		* 6.3		6.0					
Max Green Setting (Gmax), s	* 94		34.0		* 94		34.0					
Max Q Clear Time (g_c+1), s	2.0		6.0		2.0		18.0					
Green Ext Time (p_c), s	22.0		0.0		22.3		0.6					

Intersection Summary

HCM 6th Ctrl Delay	4.7
HCM 6th LOS	A

Notes

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

HCM 6th TWSC  
 3: Rochester Road (M-150) & Hickory Lawn Road

Existing Conditions  
 PM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘↗		↘	↑↑	↑↑	
Traffic Vol, veh/h	0	9	8	1706	1690	2
Future Vol, veh/h	0	9	8	1706	1690	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	95	95	94	94
Heavy Vehicles, %	0	0	1	1	1	1
Mvmt Flow	0	15	8	1796	1798	2

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	2713	900	1800	0	0
Stage 1	1799	-	-	-	-
Stage 2	914	-	-	-	-
Critical Hdwy	6.8	6.9	4.12	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.21	-	-
Pot Cap-1 Maneuver	-	*413	*617	-	-
Stage 1	*389	-	-	-	-
Stage 2	*355	-	-	-	-
Platoon blocked, %	2	1	1	-	-
Mov Cap-1 Maneuver	-	*413	*617	-	-
Mov Cap-2 Maneuver	*168	-	-	-	-
Stage 1	*384	-	-	-	-
Stage 2	*355	-	-	-	-


















Approach	EB	NB	SB
HCM Control Delay, s		0.1	0
HCM LOS	-		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	*617	-	-	-	-
HCM Lane V/C Ratio	0.014	-	-	-	-
HCM Control Delay (s)	10.9	-	-	-	-
HCM Lane LOS	B	-	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

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

HCM 6th Signalized Intersection Summary  
 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Existing Conditions  
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	389	0	459	0	1294	0	0	1312	403
Future Volume (veh/h)	0	0	0	389	0	459	0	1294	0	0	1312	403
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No		No		No			No	
Adj Sat Flow, veh/h/ln				1984	0	1984	0	1984	0	0	1984	1984
Adj Flow Rate, veh/h				447	0	523	0	1377	0	0	1381	0
Peak Hour Factor				0.87	0.87	0.87	0.94	0.94	0.94	0.95	0.95	0.95
Percent Heavy Veh, %				1	0	1	0	1	0	0	1	1
Cap, veh/h				771	0	623	0	2649	0	0	2649	
Arrive On Green				0.21	0.00	0.21	0.00	0.70	0.00	0.00	1.00	0.00
Sat Flow, veh/h				3666	0	2960	0	3969	0	0	3870	1682
Grp Volume(v), veh/h				447	0	523	0	1377	0	0	1381	0
Grp Sat Flow(s),veh/h/ln				1833	0	1480	0	1885	0	0	1885	1682
Q Serve(g_s), s				15.3	0.0	23.7	0.0	24.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s				15.3	0.0	23.7	0.0	24.0	0.0	0.0	0.0	0.0
Prop In Lane				1.00		1.00	0.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				771	0	623	0	2649	0	0	2649	
V/C Ratio(X)				0.58	0.00	0.84	0.00	0.52	0.00	0.00	0.52	
Avail Cap(c_a), veh/h				1100	0	888	0	2649	0	0	2649	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				49.7	0.0	53.0	0.0	9.8	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh				0.7	0.0	5.0	0.0	0.7	0.0	0.0	0.7	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				7.2	0.0	9.3	0.0	8.7	0.0	0.0	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				50.4	0.0	58.1	0.0	10.5	0.0	0.0	0.7	0.0
LnGrp LOS				D	A	E	A	B	A	A	A	
Approach Vol, veh/h					970			1377			1381	
Approach Delay, s/veh					54.5			10.5			0.7	
Approach LOS					D			B			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		104.5				104.5		35.5				
Change Period (Y+Rc), s		* 6.2				* 6.2		6.0				
Max Green Setting (Gmax), s		* 86				* 86		42.0				
Max Q Clear Time (g_c+I1), s		26.0				2.0		25.7				
Green Ext Time (p_c), s		13.1				13.4		3.7				

Intersection Summary

HCM 6th Ctrl Delay	18.3
HCM 6th LOS	B

Notes

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

HCM 6th Signalized Intersection Summary  
 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Existing Conditions  
 PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	315	0	244	0	0	0	0	1329	598	0	1232	0
Future Volume (veh/h)	315	0	244	0	0	0	0	1329	598	0	1232	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No						No			No	
Adj Sat Flow, veh/h/ln	1953	1953	1953				0	1984	1984	0	1984	0
Adj Flow Rate, veh/h	416	0	88				0	1445	0	0	1311	0
Peak Hour Factor	0.84	0.84	0.84				0.92	0.92	0.92	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	1	1	0	1	0
Cap, veh/h	502	0	223				0	2933		0	2933	0
Arrive On Green	0.13	0.00	0.13				0.00	0.78	0.00	0.00	0.78	0.00
Sat Flow, veh/h	3720	0	1655				0	3870	1682	0	3969	0
Grp Volume(v), veh/h	416	0	88				0	1445	0	0	1311	0
Grp Sat Flow(s),veh/h/ln	1860	0	1655				0	1885	1682	0	1885	0
Q Serve(g_s), s	15.2	0.0	6.8				0.0	19.3	0.0	0.0	16.6	0.0
Cycle Q Clear(g_c), s	15.2	0.0	6.8				0.0	19.3	0.0	0.0	16.6	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	502	0	223				0	2933		0	2933	0
V/C Ratio(X)	0.83	0.00	0.39				0.00	0.49		0.00	0.45	0.00
Avail Cap(c_a), veh/h	850	0	378				0	2933		0	2933	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	59.0	0.0	55.3				0.0	5.6	0.0	0.0	5.3	0.0
Incr Delay (d2), s/veh	3.6	0.0	1.1				0.0	0.6	0.0	0.0	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.5	0.0	2.9				0.0	5.9	0.0	0.0	5.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.6	0.0	56.5				0.0	6.2	0.0	0.0	5.8	0.0
LnGrp LOS	E	A	E				A	A		A	A	A
Approach Vol, veh/h		504						1445			1311	
Approach Delay, s/veh		61.5						6.2			5.8	
Approach LOS		E						A			A	
Timer - Assigned Phs		2		4				6				
Phs Duration (G+Y+Rc), s		115.1		24.9				115.1				
Change Period (Y+Rc), s		* 6.2		6.0				* 6.2				
Max Green Setting (Gmax), s		* 96		32.0				* 96				
Max Q Clear Time (g_c+I1), s		21.3		17.2				18.6				
Green Ext Time (p_c), s		14.6		1.6				12.2				

Intersection Summary

HCM 6th Ctrl Delay	14.6
HCM 6th LOS	B

























Notes

User approved volume balancing among the lanes for turning movement.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
 Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



HCM 6th Signalized Intersection Summary  
 1: Rochester Road (M-150) & Auburn Road

Existing Conditions  
 SAT MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	197	262	107	238	294	135	151	1262	165	170	1301	194
Future Volume (veh/h)	197	262	107	238	294	135	151	1262	165	170	1301	194
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	2000	2000	2000	1984	1984	1984
Adj Flow Rate, veh/h	274	364	149	251	309	142	159	1328	174	181	1384	206
Peak Hour Factor	0.72	0.72	0.72	0.95	0.95	0.95	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	1	1	1
Cap, veh/h	275	452	202	274	450	201	169	1739	776	167	1726	770
Arrive On Green	0.15	0.12	0.12	0.15	0.12	0.12	0.09	0.46	0.46	0.09	0.46	0.46
Sat Flow, veh/h	1890	3770	1682	1890	3770	1682	1905	3800	1695	1890	3770	1682
Grp Volume(v), veh/h	274	364	149	251	309	142	159	1328	174	181	1384	206
Grp Sat Flow(s),veh/h/ln	1890	1885	1682	1890	1885	1682	1905	1900	1695	1890	1885	1682
Q Serve(g_s), s	20.3	13.2	12.0	18.3	11.0	11.4	11.6	40.8	8.7	12.4	44.0	10.6
Cycle Q Clear(g_c), s	20.3	13.2	12.0	18.3	11.0	11.4	11.6	40.8	8.7	12.4	44.0	10.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	275	452	202	274	450	201	169	1739	776	167	1726	770
V/C Ratio(X)	0.99	0.80	0.74	0.91	0.69	0.71	0.94	0.76	0.22	1.08	0.80	0.27
Avail Cap(c_a), veh/h	275	630	281	275	630	281	169	1739	776	167	1726	770
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.7	60.0	59.5	59.0	59.1	59.3	63.4	31.6	22.9	63.8	32.5	23.5
Incr Delay (d2), s/veh	52.8	5.2	6.3	32.7	1.9	4.7	52.5	3.2	0.7	92.9	4.0	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	13.5	6.5	5.4	11.1	5.3	5.0	7.9	18.5	3.5	10.1	19.9	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	112.5	65.2	65.8	91.6	61.0	64.0	116.0	34.9	23.6	156.7	36.6	24.3
LnGrp LOS	F	E	E	F	E	E	F	C	C	F	D	C
Approach Vol, veh/h		787			702			1661			1771	
Approach Delay, s/veh		81.8			72.5			41.5			47.4	
Approach LOS		F			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	70.7	26.9	23.4	19.0	70.7	27.0	23.3				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 12	* 57	* 20	* 23	* 12	* 57	* 20	* 23				
Max Q Clear Time (g_c+I1), s	14.4	42.8	20.3	15.2	13.6	46.0	22.3	13.4				
Green Ext Time (p_c), s	0.0	7.9	0.0	1.6	0.0	7.0	0.0	1.6				

Intersection Summary

HCM 6th Ctrl Delay	54.5
HCM 6th LOS	D

Notes

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

HCM 6th Signalized Intersection Summary  
 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Existing Conditions  
 SAT MD Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (veh/h)	12	2	10	199	0	70	6	1472	113	110	1593	10
Future Volume (veh/h)	12	2	10	199	0	70	6	1472	113	110	1593	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	2000	2000	2000	2000	2000	2000	1984	1984	1984	1984	1984	1984
Adj Flow Rate, veh/h	16	3	8	219	0	34	6	1549	98	116	1677	11
Peak Hour Factor	0.75	0.75	0.75	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	1	1	1	1	1	1
Cap, veh/h	247	76	202	268	0	266	274	2847	1270	283	2899	19
Arrive On Green	0.16	0.16	0.16	0.16	0.00	0.16	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	1396	482	1286	1426	0	1695	294	3770	1682	306	3840	25
Grp Volume(v), veh/h	16	0	11	219	0	34	6	1549	98	116	823	865
Grp Sat Flow(s),veh/h/ln	1396	0	1768	1426	0	1695	294	1885	1682	306	1885	1980
Q Serve(g_s), s	1.4	0.0	0.7	21.3	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	3.8	0.0	0.7	22.0	0.0	2.4	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.73	1.00		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	247	0	278	268	0	266	274	2847	1270	283	1423	1495
V/C Ratio(X)	0.06	0.00	0.04	0.82	0.00	0.13	0.02	0.54	0.08	0.41	0.58	0.58
Avail Cap(c_a), veh/h	247	0	278	268	0	266	274	2847	1270	283	1423	1495
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.4	0.0	50.0	59.5	0.0	50.7	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.1	17.7	0.0	0.2	0.1	0.8	0.1	4.4	1.7	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.3	9.2	0.0	1.1	0.0	0.3	0.0	0.3	0.7	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.5	0.0	50.1	77.1	0.0	51.0	0.1	0.8	0.1	4.4	1.7	1.6
LnGrp LOS	D	A	D	E	A	D	A	A	A	A	A	A
Approach Vol, veh/h	27			253			1653			1804		
Approach Delay, s/veh	51.5			73.6			0.7			1.9		
Approach LOS	D			E			A			A		
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	112.0		28.0		112.0		28.0					
Change Period (Y+Rc), s	* 6.3		6.0		* 6.3		6.0					
Max Green Setting (Gmax), s*	1.1E2		22.0		* 1.1E2		22.0					
Max Q Clear Time (g_c+1), s	2.0		5.8		2.0		24.0					
Green Ext Time (p_c), s	18.3		0.0		26.8		0.0					

Intersection Summary

HCM 6th Ctrl Delay	6.6
HCM 6th LOS	A

Notes

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

HCM 6th TWSC  
 3: Rochester Road (M-150) & Hickory Lawn Road

Existing Conditions  
 SAT MD Peak Hour

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↘↗		↘	↑↑	↑↑	
Traffic Vol, veh/h	0	13	11	1591	1798	4
Future Vol, veh/h	0	13	11	1591	1798	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	65	65	95	95	91	91
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	20	12	1675	1976	4


















Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2840	990	1980	0	-	0
Stage 1	1978	-	-	-	-	-
Stage 2	862	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	14	249	296	-	-	-
Stage 1	96	-	-	-	-	-
Stage 2	379	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	13	249	296	-	-	-
Mov Cap-2 Maneuver	71	-	-	-	-	-
Stage 1	92	-	-	-	-	-
Stage 2	379	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	20.7	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	296	-	249	-	-
HCM Lane V/C Ratio	0.039	-	0.08	-	-
HCM Control Delay (s)	17.7	-	20.7	-	-
HCM Lane LOS	C	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

HCM 6th Signalized Intersection Summary  
 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Existing Conditions  
 SAT MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	319	0	417	0	1232	0	0	1480	377
Future Volume (veh/h)	0	0	0	319	0	417	0	1232	0	0	1480	377
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No		No		No			No	
Adj Sat Flow, veh/h/ln				1984	0	1984	0	1984	0	0	1984	1984
Adj Flow Rate, veh/h				347	0	446	0	1325	0	0	1558	0
Peak Hour Factor				0.92	0.92	0.92	0.93	0.93	0.93	0.95	0.95	0.95
Percent Heavy Veh, %				1	0	1	0	1	0	0	1	1
Cap, veh/h				668	0	539	0	2755	0	0	2755	
Arrive On Green				0.18	0.00	0.18	0.00	0.73	0.00	0.00	1.00	0.00
Sat Flow, veh/h				3666	0	2960	0	3969	0	0	3870	1682
Grp Volume(v), veh/h				347	0	446	0	1325	0	0	1558	0
Grp Sat Flow(s),veh/h/ln				1833	0	1480	0	1885	0	0	1885	1682
Q Serve(g_s), s				12.0	0.0	20.3	0.0	20.4	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s				12.0	0.0	20.3	0.0	20.4	0.0	0.0	0.0	0.0
Prop In Lane				1.00		1.00	0.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				668	0	539	0	2755	0	0	2755	
V/C Ratio(X)				0.52	0.00	0.83	0.00	0.48	0.00	0.00	0.57	
Avail Cap(c_a), veh/h				1152	0	930	0	2755	0	0	2755	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				51.7	0.0	55.1	0.0	7.8	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh				0.6	0.0	3.3	0.0	0.6	0.0	0.0	0.8	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				5.6	0.0	7.9	0.0	7.1	0.0	0.0	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				52.3	0.0	58.4	0.0	8.4	0.0	0.0	0.8	0.0
LnGrp LOS				D	A	E	A	A	A	A	A	
Approach Vol, veh/h					793			1325			1558	
Approach Delay, s/veh					55.8			8.4			0.8	
Approach LOS					E			A			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		108.5				108.5		31.5				
Change Period (Y+Rc), s		* 6.2				* 6.2		6.0				
Max Green Setting (Gmax), s		* 84				* 84		44.0				
Max Q Clear Time (g_c+I1), s		22.4				2.0		22.3				
Green Ext Time (p_c), s		12.2				17.1		3.2				

Intersection Summary

HCM 6th Ctrl Delay	15.4
HCM 6th LOS	B

Notes

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

HCM 6th Signalized Intersection Summary  
 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Existing Conditions  
 SAT MD Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	338	0	192	0	0	0	0	1159	416	0	1400	0
Future Volume (veh/h)	338	0	192	0	0	0	0	1159	416	0	1400	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No						No			No		
Adj Sat Flow, veh/h/ln	1984	1984	1984				0	1984	1984	0	1984	0
Adj Flow Rate, veh/h	423	0	84				0	1274	0	0	1505	0
Peak Hour Factor	0.88	0.88	0.88				0.91	0.91	0.91	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1				0	1	1	0	1	0
Cap, veh/h	516	0	230				0	2927		0	2927	0
Arrive On Green	0.14	0.00	0.14				0.00	0.78	0.00	0.00	0.78	0.00
Sat Flow, veh/h	3780	0	1682				0	3870	1682	0	3969	0
Grp Volume(v), veh/h	423	0	84				0	1274	0	0	1505	0
Grp Sat Flow(s),veh/h/ln	1890	0	1682				0	1885	1682	0	1885	0
Q Serve(g_s), s	15.2	0.0	6.4				0.0	16.0	0.0	0.0	20.8	0.0
Cycle Q Clear(g_c), s	15.2	0.0	6.4				0.0	16.0	0.0	0.0	20.8	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	516	0	230				0	2927		0	2927	0
V/C Ratio(X)	0.82	0.00	0.37				0.00	0.44		0.00	0.51	0.00
Avail Cap(c_a), veh/h	1188	0	529				0	2927		0	2927	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	58.8	0.0	54.9				0.0	5.3	0.0	0.0	5.8	0.0
Incr Delay (d2), s/veh	3.3	0.0	1.0				0.0	0.5	0.0	0.0	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	0.0	2.8				0.0	4.9	0.0	0.0	6.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.1	0.0	55.9				0.0	5.8	0.0	0.0	6.5	0.0
LnGrp LOS	E	A	E				A	A		A	A	A
Approach Vol, veh/h	507						1274			1505		
Approach Delay, s/veh	61.0						5.8			6.5		
Approach LOS	E						A			A		
Timer - Assigned Phs	2		4		6							
Phs Duration (G+Y+Rc), s	114.9		25.1		114.9							
Change Period (Y+Rc), s	* 6.2		6.0		* 6.2							
Max Green Setting (Gmax), s	* 84		44.0		* 84							
Max Q Clear Time (g_c+I1), s	18.0		17.2		22.8							
Green Ext Time (p_c), s	11.5		1.9		15.4							

Intersection Summary

























HCM 6th Ctrl Delay	14.6
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
 Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
 1: Rochester Road (M-150) & Auburn Road

Existing Conditions  
 SAT PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	193	233	102	223	219	114	162	1119	140	132	1057	150
Future Volume (veh/h)	193	233	102	223	219	114	162	1119	140	132	1057	150
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Adj Flow Rate, veh/h	205	248	109	256	252	131	171	1178	147	140	1124	160
Peak Hour Factor	0.94	0.94	0.94	0.87	0.87	0.87	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	231	332	148	278	425	189	169	1869	834	165	1861	830
Arrive On Green	0.12	0.09	0.09	0.15	0.11	0.11	0.09	0.49	0.49	0.09	0.49	0.49
Sat Flow, veh/h	1905	3800	1695	1905	3800	1695	1905	3800	1695	1905	3800	1695
Grp Volume(v), veh/h	205	248	109	256	252	131	171	1178	147	140	1124	160
Grp Sat Flow(s),veh/h/ln	1905	1900	1695	1905	1900	1695	1905	1900	1695	1905	1900	1695
Q Serve(g_s), s	14.8	8.9	8.8	18.6	8.8	10.4	12.4	32.0	6.8	10.1	30.0	7.4
Cycle Q Clear(g_c), s	14.8	8.9	8.8	18.6	8.8	10.4	12.4	32.0	6.8	10.1	30.0	7.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	231	332	148	278	425	189	169	1869	834	165	1861	830
V/C Ratio(X)	0.89	0.75	0.74	0.92	0.59	0.69	1.01	0.63	0.18	0.85	0.60	0.19
Avail Cap(c_a), veh/h	278	635	283	278	635	283	169	1869	834	169	1861	830
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.5	62.4	62.3	59.0	59.2	59.9	63.8	26.2	19.8	63.1	25.9	20.1
Incr Delay (d2), s/veh	24.3	3.3	6.9	34.2	1.3	4.5	72.9	1.6	0.5	31.1	1.5	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.5	4.4	4.0	11.4	4.3	4.6	9.3	14.1	2.7	6.2	13.2	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	84.8	65.7	69.2	93.2	60.5	64.3	136.7	27.8	20.3	94.2	27.4	20.6
LnGrp LOS	F	E	E	F	E	E	F	C	C	F	C	C
Approach Vol, veh/h		562			639			1496			1424	
Approach Delay, s/veh		73.3			74.4			39.5			33.2	
Approach LOS		E			E			D			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	18.7	75.5	27.0	18.8	19.0	75.2	23.6	22.2				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 12	* 57	* 20	* 23	* 12	* 57	* 20	* 23				
Max Q Clear Time (g_c+I1), s	12.1	34.0	20.6	10.9	14.4	32.0	16.8	12.4				
Green Ext Time (p_c), s	0.0	8.8	0.0	1.3	0.0	8.6	0.2	1.4				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			47.3									
HCM 6th LOS			D									
<b>Notes</b>												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

# HCM 6th Signalized Intersection Summary

## 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Existing Conditions  
SAT PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	
Traffic Volume (veh/h)	3	3	9	147	0	52	10	1350	74	67	1383	8
Future Volume (veh/h)	3	3	9	147	0	52	10	1350	74	67	1383	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Adj Flow Rate, veh/h	5	5	10	171	0	23	11	1436	61	74	1537	9
Peak Hour Factor	0.60	0.60	0.60	0.86	0.86	0.86	0.94	0.94	0.94	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	234	84	168	241	0	239	314	2930	1307	326	2987	17
Arrive On Green	0.14	0.14	0.14	0.14	0.00	0.14	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	1410	595	1190	1421	0	1695	340	3800	1695	356	3873	23
Grp Volume(v), veh/h	5	0	15	171	0	23	11	1436	61	74	754	792
Grp Sat Flow(s),veh/h/ln	1410	0	1786	1421	0	1695	340	1900	1695	356	1900	1996
Q Serve(g_s), s	0.4	0.0	1.0	16.6	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.1	0.0	1.0	17.6	0.0	1.7	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.67	1.00		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	234	0	252	241	0	239	314	2930	1307	326	1465	1539
V/C Ratio(X)	0.02	0.00	0.06	0.71	0.00	0.10	0.04	0.49	0.05	0.23	0.51	0.51
Avail Cap(c_a), veh/h	256	0	281	264	0	266	314	2930	1307	326	1465	1539
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.3	0.0	52.1	59.7	0.0	52.4	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.1	7.6	0.0	0.2	0.2	0.6	0.1	1.6	1.3	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.2	0.0	0.5	6.5	0.0	0.7	0.0	0.2	0.0	0.1	0.5	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.3	0.0	52.2	67.4	0.0	52.5	0.2	0.6	0.1	1.6	1.3	1.2
LnGrp LOS	D	A	D	E	A	D	A	A	A	A	A	A
Approach Vol, veh/h		20			194			1508			1620	
Approach Delay, s/veh		52.5			65.6			0.6			1.3	
Approach LOS		D			E			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		114.3		25.7		114.3		25.7				
Change Period (Y+Rc), s		* 6.3		6.0		* 6.3		6.0				
Max Green Setting (Gmax), s*		1.1E2		22.0		* 1.1E2		22.0				
Max Q Clear Time (g_c+1), s		2.0		4.1		2.0		19.6				
Green Ext Time (p_c), s		15.6		0.0		18.5		0.1				

### Intersection Summary

HCM 6th Ctrl Delay	5.0
HCM 6th LOS	A

### Notes

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

HCM 6th TWSC  
3: Rochester Road (M-150) & Hickory Lawn Road

Existing Conditions  
SAT PM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑↑	↑↑	
Traffic Vol, veh/h	0	6	4	1434	1538	1
Future Vol, veh/h	0	6	4	1434	1538	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	95	95	92	92
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	10	4	1509	1672	1

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2436	837	1673	0	-	0
Stage 1	1673	-	-	-	-	-
Stage 2	763	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	*48	*476	*714	-	-	-
Stage 1	*449	-	-	-	-	-
Stage 2	*460	-	-	-	-	-
Platoon blocked, %	1	1	1	-	-	-
Mov Cap-1 Maneuver	*48	*476	*714	-	-	-
Mov Cap-2 Maneuver	*229	-	-	-	-	-
Stage 1	*446	-	-	-	-	-
Stage 2	*460	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	0	0
HCM LOS	B		


















Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	* 714	-	476	-	-
HCM Lane V/C Ratio	0.006	-	0.021	-	-
HCM Control Delay (s)	10.1	-	12.7	-	-
HCM Lane LOS	B	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

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



HCM 6th Signalized Intersection Summary  
 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Existing Conditions  
 SAT PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	339	0	389	0	1103	0	0	1077	349
Future Volume (veh/h)	0	0	0	339	0	389	0	1103	0	0	1077	349
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No		No		No		No		No
Adj Sat Flow, veh/h/ln				2000	0	2000	0	2000	0	0	2000	2000
Adj Flow Rate, veh/h				373	0	424	0	1161	0	0	1158	0
Peak Hour Factor				0.91	0.91	0.91	0.95	0.95	0.95	0.93	0.93	0.93
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				644	0	519	0	2807	0	0	2807	
Arrive On Green				0.17	0.00	0.17	0.00	0.74	0.00	0.00	1.00	0.00
Sat Flow, veh/h				3695	0	2983	0	4000	0	0	3900	1695
Grp Volume(v), veh/h				373	0	424	0	1161	0	0	1158	0
Grp Sat Flow(s),veh/h/ln				1848	0	1492	0	1900	0	0	1900	1695
Q Serve(g_s), s				13.0	0.0	19.2	0.0	16.1	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s				13.0	0.0	19.2	0.0	16.1	0.0	0.0	0.0	0.0
Prop In Lane				1.00		1.00	0.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				644	0	519	0	2807	0	0	2807	
V/C Ratio(X)				0.58	0.00	0.82	0.00	0.41	0.00	0.00	0.41	
Avail Cap(c_a), veh/h				1161	0	938	0	2807	0	0	2807	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				53.1	0.0	55.7	0.0	6.9	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh				0.8	0.0	3.2	0.0	0.5	0.0	0.0	0.4	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				6.2	0.0	7.5	0.0	5.5	0.0	0.0	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				53.9	0.0	58.9	0.0	7.3	0.0	0.0	0.4	0.0
LnGrp LOS				D	A	E	A	A	A	A	A	
Approach Vol, veh/h					797			1161			1158	
Approach Delay, s/veh					56.5			7.3			0.4	
Approach LOS					E			A			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		109.6				109.6		30.4				
Change Period (Y+Rc), s		* 6.2				* 6.2		6.0				
Max Green Setting (Gmax), s		* 84				* 84		44.0				
Max Q Clear Time (g_c+I1), s		18.1				2.0		21.2				
Green Ext Time (p_c), s		9.8				9.8		3.2				

Intersection Summary

HCM 6th Ctrl Delay	17.4
HCM 6th LOS	B

Notes

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

HCM 6th Signalized Intersection Summary  
 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Existing Conditions  
 SAT PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	262	0	197	0	0	0	0	1038	408	0	1176	0
Future Volume (veh/h)	262	0	197	0	0	0	0	1038	408	0	1176	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No						No			No		
Adj Sat Flow, veh/h/ln	2000	2000	2000				0	1984	1984	0	1984	0
Adj Flow Rate, veh/h	318	0	83				0	1093	0	0	1278	0
Peak Hour Factor	0.94	0.94	0.94				0.95	0.95	0.95	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0				0	1	1	0	1	0
Cap, veh/h	404	0	180				0	3042		0	3042	0
Arrive On Green	0.11	0.00	0.11				0.00	0.81	0.00	0.00	0.81	0.00
Sat Flow, veh/h	3810	0	1695				0	3870	1682	0	3969	0
Grp Volume(v), veh/h	318	0	83				0	1093	0	0	1278	0
Grp Sat Flow(s),veh/h/ln	1905	0	1695				0	1885	1682	0	1885	0
Q Serve(g_s), s	11.4	0.0	6.4				0.0	11.0	0.0	0.0	13.9	0.0
Cycle Q Clear(g_c), s	11.4	0.0	6.4				0.0	11.0	0.0	0.0	13.9	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	404	0	180				0	3042		0	3042	0
V/C Ratio(X)	0.79	0.00	0.46				0.00	0.36		0.00	0.42	0.00
Avail Cap(c_a), veh/h	1197	0	533				0	3042		0	3042	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	61.0	0.0	58.8				0.0	3.7	0.0	0.0	4.0	0.0
Incr Delay (d2), s/veh	3.4	0.0	1.8				0.0	0.3	0.0	0.0	0.4	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.8	0.0	2.9				0.0	3.0	0.0	0.0	3.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.5	0.0	60.7				0.0	4.0	0.0	0.0	4.4	0.0
LnGrp LOS	E	A	E				A	A		A	A	A
Approach Vol, veh/h	401						1093			1278		
Approach Delay, s/veh	63.7						4.0			4.4		
Approach LOS	E						A			A		
Timer - Assigned Phs	2		4		6							
Phs Duration (G+Y+Rc), s	119.1		20.9		119.1							
Change Period (Y+Rc), s	* 6.2		6.0		* 6.2							
Max Green Setting (Gmax), s	* 84		44.0		* 84							
Max Q Clear Time (g_c+I1), s	13.0		13.4		15.9							
Green Ext Time (p_c), s	8.9		1.5		11.6							

Intersection Summary

HCM 6th Ctrl Delay	12.8
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
 Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

**Intersection: 1: Rochester Road (M-150) & Auburn Road**

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	218	208	209	172	340	253	246	160	179	239	236	179
Average Queue (ft)	118	104	82	94	180	148	134	54	76	105	107	42
95th Queue (ft)	196	174	178	163	291	219	215	122	154	194	197	123
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			2	8			5				2	0
Queuing Penalty (veh)			3	9			4				3	0

**Intersection: 1: Rochester Road (M-150) & Auburn Road**

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	130	321	347	235
Average Queue (ft)	55	199	207	45
95th Queue (ft)	109	291	308	129
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)			2	
Queuing Penalty (veh)			2	

**Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive**

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR	
Maximum Queue (ft)	24	31	128	45	33	75	65	26	51	99	138	
Average Queue (ft)	1	5	46	11	5	15	11	2	15	29	55	
95th Queue (ft)	11	22	99	35	23	49	42	13	41	78	123	
Link Distance (ft)	217	217	284	284		231	231	231		321	321	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					500				500			
Storage Blk Time (%)												
Queuing Penalty (veh)												

**Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road**

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	30	16
Average Queue (ft)	4	1
95th Queue (ft)	21	9
Link Distance (ft)	531	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	
Storage Blk Time (%)		
Queuing Penalty (veh)		

**Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp**

Movement	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	R	T	T	T	T
Maximum Queue (ft)	370	451	338	247	136	166	194	208
Average Queue (ft)	243	288	167	143	58	60	117	117
95th Queue (ft)	351	404	268	227	113	126	184	187
Link Distance (ft)			1030		150	150	311	311
Upstream Blk Time (%)					0	0		
Queuing Penalty (veh)					0	1		
Storage Bay Dist (ft)	250	250	250					
Storage Blk Time (%)	3	16	1	0				
Queuing Penalty (veh)	11	70	6	1				

**Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp**

Movement	EB	EB	EB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	T	T
Maximum Queue (ft)	297	345	297	124	130	169	206
Average Queue (ft)	140	212	157	43	40	77	103
95th Queue (ft)	251	294	262	93	96	150	175
Link Distance (ft)	936			1203	1203	229	229
Upstream Blk Time (%)							0
Queuing Penalty (veh)							0
Storage Bay Dist (ft)	250	250					
Storage Blk Time (%)	0	3	0				
Queuing Penalty (veh)	0	8	0				

**Zone Summary**

Zone wide Queuing Penalty: 118

**Intersection: 1: Rochester Road (M-150) & Auburn Road**

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	309	276	281	175	386	223	231	207	344	416	421	200
Average Queue (ft)	160	160	151	102	204	112	91	82	137	226	240	113
95th Queue (ft)	264	240	248	174	376	180	179	155	250	370	392	233
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)									0	1	1	
Queuing Penalty (veh)									0	8	10	
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			13	8			1	1	0	1	24	1
Queuing Penalty (veh)			18	16			1	1	0	1	42	3

**Intersection: 1: Rochester Road (M-150) & Auburn Road**

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	503	579	645	325
Average Queue (ft)	315	334	357	141
95th Queue (ft)	580	518	549	343
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)			16	
Queuing Penalty (veh)			25	

**Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive**

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (ft)	40	39	250	106	33	195	235	42	188	214	214
Average Queue (ft)	6	5	125	40	7	84	97	12	68	64	94
95th Queue (ft)	27	24	200	91	27	156	191	35	149	161	179
Link Distance (ft)	217	217	284	284		231	231	231		321	321
Upstream Blk Time (%)			0		0	0			0	0	0
Queuing Penalty (veh)			0		0	2			0	3	0
Storage Bay Dist (ft)				500					500		
Storage Blk Time (%)					0				0	0	
Queuing Penalty (veh)					0				0	0	

**Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road**

Movement	EB	NB	NB
Directions Served	LR	L	T
Maximum Queue (ft)	43	33	5
Average Queue (ft)	10	6	0
95th Queue (ft)	34	26	4
Link Distance (ft)	531		532
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		500	
Storage Blk Time (%)			
Queuing Penalty (veh)			

**Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp**

Movement	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	R	T	T	T	T
Maximum Queue (ft)	269	297	319	300	188	191	255	284
Average Queue (ft)	142	195	186	167	110	128	145	169
95th Queue (ft)	246	280	278	252	184	204	247	275
Link Distance (ft)			1030		150	150	311	311
Upstream Blk Time (%)					2	4		0
Queuing Penalty (veh)					13	25		0
Storage Bay Dist (ft)	250	250		250				
Storage Blk Time (%)	0	2	2	0				
Queuing Penalty (veh)	0	9	12	2				

**Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp**

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	273	355	287	278	339	200	230	262
Average Queue (ft)	146	219	157	143	151	46	126	147
95th Queue (ft)	245	308	264	242	268	184	209	228
Link Distance (ft)		936		1203	1203		229	229
Upstream Blk Time (%)							0	1
Queuing Penalty (veh)							1	3
Storage Bay Dist (ft)	250		250			175		
Storage Blk Time (%)	0	4	0		3	0		
Queuing Penalty (veh)	0	10	1		16	1		

**Zone Summary**

Zone wide Queuing Penalty: 224

**Intersection: 1: Rochester Road (M-150) & Auburn Road**

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	328	205	213	172	417	190	229	212	329	394	417	200
Average Queue (ft)	161	105	83	73	253	115	100	96	162	202	215	86
95th Queue (ft)	278	171	173	145	427	170	172	169	276	351	376	209
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)									0	1	1	
Queuing Penalty (veh)									0	4	9	
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			3	3			1	2	0	1	15	0
Queuing Penalty (veh)			4	6			1	2	0	1	24	0

**Intersection: 1: Rochester Road (M-150) & Auburn Road**

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	554	696	698	325
Average Queue (ft)	300	416	447	201
95th Queue (ft)	678	854	891	404
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)		1	2	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)	0	3	24	
Queuing Penalty (veh)	0	5	47	

**Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive**

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (ft)	44	45	296	110	34	179	185	48	282	336	344
Average Queue (ft)	13	10	170	38	6	99	114	17	138	141	173
95th Queue (ft)	39	35	277	83	25	172	189	41	268	308	308
Link Distance (ft)	217	217	284	284		231	231	231		321	321
Upstream Blk Time (%)			2						3	4	2
Queuing Penalty (veh)			0						0	39	14
Storage Bay Dist (ft)					500				500		
Storage Blk Time (%)									3	4	
Queuing Penalty (veh)									24	5	

**Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road**

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	46	32
Average Queue (ft)	13	8
95th Queue (ft)	39	30
Link Distance (ft)	531	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	
Storage Blk Time (%)		
Queuing Penalty (veh)		

**Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp**

Movement	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	R	T	T	T	T
Maximum Queue (ft)	240	276	284	256	189	193	302	322
Average Queue (ft)	116	163	173	151	94	106	186	203
95th Queue (ft)	211	238	251	232	168	188	292	306
Link Distance (ft)	1030				150	150	311	311
Upstream Blk Time (%)					1	2	0	0
Queuing Penalty (veh)					8	14	0	3
Storage Bay Dist (ft)	250	250	250					
Storage Blk Time (%)	0	0	1	0				
Queuing Penalty (veh)	0	2	4	1				

**Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp**

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	278	322	280	314	326	200	249	248
Average Queue (ft)	160	219	149	141	139	33	126	145
95th Queue (ft)	257	306	267	259	262	154	215	227
Link Distance (ft)	936			1203	1203		229	229
Upstream Blk Time (%)							0	1
Queuing Penalty (veh)							3	5
Storage Bay Dist (ft)	250	250		175				
Storage Blk Time (%)	0	4	0	3		0		
Queuing Penalty (veh)	0	10	0	12		0		

**Zone Summary**

Zone wide Queuing Penalty: 249



**Intersection: 1: Rochester Road (M-150) & Auburn Road**

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	279	166	163	136	390	154	156	166	295	336	377	200
Average Queue (ft)	160	99	73	59	217	91	68	81	199	174	167	55
95th Queue (ft)	260	160	140	116	356	147	131	144	314	318	306	157
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)									0	0	0	
Queuing Penalty (veh)									0	1	1	
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			2	2			0	1	0	0	4	0
Queuing Penalty (veh)			2	2			0	1	0	0	6	0

**Intersection: 1: Rochester Road (M-150) & Auburn Road**

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	262	369	401	325
Average Queue (ft)	126	236	255	95
95th Queue (ft)	233	343	376	253
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)			5	
Queuing Penalty (veh)			8	

**Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive**

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (ft)	18	52	227	67	45	159	172	34	126	151	186
Average Queue (ft)	2	13	119	24	5	74	86	7	46	67	111
95th Queue (ft)	14	40	200	52	26	142	159	27	97	127	176
Link Distance (ft)	217	217	284	284		231	231	231		321	321
Upstream Blk Time (%)			0			0					
Queuing Penalty (veh)			0			0					
Storage Bay Dist (ft)					500				500		
Storage Blk Time (%)						0					
Queuing Penalty (veh)						0					

**Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road**

Movement	EB	NB	NB
Directions Served	LR	L	T
Maximum Queue (ft)	30	25	6
Average Queue (ft)	5	2	0
95th Queue (ft)	23	11	4
Link Distance (ft)	531		532
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		500	
Storage Blk Time (%)			
Queuing Penalty (veh)			

**Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp**

Movement	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	R	T	T	T	T
Maximum Queue (ft)	230	274	289	265	183	189	258	258
Average Queue (ft)	130	172	169	146	87	101	134	139
95th Queue (ft)	212	243	248	223	156	175	231	236
Link Distance (ft)			1030		150	150	311	311
Upstream Blk Time (%)					1	1	0	0
Queuing Penalty (veh)					4	8	0	0
Storage Bay Dist (ft)	250	250		250				
Storage Blk Time (%)	0	1	1	0				
Queuing Penalty (veh)	0	2	6	2				

**Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp**

























Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	229	271	248	216	214	119	242	254
Average Queue (ft)	112	183	116	104	88	5	115	134
95th Queue (ft)	217	253	228	186	174	59	209	225
Link Distance (ft)		936		1203	1203		229	229
Upstream Blk Time (%)							0	1
Queuing Penalty (veh)							2	4
Storage Bay Dist (ft)	250		250			175		
Storage Blk Time (%)	0	1	0		1	0		
Queuing Penalty (veh)	0	2	0		2	0		

**Zone Summary**

Zone wide Queuing Penalty: 55

HCM 6th Signalized Intersection Summary  
1: Rochester Road (M-150) & Auburn Road

Background Conditions  
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	148	221	125	202	352	90	71	754	115	72	1062	114
Future Volume (veh/h)	148	221	125	202	352	90	71	754	115	72	1062	114
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1953	1953	1953	1953	1953	1953	1953	1953	1953	1969	1969	1969
Adj Flow Rate, veh/h	166	248	140	215	374	96	89	942	144	76	1118	120
Peak Hour Factor	0.89	0.89	0.89	0.94	0.94	0.94	0.80	0.80	0.80	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	2	2	2
Cap, veh/h	192	375	167	239	469	209	111	1968	878	97	1953	871
Arrive On Green	0.10	0.10	0.10	0.13	0.13	0.13	0.06	0.53	0.53	0.05	0.52	0.52
Sat Flow, veh/h	1860	3711	1655	1860	3711	1655	1860	3711	1655	1875	3741	1668
Grp Volume(v), veh/h	166	248	140	215	374	96	89	942	144	76	1118	120
Grp Sat Flow(s),veh/h/ln	1860	1856	1655	1860	1856	1655	1860	1856	1655	1875	1870	1668
Q Serve(g_s), s	12.3	9.0	11.6	15.9	13.7	7.5	6.6	22.4	6.3	5.6	28.5	5.2
Cycle Q Clear(g_c), s	12.3	9.0	11.6	15.9	13.7	7.5	6.6	22.4	6.3	5.6	28.5	5.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	192	375	167	239	469	209	111	1968	878	97	1953	871
V/C Ratio(X)	0.86	0.66	0.84	0.90	0.80	0.46	0.80	0.48	0.16	0.79	0.57	0.14
Avail Cap(c_a), veh/h	258	435	194	258	469	209	112	1968	878	113	1953	871
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.8	60.6	61.8	60.1	59.4	56.7	65.0	20.7	16.9	65.6	22.8	17.2
Incr Delay (d2), s/veh	19.9	3.0	23.7	29.7	9.3	1.6	32.9	0.8	0.4	26.3	1.2	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	4.3	5.9	9.3	6.9	3.2	4.1	9.4	2.4	3.3	12.1	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	81.7	63.7	85.5	89.8	68.7	58.3	97.9	21.5	17.3	92.0	24.0	17.6
LnGrp LOS	F	E	F	F	E	E	F	C	B	F	C	B
Approach Vol, veh/h		554			685			1175			1314	
Approach Delay, s/veh		74.6			73.9			26.8			27.4	
Approach LOS		E			E			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.8	80.8	24.6	20.7	14.9	79.7	21.0	24.3				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 8.4	* 69	* 19	* 16	* 8.4	* 69	* 19	* 16				
Max Q Clear Time (g_c+I1), s	7.6	24.4	17.9	13.6	8.6	30.5	14.3	15.7				
Green Ext Time (p_c), s	0.0	7.7	0.1	0.5	0.0	9.4	0.2	0.2				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			42.8									
HCM 6th LOS			D									
<b>Notes</b>												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary  
 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Background Conditions  
 AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	
Traffic Volume (veh/h)	1	2	2	57	1	12	6	990	33	23	1404	3
Future Volume (veh/h)	1	2	2	57	1	12	6	990	33	23	1404	3
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No			No			No			No		
Adj Sat Flow, veh/h/ln	2000	2000	2000	1891	1891	1891	1938	1938	1938	1969	1969	1969
Adj Flow Rate, veh/h	2	3	1	80	1	0	7	1138	33	25	1543	3
Peak Hour Factor	0.63	0.63	0.63	0.71	0.71	0.71	0.87	0.87	0.87	0.91	0.91	0.91
Percent Heavy Veh, %	0	0	0	7	7	7	4	4	4	2	2	2
Cap, veh/h	155	105	35	148	138	0	328	3090	1378	454	3215	6
Arrive On Green	0.07	0.07	0.07	0.07	0.07	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	1439	1435	478	1356	1891	0	329	3681	1642	479	3830	7
Grp Volume(v), veh/h	2	0	4	80	1	0	7	1138	33	25	753	793
Grp Sat Flow(s),veh/h/ln	1439	0	1914	1356	1891	0	329	1841	1642	479	1870	1967
Q Serve(g_s), s	0.2	0.0	0.3	8.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	0.2	0.0	0.3	8.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.25	1.00		0.00	1.00		1.00	1.00		0.00
Lane Grp Cap(c), veh/h	155	0	139	148	138	0	328	3090	1378	454	1570	1651
V/C Ratio(X)	0.01	0.00	0.03	0.54	0.01	0.00	0.02	0.37	0.02	0.06	0.48	0.48
Avail Cap(c_a), veh/h	277	0	301	262	297	0	328	3090	1378	454	1570	1651
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.3	0.0	60.3	64.2	60.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.1	3.1	0.0	0.0	0.1	0.3	0.0	0.2	1.1	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.1	3.0	0.0	0.0	0.0	0.1	0.0	0.0	0.5	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.4	0.0	60.4	67.3	60.2	0.0	0.1	0.3	0.0	0.2	1.1	1.0
LnGrp LOS	E	A	E	E	E	A	A	A	A	A	A	A
Approach Vol, veh/h	6			81			1178			1571		
Approach Delay, s/veh	60.4			67.2			0.3			1.0		
Approach LOS	E			E			A			A		
Timer - Assigned Phs	2		4		6		8					
Phs Duration (G+Y+Rc), s	123.8		16.2		123.8		16.2					
Change Period (Y+Rc), s	* 6.3		6.0		* 6.3		6.0					
Max Green Setting (Gmax), s*	1.1E2		22.0		* 1.1E2		22.0					
Max Q Clear Time (g_c+1), s	2.0		2.3		2.0		10.4					
Green Ext Time (p_c), s	10.1		0.0		15.7		0.1					

Intersection Summary

HCM 6th Ctrl Delay	2.7
HCM 6th LOS	A

Notes

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

HCM 6th TWSC  
 3: Rochester Road (M-150) & Hickory Lawn Road

Background Conditions  
 AM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑↑	↑↑	
Traffic Vol, veh/h	0	5	3	1029	1463	0
Future Vol, veh/h	0	5	3	1029	1463	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	87	87	91	91
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	8	3	1183	1608	0

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2206	804	1608	0	-	0
Stage 1	1608	-	-	-	-	-
Stage 2	598	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.18	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.24	-	-	-
Pot Cap-1 Maneuver	*236	*518	719	-	-	-
Stage 1	*451	-	-	-	-	-
Stage 2	*627	-	-	-	-	-
Platoon blocked, %	1	1	1	-	-	-
Mov Cap-1 Maneuver	*235	*518	719	-	-	-
Mov Cap-2 Maneuver	*341	-	-	-	-	-
Stage 1	*449	-	-	-	-	-
Stage 2	*627	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.1	0	0
HCM LOS	B		


















Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	719	-	518	-	-
HCM Lane V/C Ratio	0.005	-	0.015	-	-
HCM Control Delay (s)	10	-	12.1	-	-
HCM Lane LOS	B	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

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

# HCM 6th Signalized Intersection Summary

## 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Background Conditions  
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	629	0	431	0	672	0	0	1143	333
Future Volume (veh/h)	0	0	0	629	0	431	0	672	0	0	1143	333
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No			No			No		
Adj Sat Flow, veh/h/ln				1969	0	1969	0	1938	0	0	1969	1969
Adj Flow Rate, veh/h				676	0	463	0	791	0	0	1256	0
Peak Hour Factor				0.93	0.93	0.93	0.85	0.85	0.85	0.91	0.91	0.91
Percent Heavy Veh, %				2	0	2	0	4	0	0	2	2
Cap, veh/h				789	0	637	0	2562	0	0	2603	
Arrive On Green				0.22	0.00	0.22	0.00	1.00	0.00	0.00	0.47	0.00
Sat Flow, veh/h				3638	0	2937	0	3875	0	0	3839	1668
Grp Volume(v), veh/h				676	0	463	0	791	0	0	1256	0
Grp Sat Flow(s),veh/h/ln				1819	0	1468	0	1841	0	0	1870	1668
Q Serve(g_s), s				25.0	0.0	20.5	0.0	0.0	0.0	0.0	32.4	0.0
Cycle Q Clear(g_c), s				25.0	0.0	20.5	0.0	0.0	0.0	0.0	32.4	0.0
Prop In Lane				1.00		1.00	0.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				789	0	637	0	2562	0	0	2603	
V/C Ratio(X)				0.86	0.00	0.73	0.00	0.31	0.00	0.00	0.48	
Avail Cap(c_a), veh/h				935	0	755	0	2562	0	0	2603	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	1.00	1.00	0.67	0.67
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				52.7	0.0	51.0	0.0	0.0	0.0	0.0	20.0	0.0
Incr Delay (d2), s/veh				7.0	0.0	2.9	0.0	0.3	0.0	0.0	0.6	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				12.3	0.0	7.9	0.0	0.1	0.0	0.0	15.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				59.7	0.0	53.9	0.0	0.3	0.0	0.0	20.6	0.0
LnGrp LOS				E	A	D	A	A	A	A	C	
Approach Vol, veh/h					1139			791			1256	
Approach Delay, s/veh					57.3			0.3			20.6	
Approach LOS					E			A			C	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		103.6				103.6		36.4				
Change Period (Y+Rc), s		* 6.2				* 6.2		6.0				
Max Green Setting (Gmax), s		* 92				* 92		36.0				
Max Q Clear Time (g_c+I1), s		2.0				34.4		27.0				
Green Ext Time (p_c), s		5.7				11.1		3.3				

### Intersection Summary

HCM 6th Ctrl Delay	28.7
HCM 6th LOS	C

### Notes

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

# HCM 6th Signalized Intersection Summary

## 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Background Conditions  
AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	254	0	223	0	0	0	0	613	296	0	1464	0
Future Volume (veh/h)	254	0	223	0	0	0	0	613	296	0	1464	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No						No			No		
Adj Sat Flow, veh/h/ln	1906	1906	1906				0	1953	1953	0	1969	0
Adj Flow Rate, veh/h	307	0	73				0	739	0	0	1627	0
Peak Hour Factor	0.93	0.93	0.93				0.83	0.83	0.83	0.90	0.90	0.90
Percent Heavy Veh, %	6	6	6				0	3	3	0	2	0
Cap, veh/h	382	0	170				0	2997		0	3021	0
Arrive On Green	0.11	0.00	0.11				0.00	0.81	0.00	0.00	1.00	0.00
Sat Flow, veh/h	3631	0	1616				0	3809	1655	0	3938	0
Grp Volume(v), veh/h	307	0	73				0	739	0	0	1627	0
Grp Sat Flow(s),veh/h/ln	1816	0	1616				0	1856	1655	0	1870	0
Q Serve(g_s), s	11.6	0.0	5.9				0.0	6.7	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	11.6	0.0	5.9				0.0	6.7	0.0	0.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	382	0	170				0	2997		0	3021	0
V/C Ratio(X)	0.80	0.00	0.43				0.00	0.25		0.00	0.54	0.00
Avail Cap(c_a), veh/h	726	0	323				0	2997		0	3021	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	61.2	0.0	58.7				0.0	3.2	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	4.0	0.0	1.7				0.0	0.2	0.0	0.0	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.6	0.0	2.5				0.0	1.8	0.0	0.0	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.2	0.0	60.4				0.0	3.4	0.0	0.0	0.7	0.0
LnGrp LOS	E	A	E				A	A		A	A	A
Approach Vol, veh/h	380						739			1627		
Approach Delay, s/veh	64.2						3.4			0.7		
Approach LOS	E						A			A		
Timer - Assigned Phs	2		4		6							
Phs Duration (G+Y+Rc), s	119.3		20.7		119.3							
Change Period (Y+Rc), s	* 6.2		6.0		* 6.2							
Max Green Setting (Gmax), s	* 1E2		28.0		* 1E2							
Max Q Clear Time (g_c+I1), s	8.7		13.6		2.0							
Green Ext Time (p_c), s	5.2		1.2		19.0							

### Intersection Summary

























HCM 6th Ctrl Delay	10.2
HCM 6th LOS	B

### Notes

User approved volume balancing among the lanes for turning movement.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
 Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
1: Rochester Road (M-150) & Auburn Road

Background Conditions  
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	210	407	137	211	298	131	139	1318	175	187	1263	160
Future Volume (veh/h)	210	407	137	211	298	131	139	1318	175	187	1263	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984
Adj Flow Rate, veh/h	231	447	151	260	368	162	148	1402	186	201	1358	172
Peak Hour Factor	0.91	0.91	0.91	0.81	0.81	0.81	0.94	0.94	0.94	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	256	529	236	275	568	253	167	1647	735	167	1647	735
Arrive On Green	0.14	0.14	0.14	0.15	0.15	0.15	0.18	0.87	0.87	0.09	0.44	0.44
Sat Flow, veh/h	1890	3770	1682	1890	3770	1682	1890	3770	1682	1890	3770	1682
Grp Volume(v), veh/h	231	447	151	260	368	162	148	1402	186	201	1358	172
Grp Sat Flow(s),veh/h/ln	1890	1885	1682	1890	1885	1682	1890	1885	1682	1890	1885	1682
Q Serve(g_s), s	16.9	16.2	11.9	19.1	12.9	12.7	10.7	25.6	2.5	12.4	44.4	9.0
Cycle Q Clear(g_c), s	16.9	16.2	11.9	19.1	12.9	12.7	10.7	25.6	2.5	12.4	44.4	9.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	256	529	236	275	568	253	167	1647	735	167	1647	735
V/C Ratio(X)	0.90	0.85	0.64	0.94	0.65	0.64	0.88	0.85	0.25	1.20	0.82	0.23
Avail Cap(c_a), veh/h	275	630	281	275	630	281	167	1647	735	167	1647	735
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.6	58.7	56.8	59.2	56.0	55.9	56.9	6.6	5.1	63.8	34.7	24.7
Incr Delay (d2), s/veh	29.3	9.0	3.6	39.3	2.0	4.1	38.6	5.8	0.8	133.8	4.8	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.9	8.2	5.2	11.9	6.2	5.6	6.3	4.4	1.0	12.0	20.3	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	88.9	67.7	60.5	98.5	58.0	60.0	95.5	12.3	6.0	197.6	39.5	25.5
LnGrp LOS	F	E	E	F	E	E	F	B	A	F	D	C
Approach Vol, veh/h		829			790			1736			1731	
Approach Delay, s/veh		72.3			71.7			18.7			56.5	
Approach LOS		E			E			B			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	67.8	27.0	26.2	19.0	67.8	25.6	27.7				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 12	* 57	* 20	* 23	* 12	* 57	* 20	* 23				
Max Q Clear Time (g_c+I1), s	14.4	27.6	21.1	18.2	12.7	46.4	18.9	14.9				
Green Ext Time (p_c), s	0.0	12.3	0.0	1.4	0.0	6.7	0.1	1.8				

Intersection Summary

HCM 6th Ctrl Delay	48.5
HCM 6th LOS	D

Notes

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



# HCM 6th Signalized Intersection Summary

## 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Background Conditions  
PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	
Traffic Volume (veh/h)	5	1	7	147	1	62	9	1649	90	65	1578	8
Future Volume (veh/h)	5	1	7	147	1	62	9	1649	90	65	1578	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	1984	1984	1984	1984	1984	1984	1969	1969	1969
Adj Flow Rate, veh/h	8	2	7	162	1	44	9	1736	76	69	1679	9
Peak Hour Factor	0.60	0.60	0.60	0.91	0.91	0.91	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	1	1	1	1	1	1	2	2	2
Cap, veh/h	206	53	185	237	5	223	280	2929	1307	252	2964	16
Arrive On Green	0.14	0.14	0.14	0.14	0.14	0.14	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	1383	390	1365	1417	37	1650	294	3770	1682	259	3815	20
Grp Volume(v), veh/h	8	0	9	162	0	45	9	1736	76	69	823	865
Grp Sat Flow(s),veh/h/ln	1383	0	1754	1417	0	1687	294	1885	1682	259	1870	1965
Q Serve(g_s), s	0.7	0.0	0.6	15.7	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	4.0	0.0	0.6	16.3	0.0	3.3	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.78	1.00		0.98	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	206	0	237	237	0	228	280	2929	1307	252	1453	1527
V/C Ratio(X)	0.04	0.00	0.04	0.68	0.00	0.20	0.03	0.59	0.06	0.27	0.57	0.57
Avail Cap(c_a), veh/h	354	0	426	389	0	410	280	2929	1307	252	1453	1527
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.6	0.0	52.6	59.7	0.0	53.8	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.1	3.5	0.0	0.4	0.2	0.9	0.1	2.7	1.6	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.3	0.0	0.3	5.9	0.0	1.5	0.0	0.4	0.0	0.2	0.6	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	55.7	0.0	52.7	63.2	0.0	54.2	0.2	0.9	0.1	2.7	1.6	1.5
LnGrp LOS	E	A	D	E	A	D	A	A	A	A	A	A
Approach Vol, veh/h		17		207				1821			1757	
Approach Delay, s/veh		54.1		61.2				0.9			1.6	
Approach LOS		D		E				A			A	
Timer - Assigned Phs		2		4				6			8	
Phs Duration (G+Y+Rc), s		115.1		24.9				115.1			24.9	
Change Period (Y+Rc), s		* 6.3		6.0				* 6.3			6.0	
Max Green Setting (Gmax), s		* 94		34.0				* 94			34.0	
Max Q Clear Time (g_c+1), s		2.0		6.0				2.0			18.3	
Green Ext Time (p_c), s		23.3		0.0				23.9			0.6	

### Intersection Summary

HCM 6th Ctrl Delay	4.7
HCM 6th LOS	A

### Notes

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

HCM 6th TWSC  
 3: Rochester Road (M-150) & Hickory Lawn Road

Background Conditions  
 PM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑↑	↑↑	
Traffic Vol, veh/h	0	9	8	1748	1730	2
Future Vol, veh/h	0	9	8	1748	1730	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	95	95	94	94
Heavy Vehicles, %	0	0	1	1	1	1
Mvmt Flow	0	15	8	1840	1840	2

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	2777	921	1842	0	0
Stage 1	1841	-	-	-	-
Stage 2	936	-	-	-	-
Critical Hdwy	6.8	6.9	4.12	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.21	-	-
Pot Cap-1 Maneuver	-	*413	*617	-	-
Stage 1	*389	-	-	-	-
Stage 2	*334	-	-	-	-
Platoon blocked, %	2	1	1	-	-
Mov Cap-1 Maneuver	-	*413	*617	-	-
Mov Cap-2 Maneuver	*163	-	-	-	-
Stage 1	*384	-	-	-	-
Stage 2	*334	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s		0	0
HCM LOS	-		


















Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	*617	-	-	-	-
HCM Lane V/C Ratio	0.014	-	-	-	-
HCM Control Delay (s)	10.9	-	-	-	-
HCM Lane LOS	B	-	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

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

# HCM 6th Signalized Intersection Summary

## 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Background Conditions  
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	393	0	471	0	1324	0	0	1340	415
Future Volume (veh/h)	0	0	0	393	0	471	0	1324	0	0	1340	415
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No		No		No			No	
Adj Sat Flow, veh/h/ln				1984	0	1984	0	1984	0	0	1984	1984
Adj Flow Rate, veh/h				452	0	536	0	1409	0	0	1411	0
Peak Hour Factor				0.87	0.87	0.87	0.94	0.94	0.94	0.95	0.95	0.95
Percent Heavy Veh, %				1	0	1	0	1	0	0	1	1
Cap, veh/h				787	0	636	0	2632	0	0	2632	
Arrive On Green				0.21	0.00	0.21	0.00	0.70	0.00	0.00	1.00	0.00
Sat Flow, veh/h				3666	0	2960	0	3969	0	0	3870	1682
Grp Volume(v), veh/h				452	0	536	0	1409	0	0	1411	0
Grp Sat Flow(s),veh/h/ln				1833	0	1480	0	1885	0	0	1885	1682
Q Serve(g_s), s				15.5	0.0	24.3	0.0	25.2	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s				15.5	0.0	24.3	0.0	25.2	0.0	0.0	0.0	0.0
Prop In Lane				1.00		1.00	0.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				787	0	636	0	2632	0	0	2632	
V/C Ratio(X)				0.57	0.00	0.84	0.00	0.54	0.00	0.00	0.54	
Avail Cap(c_a), veh/h				1100	0	888	0	2632	0	0	2632	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				49.2	0.0	52.7	0.0	10.2	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh				0.7	0.0	5.4	0.0	0.8	0.0	0.0	0.8	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				7.3	0.0	9.6	0.0	9.2	0.0	0.0	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				49.9	0.0	58.1	0.0	11.0	0.0	0.0	0.8	0.0
LnGrp LOS				D	A	E	A	B	A	A	A	
Approach Vol, veh/h					988			1409			1411	
Approach Delay, s/veh					54.3			11.0			0.8	
Approach LOS					D			B			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		103.9				103.9		36.1				
Change Period (Y+Rc), s		* 6.2				* 6.2		6.0				
Max Green Setting (Gmax), s		* 86				* 86		42.0				
Max Q Clear Time (g_c+I1), s		27.2				2.0		26.3				
Green Ext Time (p_c), s		13.6				14.0		3.8				

### Intersection Summary

HCM 6th Ctrl Delay	18.4
HCM 6th LOS	B

### Notes

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

HCM 6th Signalized Intersection Summary  
 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Background Conditions  
 PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	321	0	246	0	0	0	0	1357	604	0	1250	0
Future Volume (veh/h)	321	0	246	0	0	0	0	1357	604	0	1250	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No						No			No		
Adj Sat Flow, veh/h/ln	1953	1953	1953				0	1984	1984	0	1984	0
Adj Flow Rate, veh/h	424	0	90				0	1475	0	0	1330	0
Peak Hour Factor	0.84	0.84	0.84				0.92	0.92	0.92	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	1	1	0	1	0
Cap, veh/h	510	0	227				0	2925		0	2925	0
Arrive On Green	0.14	0.00	0.14				0.00	0.78	0.00	0.00	0.78	0.00
Sat Flow, veh/h	3720	0	1655				0	3870	1682	0	3969	0
Grp Volume(v), veh/h	424	0	90				0	1475	0	0	1330	0
Grp Sat Flow(s),veh/h/ln	1860	0	1655				0	1885	1682	0	1885	0
Q Serve(g_s), s	15.5	0.0	6.9				0.0	20.2	0.0	0.0	17.1	0.0
Cycle Q Clear(g_c), s	15.5	0.0	6.9				0.0	20.2	0.0	0.0	17.1	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	510	0	227				0	2925		0	2925	0
V/C Ratio(X)	0.83	0.00	0.40				0.00	0.50		0.00	0.45	0.00
Avail Cap(c_a), veh/h	850	0	378				0	2925		0	2925	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	58.8	0.0	55.1				0.0	5.8	0.0	0.0	5.4	0.0
Incr Delay (d2), s/veh	3.6	0.0	1.1				0.0	0.6	0.0	0.0	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.6	0.0	3.0				0.0	6.3	0.0	0.0	5.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.4	0.0	56.2				0.0	6.4	0.0	0.0	6.0	0.0
LnGrp LOS	E	A	E				A	A		A	A	A
Approach Vol, veh/h	514						1475			1330		
Approach Delay, s/veh	61.3						6.4			6.0		
Approach LOS	E						A			A		
Timer - Assigned Phs	2		4		6							
Phs Duration (G+Y+Rc), s	114.8		25.2		114.8							
Change Period (Y+Rc), s	* 6.2		6.0		* 6.2							
Max Green Setting (Gmax), s	* 96		32.0		* 96							
Max Q Clear Time (g_c+I1), s	22.2		17.5		19.1							
Green Ext Time (p_c), s	15.2		1.7		12.5							
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay	14.7											
HCM 6th LOS	B											
<b>Notes</b>												
User approved volume balancing among the lanes for turning movement.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 6th Signalized Intersection Summary  
 1: Rochester Road (M-150) & Auburn Road

Background Conditions  
 SAT MD Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	213	265	108	240	297	149	153	1304	167	185	1346	209
Future Volume (veh/h)	213	265	108	240	297	149	153	1304	167	185	1346	209
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	2000	2000	2000	1984	1984	1984
Adj Flow Rate, veh/h	296	368	150	253	313	157	161	1373	176	197	1432	222
Peak Hour Factor	0.72	0.72	0.72	0.95	0.95	0.95	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	1	1	1
Cap, veh/h	275	456	203	275	456	203	169	1733	773	167	1720	767
Arrive On Green	0.15	0.12	0.12	0.15	0.12	0.12	0.09	0.46	0.46	0.09	0.46	0.46
Sat Flow, veh/h	1890	3770	1682	1890	3770	1682	1905	3800	1695	1890	3770	1682
Grp Volume(v), veh/h	296	368	150	253	313	157	161	1373	176	197	1432	222
Grp Sat Flow(s),veh/h/ln	1890	1885	1682	1890	1885	1682	1905	1900	1695	1890	1885	1682
Q Serve(g_s), s	20.4	13.3	12.1	18.5	11.1	12.7	11.8	43.1	8.8	12.4	46.6	11.6
Cycle Q Clear(g_c), s	20.4	13.3	12.1	18.5	11.1	12.7	11.8	43.1	8.8	12.4	46.6	11.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	275	456	203	275	456	203	169	1733	773	167	1720	767
V/C Ratio(X)	1.07	0.81	0.74	0.92	0.69	0.77	0.95	0.79	0.23	1.18	0.83	0.29
Avail Cap(c_a), veh/h	275	630	281	275	630	281	169	1733	773	167	1720	767
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.8	59.9	59.4	59.0	59.0	59.7	63.5	32.4	23.1	63.8	33.4	23.9
Incr Delay (d2), s/veh	75.5	5.4	6.3	33.6	1.8	8.5	55.7	3.8	0.7	125.1	4.9	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.3	6.5	5.4	11.2	5.3	5.8	8.2	19.6	3.6	11.6	21.2	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	135.3	65.3	65.7	92.6	60.8	68.2	119.3	36.2	23.8	188.9	38.3	24.8
LnGrp LOS	F	E	E	F	E	E	F	D	C	F	D	C
Approach Vol, veh/h		814			723			1710			1851	
Approach Delay, s/veh		90.9			73.5			42.8			52.7	
Approach LOS		F			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	70.5	27.0	23.5	19.0	70.5	27.0	23.5				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 12	* 57	* 20	* 23	* 12	* 57	* 20	* 23				
Max Q Clear Time (g_c+I1), s	14.4	45.1	20.5	15.3	13.8	48.6	22.4	14.7				
Green Ext Time (p_c), s	0.0	7.3	0.0	1.6	0.0	6.0	0.0	1.5				

Intersection Summary

HCM 6th Ctrl Delay	58.4
HCM 6th LOS	E

Notes

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

HCM 6th Signalized Intersection Summary  
 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Background Conditions  
 SAT MD Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	
Traffic Volume (veh/h)	12	2	10	201	0	72	6	1516	114	113	1639	10
Future Volume (veh/h)	12	2	10	201	0	72	6	1516	114	113	1639	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	2000	2000	2000	1984	1984	1984	1984	1984	1984
Adj Flow Rate, veh/h	16	3	8	221	0	36	6	1596	99	119	1725	11
Peak Hour Factor	0.75	0.75	0.75	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	1	1	1	1	1	1
Cap, veh/h	245	76	202	268	0	266	263	2847	1270	272	2900	18
Arrive On Green	0.16	0.16	0.16	0.16	0.00	0.16	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	1394	482	1286	1426	0	1695	281	3770	1682	292	3841	24
Grp Volume(v), veh/h	16	0	11	221	0	36	6	1596	99	119	846	890
Grp Sat Flow(s),veh/h/ln	1394	0	1768	1426	0	1695	281	1885	1682	292	1885	1980
Q Serve(g_s), s	1.4	0.0	0.7	21.3	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	4.0	0.0	0.7	22.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.73	1.00		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	245	0	278	268	0	266	263	2847	1270	272	1423	1495
V/C Ratio(X)	0.07	0.00	0.04	0.82	0.00	0.14	0.02	0.56	0.08	0.44	0.59	0.60
Avail Cap(c_a), veh/h	245	0	278	268	0	266	263	2847	1270	272	1423	1495
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	52.5	0.0	50.0	59.6	0.0	50.8	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.1	0.0	0.1	18.6	0.0	0.2	0.2	0.8	0.1	5.0	1.8	1.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.5	0.0	0.3	9.3	0.0	1.1	0.0	0.3	0.0	0.4	0.7	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	52.6	0.0	50.1	78.1	0.0	51.0	0.2	0.8	0.1	5.0	1.8	1.8
LnGrp LOS	D	A	D	E	A	D	A	A	A	A	A	A
Approach Vol, veh/h		27			257			1701			1855	
Approach Delay, s/veh		51.6			74.3			0.8			2.0	
Approach LOS		D			E			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		112.0		28.0		112.0		28.0				
Change Period (Y+Rc), s		* 6.3		6.0		* 6.3		6.0				
Max Green Setting (Gmax), s*		1.1E2		22.0		* 1.1E2		22.0				
Max Q Clear Time (g_c+1), s		2.0		6.0		2.0		24.0				
Green Ext Time (p_c), s		19.6		0.0		29.4		0.0				

Intersection Summary

HCM 6th Ctrl Delay	6.6
HCM 6th LOS	A

Notes

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

HCM 6th TWSC  
 3: Rochester Road (M-150) & Hickory Lawn Road

Background Conditions  
 SAT MD Peak Hour

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑↑	↑↑	
Traffic Vol, veh/h	0	13	11	1636	1846	4
Future Vol, veh/h	0	13	11	1636	1846	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	65	65	95	95	91	91
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	20	12	1722	2029	4

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2916	1017	2033	0	-	0
Stage 1	2031	-	-	-	-	-
Stage 2	885	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	13	239	282	-	-	-
Stage 1	89	-	-	-	-	-
Stage 2	369	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	12	239	282	-	-	-
Mov Cap-2 Maneuver	66	-	-	-	-	-
Stage 1	85	-	-	-	-	-
Stage 2	369	-	-	-	-	-


















Approach	EB	NB	SB
HCM Control Delay, s	21.4	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	282	-	239	-	-
HCM Lane V/C Ratio	0.041	-	0.084	-	-
HCM Control Delay (s)	18.3	-	21.4	-	-
HCM Lane LOS	C	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

# HCM 6th Signalized Intersection Summary

## 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Background Conditions  
SAT MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	322	0	428	0	1266	0	0	1517	387
Future Volume (veh/h)	0	0	0	322	0	428	0	1266	0	0	1517	387
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No		No		No			No	
Adj Sat Flow, veh/h/ln				1984	0	1984	0	1984	0	0	1984	1984
Adj Flow Rate, veh/h				350	0	458	0	1361	0	0	1597	0
Peak Hour Factor				0.92	0.92	0.92	0.93	0.93	0.93	0.95	0.95	0.95
Percent Heavy Veh, %				1	0	1	0	1	0	0	1	1
Cap, veh/h				684	0	552	0	2739	0	0	2739	
Arrive On Green				0.19	0.00	0.19	0.00	0.73	0.00	0.00	1.00	0.00
Sat Flow, veh/h				3666	0	2960	0	3969	0	0	3870	1682
Grp Volume(v), veh/h				350	0	458	0	1361	0	0	1597	0
Grp Sat Flow(s),veh/h/ln				1833	0	1480	0	1885	0	0	1885	1682
Q Serve(g_s), s				12.0	0.0	20.9	0.0	21.6	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s				12.0	0.0	20.9	0.0	21.6	0.0	0.0	0.0	0.0
Prop In Lane				1.00		1.00	0.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				684	0	552	0	2739	0	0	2739	
V/C Ratio(X)				0.51	0.00	0.83	0.00	0.50	0.00	0.00	0.58	
Avail Cap(c_a), veh/h				1152	0	930	0	2739	0	0	2739	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				51.2	0.0	54.8	0.0	8.2	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh				0.6	0.0	3.3	0.0	0.6	0.0	0.0	0.9	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				5.7	0.0	8.1	0.0	7.6	0.0	0.0	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				51.8	0.0	58.1	0.0	8.8	0.0	0.0	0.9	0.0
LnGrp LOS				D	A	E	A	A	A	A	A	
Approach Vol, veh/h					808			1361			1597	
Approach Delay, s/veh					55.4			8.8			0.9	
Approach LOS					E			A			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		107.9				107.9		32.1				
Change Period (Y+Rc), s		* 6.2				* 6.2		6.0				
Max Green Setting (Gmax), s		* 84				* 84		44.0				
Max Q Clear Time (g_c+I1), s		23.6				2.0		22.9				
Green Ext Time (p_c), s		12.8				18.0		3.3				

### Intersection Summary

HCM 6th Ctrl Delay	15.5
HCM 6th LOS	B

### Notes

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



HCM 6th Signalized Intersection Summary  
 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Background Conditions  
 SAT MD Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	346	0	194	0	0	0	0	1188	420	0	1431	0
Future Volume (veh/h)	346	0	194	0	0	0	0	1188	420	0	1431	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No						No			No		
Adj Sat Flow, veh/h/ln	1984	1984	1984				0	1984	1984	0	1984	0
Adj Flow Rate, veh/h	433	0	85				0	1305	0	0	1539	0
Peak Hour Factor	0.88	0.88	0.88				0.91	0.91	0.91	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1				0	1	1	0	1	0
Cap, veh/h	527	0	234				0	2916		0	2916	0
Arrive On Green	0.14	0.00	0.14				0.00	0.77	0.00	0.00	0.77	0.00
Sat Flow, veh/h	3780	0	1682				0	3870	1682	0	3969	0
Grp Volume(v), veh/h	433	0	85				0	1305	0	0	1539	0
Grp Sat Flow(s),veh/h/ln	1984	0	1682				0	1885	1682	0	1885	0
Q Serve(g_s), s	15.6	0.0	6.4				0.0	16.8	0.0	0.0	21.9	0.0
Cycle Q Clear(g_c), s	15.6	0.0	6.4				0.0	16.8	0.0	0.0	21.9	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	527	0	234				0	2916		0	2916	0
V/C Ratio(X)	0.82	0.00	0.36				0.00	0.45		0.00	0.53	0.00
Avail Cap(c_a), veh/h	1188	0	529				0	2916		0	2916	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	58.6	0.0	54.6				0.0	5.5	0.0	0.0	6.1	0.0
Incr Delay (d2), s/veh	3.3	0.0	0.9				0.0	0.5	0.0	0.0	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.8	0.0	2.8				0.0	5.2	0.0	0.0	6.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.8	0.0	55.6				0.0	6.0	0.0	0.0	6.8	0.0
LnGrp LOS	E	A	E				A	A		A	A	A
Approach Vol, veh/h	518						1305			1539		
Approach Delay, s/veh	60.8						6.0			6.8		
Approach LOS	E						A			A		
Timer - Assigned Phs	2		4		6							
Phs Duration (G+Y+Rc), s	114.5		25.5		114.5							
Change Period (Y+Rc), s	* 6.2		6.0		* 6.2							
Max Green Setting (Gmax), s	* 84		44.0		* 84							
Max Q Clear Time (g_c+I1), s	18.8		17.6		23.9							
Green Ext Time (p_c), s	12.0		1.9		16.1							

Intersection Summary

























HCM 6th Ctrl Delay	14.8
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
 Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
 1: Rochester Road (M-150) & Auburn Road

Background Conditions  
 SAT PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	209	235	103	225	221	128	164	1160	141	146	1100	165
Future Volume (veh/h)	209	235	103	225	221	128	164	1160	141	146	1100	165
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Adj Flow Rate, veh/h	222	250	110	259	254	147	173	1221	148	155	1170	176
Peak Hour Factor	0.94	0.94	0.94	0.87	0.87	0.87	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	248	352	157	278	412	184	169	1841	821	169	1841	821
Arrive On Green	0.13	0.09	0.09	0.15	0.11	0.11	0.09	0.48	0.48	0.09	0.48	0.48
Sat Flow, veh/h	1905	3800	1695	1905	3800	1695	1905	3800	1695	1905	3800	1695
Grp Volume(v), veh/h	222	250	110	259	254	147	173	1221	148	155	1170	176
Grp Sat Flow(s),veh/h/ln	1905	1900	1695	1905	1900	1695	1905	1900	1695	1905	1900	1695
Q Serve(g_s), s	16.1	8.9	8.8	18.8	8.9	11.9	12.4	34.2	6.9	11.3	32.1	8.4
Cycle Q Clear(g_c), s	16.1	8.9	8.8	18.8	8.9	11.9	12.4	34.2	6.9	11.3	32.1	8.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	248	352	157	278	412	184	169	1841	821	169	1841	821
V/C Ratio(X)	0.90	0.71	0.70	0.93	0.62	0.80	1.03	0.66	0.18	0.92	0.64	0.21
Avail Cap(c_a), veh/h	278	635	283	278	635	283	169	1841	821	169	1841	821
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.0	61.7	61.6	59.1	59.6	60.9	63.8	27.4	20.4	63.3	26.9	20.8
Incr Delay (d2), s/veh	27.3	2.7	5.6	36.6	1.5	8.8	76.1	1.9	0.5	46.4	1.7	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.4	4.3	4.0	11.7	4.3	5.5	9.4	15.1	2.8	7.5	14.2	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	87.2	64.3	67.2	95.7	61.1	69.7	139.9	29.3	20.9	109.7	28.6	21.4
LnGrp LOS	F	E	E	F	E	E	F	C	C	F	C	C
Approach Vol, veh/h		582			660			1542			1501	
Approach Delay, s/veh		73.6			76.6			40.9			36.1	
Approach LOS		E			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	74.4	27.0	19.6	19.0	74.4	24.8	21.8				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 12	* 57	* 20	* 23	* 12	* 57	* 20	* 23				
Max Q Clear Time (g_c+I1), s	13.3	36.2	20.8	10.9	14.4	34.1	18.1	13.9				
Green Ext Time (p_c), s	0.0	8.8	0.0	1.3	0.0	8.8	0.1	1.3				

Intersection Summary

HCM 6th Ctrl Delay	49.2
HCM 6th LOS	D

Notes

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

HCM 6th Signalized Intersection Summary  
 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Background Conditions  
 SAT PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	
Traffic Volume (veh/h)	3	3	9	148	0	54	10	1392	75	70	1427	8
Future Volume (veh/h)	3	3	9	148	0	54	10	1392	75	70	1427	8
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Adj Flow Rate, veh/h	5	5	10	172	0	26	11	1481	62	78	1586	9
Peak Hour Factor	0.60	0.60	0.60	0.86	0.86	0.86	0.94	0.94	0.94	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	232	84	169	242	0	240	301	2928	1306	314	2985	17
Arrive On Green	0.14	0.14	0.14	0.14	0.00	0.14	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	1407	595	1190	1421	0	1695	324	3800	1695	341	3874	22
Grp Volume(v), veh/h	5	0	15	172	0	26	11	1481	62	78	778	817
Grp Sat Flow(s),veh/h/ln1407	0	1786	1421	0	1695	324	1900	1695	341	1900	1996	
Q Serve(g_s), s	0.4	0.0	1.0	16.7	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	2.3	0.0	1.0	17.7	0.0	1.9	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.67	1.00		1.00	1.00		1.00	1.00		0.01
Lane Grp Cap(c), veh/h	232	0	253	242	0	240	301	2928	1306	314	1464	1538
V/C Ratio(X)	0.02	0.00	0.06	0.71	0.00	0.11	0.04	0.51	0.05	0.25	0.53	0.53
Avail Cap(c_a), veh/h	254	0	281	264	0	266	301	2928	1306	314	1464	1538
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.4	0.0	52.0	59.7	0.0	52.4	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.0	0.0	0.1	7.7	0.0	0.2	0.2	0.6	0.1	1.9	1.4	1.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln0.2	0.0	0.0	0.5	6.6	0.0	0.8	0.0	0.3	0.0	0.2	0.6	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	53.4	0.0	52.1	67.4	0.0	52.6	0.2	0.6	0.1	1.9	1.4	1.3
LnGrp LOS	D	A	D	E	A	D	A	A	A	A	A	A
Approach Vol, veh/h		20		198				1554			1673	
Approach Delay, s/veh		52.4		65.5				0.6			1.4	
Approach LOS		D		E				A			A	
Timer - Assigned Phs		2		4				6			8	
Phs Duration (G+Y+Rc), s		114.2		25.8				114.2			25.8	
Change Period (Y+Rc), s		* 6.3		6.0				* 6.3			6.0	
Max Green Setting (Gmax), s*		1.1E2		22.0				* 1.1E2			22.0	
Max Q Clear Time (g_c+1), s		2.0		4.3				2.0			19.7	
Green Ext Time (p_c), s		16.6		0.0				20.3			0.1	

Intersection Summary

HCM 6th Ctrl Delay	5.0
HCM 6th LOS	A

Notes

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

HCM 6th TWSC  
 3: Rochester Road (M-150) & Hickory Lawn Road

Background Conditions  
 SAT PM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑↑	↑↑	
Traffic Vol, veh/h	0	6	4	1477	1583	1
Future Vol, veh/h	0	6	4	1477	1583	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	95	95	92	92
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	10	4	1555	1721	1

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2508	861	1722	0	-	0
Stage 1	1722	-	-	-	-	-
Stage 2	786	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	*35	*476	672	-	-	-
Stage 1	*413	-	-	-	-	-
Stage 2	*460	-	-	-	-	-
Platoon blocked, %	1	1	1	-	-	-
Mov Cap-1 Maneuver	*35	*476	672	-	-	-
Mov Cap-2 Maneuver	*214	-	-	-	-	-
Stage 1	*411	-	-	-	-	-
Stage 2	*460	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	12.7	0	0
HCM LOS	B		


















Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	672	-	476	-	-
HCM Lane V/C Ratio	0.006	-	0.021	-	-
HCM Control Delay (s)	10.4	-	12.7	-	-
HCM Lane LOS	B	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

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

# HCM 6th Signalized Intersection Summary

## 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Background Conditions  
SAT PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	342	0	400	0	1136	0	0	1110	358
Future Volume (veh/h)	0	0	0	342	0	400	0	1136	0	0	1110	358
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No		No		No			No	
Adj Sat Flow, veh/h/ln				2000	0	2000	0	2000	0	0	2000	2000
Adj Flow Rate, veh/h				376	0	437	0	1196	0	0	1194	0
Peak Hour Factor				0.91	0.91	0.91	0.95	0.95	0.95	0.93	0.93	0.93
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				660	0	533	0	2790	0	0	2790	
Arrive On Green				0.18	0.00	0.18	0.00	0.73	0.00	0.00	1.00	0.00
Sat Flow, veh/h				3695	0	2983	0	4000	0	0	3900	1695
Grp Volume(v), veh/h				376	0	437	0	1196	0	0	1194	0
Grp Sat Flow(s),veh/h/ln				1848	0	1492	0	1900	0	0	1900	1695
Q Serve(g_s), s				13.0	0.0	19.7	0.0	17.1	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s				13.0	0.0	19.7	0.0	17.1	0.0	0.0	0.0	0.0
Prop In Lane				1.00		1.00	0.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				660	0	533	0	2790	0	0	2790	
V/C Ratio(X)				0.57	0.00	0.82	0.00	0.43	0.00	0.00	0.43	
Avail Cap(c_a), veh/h				1161	0	938	0	2790	0	0	2790	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				52.6	0.0	55.3	0.0	7.2	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh				0.8	0.0	3.2	0.0	0.5	0.0	0.0	0.5	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				6.2	0.0	7.7	0.0	5.9	0.0	0.0	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				53.3	0.0	58.5	0.0	7.7	0.0	0.0	0.5	0.0
LnGrp LOS				D	A	E	A	A	A	A	A	
Approach Vol, veh/h					813			1196			1194	
Approach Delay, s/veh					56.1			7.7			0.5	
Approach LOS					E			A			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		109.0				109.0		31.0				
Change Period (Y+Rc), s		* 6.2				* 6.2		6.0				
Max Green Setting (Gmax), s		* 84				* 84		44.0				
Max Q Clear Time (g_c+I1), s		19.1				2.0		21.7				
Green Ext Time (p_c), s		10.3				10.3		3.3				

### Intersection Summary

HCM 6th Ctrl Delay	17.3
HCM 6th LOS	B

### Notes

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

# HCM 6th Signalized Intersection Summary

## 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Background Conditions  
SAT PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	270	0	199	0	0	0	0	1065	412	0	1205	0
Future Volume (veh/h)	270	0	199	0	0	0	0	1065	412	0	1205	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No						No			No		
Adj Sat Flow, veh/h/ln	2000	2000	2000				0	1984	1984	0	1984	0
Adj Flow Rate, veh/h	326	0	84				0	1121	0	0	1310	0
Peak Hour Factor	0.94	0.94	0.94				0.95	0.95	0.95	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0				0	1	1	0	1	0
Cap, veh/h	413	0	184				0	3033		0	3033	0
Arrive On Green	0.11	0.00	0.11				0.00	0.80	0.00	0.00	0.80	0.00
Sat Flow, veh/h	3810	0	1695				0	3870	1682	0	3969	0
Grp Volume(v), veh/h	326	0	84				0	1121	0	0	1310	0
Grp Sat Flow(s),veh/h/ln	1905	0	1695				0	1885	1682	0	1885	0
Q Serve(g_s), s	11.7	0.0	6.5				0.0	11.6	0.0	0.0	14.6	0.0
Cycle Q Clear(g_c), s	11.7	0.0	6.5				0.0	11.6	0.0	0.0	14.6	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	413	0	184				0	3033		0	3033	0
V/C Ratio(X)	0.79	0.00	0.46				0.00	0.37		0.00	0.43	0.00
Avail Cap(c_a), veh/h	1197	0	533				0	3033		0	3033	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	60.9	0.0	58.5				0.0	3.8	0.0	0.0	4.1	0.0
Incr Delay (d2), s/veh	3.4	0.0	1.8				0.0	0.3	0.0	0.0	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.9	0.0	2.9				0.0	3.2	0.0	0.0	4.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.3	0.0	60.3				0.0	4.2	0.0	0.0	4.6	0.0
LnGrp LOS	E	A	E				A	A		A	A	A
Approach Vol, veh/h	410						1121			1310		
Approach Delay, s/veh	63.5						4.2			4.6		
Approach LOS	E						A			A		
Timer - Assigned Phs	2		4		6							
Phs Duration (G+Y+Rc), s	118.8		21.2		118.8							
Change Period (Y+Rc), s	* 6.2		6.0		* 6.2							
Max Green Setting (Gmax), s	* 84		44.0		* 84							
Max Q Clear Time (g_c+I1), s	13.6		13.7		16.6							
Green Ext Time (p_c), s	9.3		1.5		12.1							

### Intersection Summary

HCM 6th Ctrl Delay	12.9
HCM 6th LOS	B

### Notes

User approved volume balancing among the lanes for turning movement.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
 Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

**Intersection: 1: Rochester Road (M-150) & Auburn Road**

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	239	229	280	169	305	226	227	182	158	243	259	160
Average Queue (ft)	126	110	98	100	180	149	138	73	70	112	117	49
95th Queue (ft)	206	185	220	173	285	214	207	144	137	195	203	124
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			4	12			3	0			2	0
Queuing Penalty (veh)			5	14			3	0			2	0

**Intersection: 1: Rochester Road (M-150) & Auburn Road**

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	163	370	381	202
Average Queue (ft)	72	204	216	47
95th Queue (ft)	133	312	317	138
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)			2	
Queuing Penalty (veh)			2	

**Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive**

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR	
Maximum Queue (ft)	12	38	149	65	34	61	90	30	67	101	138	
Average Queue (ft)	1	4	51	10	4	17	18	2	16	32	59	
95th Queue (ft)	7	21	114	39	21	49	60	17	46	82	127	
Link Distance (ft)	217	217	284	284		231	231	231		321	321	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					500				500			
Storage Blk Time (%)												
Queuing Penalty (veh)												

**Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road**

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	30	26
Average Queue (ft)	6	2
95th Queue (ft)	25	15
Link Distance (ft)	531	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	
Storage Blk Time (%)		
Queuing Penalty (veh)		

**Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp**

Movement	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	R	T	T	T	T
Maximum Queue (ft)	370	450	329	239	127	144	220	216
Average Queue (ft)	237	285	174	150	53	67	121	121
95th Queue (ft)	341	394	265	223	106	124	190	191
Link Distance (ft)			1030		150	150	311	311
Upstream Blk Time (%)					0	0		
Queuing Penalty (veh)					0	0		
Storage Bay Dist (ft)	250	250	250					
Storage Blk Time (%)	2	15	0	0				
Queuing Penalty (veh)	8	65	4	0				

**Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp**

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	272	339	291	122	150	38	150	187
Average Queue (ft)	135	214	156	45	49	1	72	98
95th Queue (ft)	247	302	266	98	111	27	139	179
Link Distance (ft)	936		1203		1203	229		
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	250	250		175				
Storage Blk Time (%)	0	4	0	0		0		
Queuing Penalty (veh)	0	9	0	0		0		

**Zone Summary**

Zone wide Queuing Penalty: 113



Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	333	249	273	175	450	213	245	196	380	436	442	200
Average Queue (ft)	182	158	147	107	226	118	103	81	150	270	283	114
95th Queue (ft)	296	234	238	187	396	184	182	153	292	439	453	241
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)									0	6	8	
Queuing Penalty (veh)									0	47	62	
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			14	9			1	1	0	6	33	0
Queuing Penalty (veh)			19	18			2	1	0	8	58	1

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	584	591	613	325
Average Queue (ft)	351	333	355	138
95th Queue (ft)	605	510	545	337
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)			19	
Queuing Penalty (veh)			31	

Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (ft)	35	51	224	80	35	195	224	34	210	222	251
Average Queue (ft)	3	8	122	33	8	88	103	10	82	78	108
95th Queue (ft)	19	32	202	71	29	173	204	32	183	206	231
Link Distance (ft)	217	217	284	284		231	231	231		321	321
Upstream Blk Time (%)			0			0	0		0	1	1
Queuing Penalty (veh)			0			0	1		0	5	4
Storage Bay Dist (ft)					500				500		
Storage Blk Time (%)						0			0	1	
Queuing Penalty (veh)						0			0	0	

**Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road**

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	34	32
Average Queue (ft)	9	5
95th Queue (ft)	31	23
Link Distance (ft)	531	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	
Storage Blk Time (%)		
Queuing Penalty (veh)		

**Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp**

Movement	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	R	T	T	T	T
Maximum Queue (ft)	255	310	298	275	189	194	296	312
Average Queue (ft)	143	193	185	163	113	127	152	178
95th Queue (ft)	233	270	269	249	186	200	255	282
Link Distance (ft)	1030				150	150	311	311
Upstream Blk Time (%)					2	4	0	0
Queuing Penalty (veh)					15	26	1	2
Storage Bay Dist (ft)	250	250	250					
Storage Blk Time (%)	0	2	1	0				
Queuing Penalty (veh)	0	9	9	3				

**Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp**

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	286	349	330	326	510	200	230	242
Average Queue (ft)	152	226	164	138	155	50	131	148
95th Queue (ft)	251	322	295	243	347	192	210	224
Link Distance (ft)	936			1203	1203		229	229
Upstream Blk Time (%)					0		0	0
Queuing Penalty (veh)					0		1	2
Storage Bay Dist (ft)	250	250		175				
Storage Blk Time (%)	0	5	0		2	0		
Queuing Penalty (veh)	0	15	1		14	0		

**Zone Summary**

Zone wide Queuing Penalty: 354

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	406	200	215	171	451	228	248	227	379	425	433	200
Average Queue (ft)	197	105	81	75	247	115	110	101	171	246	258	108
95th Queue (ft)	355	176	165	144	464	187	198	187	305	405	425	233
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)									0	2	3	
Queuing Penalty (veh)									0	13	20	
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			3	5			1	2	0	2	21	0
Queuing Penalty (veh)			4	7			2	3	1	2	35	1

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	755	963	996	325
Average Queue (ft)	408	603	640	230
95th Queue (ft)	821	1099	1145	434
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)		3	5	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)	0	4	40	
Queuing Penalty (veh)	0	8	83	

Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (ft)	47	52	281	111	30	188	208	39	321	379	368
Average Queue (ft)	11	12	179	41	4	112	127	14	209	231	233
95th Queue (ft)	36	40	294	89	19	186	201	38	375	442	388
Link Distance (ft)	217	217	284	284		231	231	231		321	321
Upstream Blk Time (%)			3			0	0		10	21	4
Queuing Penalty (veh)			0			0	0		0	182	35
Storage Bay Dist (ft)					500				500		
Storage Blk Time (%)						0			10	21	
Queuing Penalty (veh)						0			81	23	

**Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road**

Movement	EB	NB	SB
Directions Served	LR	L	TR
Maximum Queue (ft)	38	51	16
Average Queue (ft)	11	7	1
95th Queue (ft)	34	30	9
Link Distance (ft)	531		231
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		500	
Storage Blk Time (%)			
Queuing Penalty (veh)			

**Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp**

Movement	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	R	T	T	T	T
Maximum Queue (ft)	225	255	278	252	192	191	297	318
Average Queue (ft)	114	165	175	151	96	107	168	193
95th Queue (ft)	213	235	246	231	167	184	270	300
Link Distance (ft)			1030		150	150	311	311
Upstream Blk Time (%)					1	2	0	0
Queuing Penalty (veh)					7	15	1	3
Storage Bay Dist (ft)	250	250		250				
Storage Blk Time (%)	0	0	1	0				
Queuing Penalty (veh)	0	2	4	1				

**Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp**

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	283	358	315	269	305	200	231	254
Average Queue (ft)	149	218	149	138	136	38	119	138
95th Queue (ft)	263	319	276	239	250	166	204	223
Link Distance (ft)		936		1203	1203		229	229
Upstream Blk Time (%)							0	1
Queuing Penalty (veh)							2	5
Storage Bay Dist (ft)	250		250			175		
Storage Blk Time (%)	0	4	0		3	0		
Queuing Penalty (veh)	0	12	1		12	0		

**Zone Summary**

Zone wide Queuing Penalty: 564

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	287	197	203	166	330	163	162	169	274	336	367	200
Average Queue (ft)	188	100	75	73	193	90	71	83	179	173	175	65
95th Queue (ft)	291	167	154	133	308	148	137	151	272	295	303	178
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)										0	0	
Queuing Penalty (veh)										0	0	
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			2	2			0	0		0	6	0
Queuing Penalty (veh)			2	2			0	0		0	8	2

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	233	417	438	325
Average Queue (ft)	126	253	280	100
95th Queue (ft)	209	365	399	257
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)			8	
Queuing Penalty (veh)			14	

Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (ft)	24	43	256	107	39	157	183	30	128	183	209
Average Queue (ft)	2	11	128	30	6	82	92	9	51	75	115
95th Queue (ft)	15	36	219	70	26	153	172	30	108	144	188
Link Distance (ft)	217	217	284	284		231	231	231		321	321
Upstream Blk Time (%)			0								
Queuing Penalty (veh)			0								
Storage Bay Dist (ft)					500				500		
Storage Blk Time (%)											
Queuing Penalty (veh)											

**Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road**

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	34	26
Average Queue (ft)	6	2
95th Queue (ft)	25	14
Link Distance (ft)	531	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	
Storage Blk Time (%)		
Queuing Penalty (veh)		

**Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp**

Movement	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	R	T	T	T	T
Maximum Queue (ft)	239	270	274	246	178	187	244	261
Average Queue (ft)	126	172	169	144	92	102	144	150
95th Queue (ft)	222	249	246	222	166	181	232	241
Link Distance (ft)	1030				150	150	311	311
Upstream Blk Time (%)					1	2		
Queuing Penalty (veh)					5	10		
Storage Bay Dist (ft)	250	250	250					
Storage Blk Time (%)	0	1	1	0				
Queuing Penalty (veh)	0	3	4	0				

**Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp**

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	249	292	252	245	273	159	242	252
Average Queue (ft)	125	184	120	114	100	8	120	141
95th Queue (ft)	221	257	231	207	210	73	214	231
Link Distance (ft)	936			1203	1203		229	229
Upstream Blk Time (%)							0	1
Queuing Penalty (veh)							2	4
Storage Bay Dist (ft)	250	250		175				
Storage Blk Time (%)	0	1	0		1	0		
Queuing Penalty (veh)	0	2	0		4	0		

























**Zone Summary**

Zone wide Queuing Penalty: 65

# HCM 6th Signalized Intersection Summary

## 1: Rochester Road (M-150) & Auburn Road

Future Conditions (Opening Day)  
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	148	221	130	208	352	90	76	767	122	72	1074	114
Future Volume (veh/h)	148	221	130	208	352	90	76	767	122	72	1074	114
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1953	1953	1953	1953	1953	1953	1953	1953	1953	1969	1969	1969
Adj Flow Rate, veh/h	166	248	146	221	374	96	95	959	152	76	1131	120
Peak Hour Factor	0.89	0.89	0.89	0.94	0.94	0.94	0.80	0.80	0.80	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	2	2	2
Cap, veh/h	192	386	172	245	492	219	112	1945	867	97	1929	860
Arrive On Green	0.10	0.10	0.10	0.13	0.13	0.13	0.06	0.52	0.52	0.05	0.52	0.52
Sat Flow, veh/h	1860	3711	1655	1860	3711	1655	1860	3711	1655	1875	3741	1668
Grp Volume(v), veh/h	166	248	146	221	374	96	95	959	152	76	1131	120
Grp Sat Flow(s),veh/h/ln	1860	1856	1655	1860	1856	1655	1860	1856	1655	1875	1870	1668
Q Serve(g_s), s	12.3	9.0	12.1	16.4	13.6	7.5	7.1	23.2	6.7	5.6	29.4	5.3
Cycle Q Clear(g_c), s	12.3	9.0	12.1	16.4	13.6	7.5	7.1	23.2	6.7	5.6	29.4	5.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	192	386	172	245	492	219	112	1945	867	97	1929	860
V/C Ratio(X)	0.86	0.64	0.85	0.90	0.76	0.44	0.85	0.49	0.18	0.79	0.59	0.14
Avail Cap(c_a), veh/h	258	435	194	258	492	219	112	1945	867	113	1929	860
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.8	60.2	61.6	59.9	58.6	55.9	65.2	21.4	17.5	65.6	23.5	17.7
Incr Delay (d2), s/veh	19.9	2.7	25.9	30.8	6.8	1.4	43.0	0.9	0.4	26.3	1.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	4.3	6.2	9.7	6.7	3.2	4.6	9.8	2.6	3.3	12.6	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	81.7	62.9	87.6	90.7	65.4	57.3	108.2	22.3	17.9	92.0	24.9	18.0
LnGrp LOS	F	E	F	F	E	E	F	C	B	F	C	B
Approach Vol, veh/h		560			691			1206			1327	
Approach Delay, s/veh		74.9			72.3			28.5			28.1	
Approach LOS		E			E			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.8	80.0	25.0	21.2	15.0	78.8	21.0	25.2				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 8.4	* 69	* 19	* 16	* 8.4	* 69	* 19	* 16				
Max Q Clear Time (g_c+I1), s	7.6	25.2	18.4	14.1	9.1	31.4	14.3	15.6				
Green Ext Time (p_c), s	0.0	7.9	0.1	0.4	0.0	9.5	0.2	0.2				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				43.2								
HCM 6th LOS				D								
<b>Notes</b>												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary  
 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Future Conditions (Opening Day)  
 AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (veh/h)	28	5	30	57	3	12	32	988	33	23	1401	29
Future Volume (veh/h)	28	5	30	57	3	12	32	988	33	23	1401	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	2000	2000	2000	1891	1891	1891	1938	1938	1938	1969	1969	1969
Adj Flow Rate, veh/h	44	8	46	80	4	0	37	1136	33	25	1540	32
Peak Hour Factor	0.63	0.63	0.63	0.71	0.71	0.71	0.87	0.87	0.87	0.91	0.91	0.91
Percent Heavy Veh, %	0	0	0	7	7	7	4	4	4	2	2	2
Cap, veh/h	199	27	154	150	198	0	311	2973	1326	439	3027	63
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	1435	257	1477	1297	1891	0	321	3681	1642	480	3747	78
Grp Volume(v), veh/h	44	0	54	80	4	0	37	1136	33	25	768	804
Grp Sat Flow(s),veh/h/ln	1435	0	1734	1297	1891	0	321	1841	1642	480	1870	1955
Q Serve(g_s), s	4.0	0.0	4.0	8.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	4.2	0.0	4.0	12.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.85	1.00		0.00	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	199	0	181	150	198	0	311	2973	1326	439	1511	1579
V/C Ratio(X)	0.22	0.00	0.30	0.53	0.02	0.00	0.12	0.38	0.02	0.06	0.51	0.51
Avail Cap(c_a), veh/h	274	0	273	218	297	0	311	2973	1326	439	1511	1579
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.2	0.0	57.9	63.7	56.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.9	2.9	0.0	0.0	0.8	0.4	0.0	0.2	1.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	1.8	3.0	0.1	0.0	0.1	0.2	0.0	0.0	0.5	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.7	0.0	58.8	66.7	56.3	0.0	0.8	0.4	0.0	0.2	1.2	1.2
LnGrp LOS	E	A	E	E	E	A	A	A	A	A	A	A
Approach Vol, veh/h		98			84			1206			1597	
Approach Delay, s/veh		58.8			66.2			0.4			1.2	
Approach LOS		E			E			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		119.4		20.6		119.4		20.6				
Change Period (Y+Rc), s		* 6.3		6.0		* 6.3		6.0				
Max Green Setting (Gmax), s*		1.1E2		22.0		* 1.1E2		22.0				
Max Q Clear Time (g_c+1), s		2.0		6.2		2.0		14.5				
Green Ext Time (p_c), s		11.3		0.3		16.4		0.1				

Intersection Summary

HCM 6th Ctrl Delay	4.6
HCM 6th LOS	A

Notes

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



HCM 6th TWSC  
3: Rochester Road (M-150) & Hickory Lawn Road

Future Conditions (Opening Day)  
AM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑↑	↑↑	
Traffic Vol, veh/h	0	5	3	1053	1488	0
Future Vol, veh/h	0	5	3	1053	1488	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	87	87	91	91
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	8	3	1210	1635	0

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	2246	818	1635	0	0
Stage 1	1635	-	-	-	-
Stage 2	611	-	-	-	-
Critical Hdwy	6.8	6.9	4.18	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.24	-	-
Pot Cap-1 Maneuver	*236	*497	729	-	-
Stage 1	*466	-	-	-	-
Stage 2	*627	-	-	-	-
Platoon blocked, %	1	1	1	-	-
Mov Cap-1 Maneuver	*235	*497	729	-	-
Mov Cap-2 Maneuver	*346	-	-	-	-
Stage 1	*464	-	-	-	-
Stage 2	*627	-	-	-	-


















Approach	EB	NB	SB
HCM Control Delay, s	12.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	729	-	497	-	-
HCM Lane V/C Ratio	0.005	-	0.016	-	-
HCM Control Delay (s)	10	-	12.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

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

HCM 6th Signalized Intersection Summary  
 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Future Conditions (Opening Day)  
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	629	0	441	0	686	0	0	1163	338
Future Volume (veh/h)	0	0	0	629	0	441	0	686	0	0	1163	338
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No			No			No		
Adj Sat Flow, veh/h/ln				1969	0	1969	0	1938	0	0	1969	1969
Adj Flow Rate, veh/h				676	0	474	0	807	0	0	1278	0
Peak Hour Factor				0.93	0.93	0.93	0.85	0.85	0.85	0.91	0.91	0.91
Percent Heavy Veh, %				2	0	2	0	4	0	0	2	2
Cap, veh/h				790	0	638	0	2561	0	0	2603	
Arrive On Green				0.22	0.00	0.22	0.00	1.00	0.00	0.00	0.47	0.00
Sat Flow, veh/h				3638	0	2937	0	3875	0	0	3839	1668
Grp Volume(v), veh/h				676	0	474	0	807	0	0	1278	0
Grp Sat Flow(s),veh/h/ln				1819	0	1468	0	1841	0	0	1870	1668
Q Serve(g_s), s				25.0	0.0	21.1	0.0	0.0	0.0	0.0	33.1	0.0
Cycle Q Clear(g_c), s				25.0	0.0	21.1	0.0	0.0	0.0	0.0	33.1	0.0
Prop In Lane				1.00		1.00	0.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				790	0	638	0	2561	0	0	2603	
V/C Ratio(X)				0.86	0.00	0.74	0.00	0.32	0.00	0.00	0.49	
Avail Cap(c_a), veh/h				935	0	755	0	2561	0	0	2603	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	1.00	1.00	0.67	0.67
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				52.7	0.0	51.2	0.0	0.0	0.0	0.0	20.2	0.0
Incr Delay (d2), s/veh				6.9	0.0	3.3	0.0	0.3	0.0	0.0	0.7	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				12.3	0.0	8.1	0.0	0.1	0.0	0.0	15.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				59.6	0.0	54.5	0.0	0.3	0.0	0.0	20.9	0.0
LnGrp LOS				E	A	D	A	A	A	A	C	
Approach Vol, veh/h					1150			807			1278	
Approach Delay, s/veh					57.5			0.3			20.9	
Approach LOS					E			A			C	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		103.6				103.6		36.4				
Change Period (Y+Rc), s		* 6.2				* 6.2		6.0				
Max Green Setting (Gmax), s		* 92				* 92		36.0				
Max Q Clear Time (g_c+I1), s		2.0				35.1		27.0				
Green Ext Time (p_c), s		5.8				11.4		3.4				

Intersection Summary

HCM 6th Ctrl Delay	28.8
HCM 6th LOS	C

Notes

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

HCM 6th Signalized Intersection Summary  
 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Future Conditions (Opening Day)  
 AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	259	0	223	0	0	0	0	622	296	0	1473	0
Future Volume (veh/h)	259	0	223	0	0	0	0	622	296	0	1473	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No						No			No		
Adj Sat Flow, veh/h/ln	1906	1906	1906				0	1953	1953	0	1969	0
Adj Flow Rate, veh/h	312	0	73				0	749	0	0	1637	0
Peak Hour Factor	0.93	0.93	0.93				0.83	0.83	0.83	0.90	0.90	0.90
Percent Heavy Veh, %	6	6	6				0	3	3	0	2	0
Cap, veh/h	388	0	172				0	2991		0	3015	0
Arrive On Green	0.11	0.00	0.11				0.00	0.81	0.00	0.00	1.00	0.00
Sat Flow, veh/h	3631	0	1616				0	3809	1655	0	3938	0
Grp Volume(v), veh/h	312	0	73				0	749	0	0	1637	0
Grp Sat Flow(s),veh/h/ln	1816	0	1616				0	1856	1655	0	1870	0
Q Serve(g_s), s	11.8	0.0	5.9				0.0	6.9	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	11.8	0.0	5.9				0.0	6.9	0.0	0.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	388	0	172				0	2991		0	3015	0
V/C Ratio(X)	0.80	0.00	0.42				0.00	0.25		0.00	0.54	0.00
Avail Cap(c_a), veh/h	726	0	323				0	2991		0	3015	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	61.1	0.0	58.5				0.0	3.3	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	4.0	0.0	1.6				0.0	0.2	0.0	0.0	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	0.0	2.5				0.0	1.8	0.0	0.0	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.1	0.0	60.1				0.0	3.5	0.0	0.0	0.7	0.0
LnGrp LOS	E	A	E				A	A		A	A	A
Approach Vol, veh/h	385						749			1637		
Approach Delay, s/veh	64.1						3.5			0.7		
Approach LOS	E						A			A		
Timer - Assigned Phs	2		4		6							
Phs Duration (G+Y+Rc), s	119.1		20.9		119.1							
Change Period (Y+Rc), s	* 6.2		6.0		* 6.2							
Max Green Setting (Gmax), s	* 1E2		28.0		* 1E2							
Max Q Clear Time (g_c+I1), s	8.9		13.8		2.0							
Green Ext Time (p_c), s	5.3		1.2		19.3							

Intersection Summary

























HCM 6th Ctrl Delay	10.3
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
 Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
 1: Rochester Road (M-150) & Auburn Road

Future Conditions (Opening Day)  
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	210	407	155	226	298	131	157	1357	191	187	1301	160
Future Volume (veh/h)	210	407	155	226	298	131	157	1357	191	187	1301	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984
Adj Flow Rate, veh/h	231	447	170	279	368	162	167	1444	203	201	1399	172
Peak Hour Factor	0.91	0.91	0.91	0.81	0.81	0.81	0.94	0.94	0.94	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	256	530	236	275	569	254	167	1646	734	167	1646	734
Arrive On Green	0.14	0.14	0.14	0.15	0.15	0.15	0.18	0.87	0.87	0.09	0.44	0.44
Sat Flow, veh/h	1890	3770	1682	1890	3770	1682	1890	3770	1682	1890	3770	1682
Grp Volume(v), veh/h	231	447	170	279	368	162	167	1444	203	201	1399	172
Grp Sat Flow(s),veh/h/ln	1890	1885	1682	1890	1885	1682	1890	1885	1682	1890	1885	1682
Q Serve(g_s), s	16.9	16.2	13.5	20.4	12.9	12.7	12.4	29.0	2.8	12.4	46.5	9.0
Cycle Q Clear(g_c), s	16.9	16.2	13.5	20.4	12.9	12.7	12.4	29.0	2.8	12.4	46.5	9.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	256	530	236	275	569	254	167	1646	734	167	1646	734
V/C Ratio(X)	0.90	0.84	0.72	1.01	0.65	0.64	1.00	0.88	0.28	1.20	0.85	0.23
Avail Cap(c_a), veh/h	275	630	281	275	630	281	167	1646	734	167	1646	734
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.6	58.7	57.5	59.8	55.9	55.9	57.6	6.8	5.2	63.8	35.3	24.7
Incr Delay (d2), s/veh	29.3	8.9	7.0	57.6	2.0	4.1	68.8	6.9	0.9	133.8	5.7	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.9	8.2	6.1	14.0	6.2	5.6	8.4	4.8	1.0	12.0	21.5	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	88.9	67.6	64.6	117.4	57.9	60.0	126.4	13.8	6.1	197.6	41.0	25.5
LnGrp LOS	F	E	E	F	E	E	F	B	A	F	D	C
Approach Vol, veh/h		848			809			1814			1772	
Approach Delay, s/veh		72.8			78.9			23.3			57.3	
Approach LOS		E			E			C			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	67.7	27.0	26.3	19.0	67.7	25.6	27.7				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 12	* 57	* 20	* 23	* 12	* 57	* 20	* 23				
Max Q Clear Time (g_c+I1), s	14.4	31.0	22.4	18.2	14.4	48.5	18.9	14.9				
Green Ext Time (p_c), s	0.0	12.2	0.0	1.5	0.0	5.8	0.1	1.8				

Intersection Summary

HCM 6th Ctrl Delay	51.3
HCM 6th LOS	D

Notes

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

# HCM 6th Signalized Intersection Summary

## 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Future Conditions (Opening Day)  
PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (veh/h)	86	9	98	147	9	62	99	1641	90	65	1570	87
Future Volume (veh/h)	86	9	98	147	9	62	99	1641	90	65	1570	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	1984	1984	1984	1984	1984	1984	1969	1969	1969
Adj Flow Rate, veh/h	143	15	153	162	10	44	104	1727	76	69	1670	93
Peak Hour Factor	0.60	0.60	0.60	0.91	0.91	0.91	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	1	1	1	1	1	1	2	2	2
Cap, veh/h	331	35	358	230	73	323	238	2576	1149	230	2462	136
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	1371	153	1565	1227	320	1410	273	3770	1682	261	3604	199
Grp Volume(v), veh/h	143	0	168	162	0	54	104	1727	76	69	862	901
Grp Sat Flow(s),veh/h/ln	1371	0	1718	1227	0	1731	273	1885	1682	261	1870	1933
Q Serve(g_s), s	13.0	0.0	11.7	18.2	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	16.4	0.0	11.7	29.9	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.91	1.00		0.81	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	331	0	394	230	0	396	238	2576	1149	230	1278	1320
V/C Ratio(X)	0.43	0.00	0.43	0.70	0.00	0.14	0.44	0.67	0.07	0.30	0.67	0.68
Avail Cap(c_a), veh/h	350	0	417	247	0	420	238	2576	1149	230	1278	1320
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.5	0.0	46.1	58.9	0.0	42.9	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.9	0.0	0.7	8.1	0.0	0.2	5.7	1.4	0.1	3.3	2.9	2.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	0.0	5.2	6.2	0.0	1.5	0.4	0.5	0.0	0.2	1.0	1.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.4	0.0	46.8	67.0	0.0	43.1	5.7	1.4	0.1	3.3	2.9	2.9
LnGrp LOS	D	A	D	E	A	D	A	A	A	A	A	A
Approach Vol, veh/h		311			216			1907			1832	
Approach Delay, s/veh		48.5			61.0			1.6			2.9	
Approach LOS		D			E			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		101.9		38.1		101.9		38.1				
Change Period (Y+Rc), s		* 6.3		6.0		* 6.3		6.0				
Max Green Setting (Gmax), s		* 94		34.0		* 94		34.0				
Max Q Clear Time (g_c+1), s		2.0		18.4		2.0		31.9				
Green Ext Time (p_c), s		31.4		1.3		26.6		0.2				

### Intersection Summary

HCM 6th Ctrl Delay	8.6
HCM 6th LOS	A

### Notes

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

HCM 6th TWSC  
 3: Rochester Road (M-150) & Hickory Lawn Road

Future Conditions (Opening Day)  
 PM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑↑	↑↑	
Traffic Vol, veh/h	0	9	8	1830	1813	2
Future Vol, veh/h	0	9	8	1830	1813	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	95	95	94	94
Heavy Vehicles, %	0	0	1	1	1	1
Mvmt Flow	0	15	8	1926	1929	2

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2909	966	1931	0	-	0
Stage 1	1930	-	-	-	-	-
Stage 2	979	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.12	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.21	-	-	-
Pot Cap-1 Maneuver	-	*371	*554	-	-	-
Stage 1	*349	-	-	-	-	-
Stage 2	*313	-	-	-	-	-
Platoon blocked, %	2	1	1	-	-	-
Mov Cap-1 Maneuver	-	*371	*554	-	-	-
Mov Cap-2 Maneuver	*149	-	-	-	-	-
Stage 1	*345	-	-	-	-	-
Stage 2	*313	-	-	-	-	-


















Approach	EB	NB	SB
HCM Control Delay, s		0.1	0
HCM LOS	-		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	* 554	-	-	-	-
HCM Lane V/C Ratio	0.015	-	-	-	-
HCM Control Delay (s)	11.6	-	-	-	-
HCM Lane LOS	B	-	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

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

HCM 6th Signalized Intersection Summary  
 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Future Conditions (Opening Day)  
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	393	0	492	0	1385	0	0	1409	429
Future Volume (veh/h)	0	0	0	393	0	492	0	1385	0	0	1409	429
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No		No		No			No	
Adj Sat Flow, veh/h/ln				1984	0	1984	0	1984	0	0	1984	1984
Adj Flow Rate, veh/h				452	0	561	0	1473	0	0	1483	0
Peak Hour Factor				0.87	0.87	0.87	0.94	0.94	0.94	0.95	0.95	0.95
Percent Heavy Veh, %				1	0	1	0	1	0	0	1	1
Cap, veh/h				817	0	660	0	2601	0	0	2601	
Arrive On Green				0.22	0.00	0.22	0.00	0.69	0.00	0.00	1.00	0.00
Sat Flow, veh/h				3666	0	2960	0	3969	0	0	3870	1682
Grp Volume(v), veh/h				452	0	561	0	1473	0	0	1483	0
Grp Sat Flow(s),veh/h/ln				1833	0	1480	0	1885	0	0	1885	1682
Q Serve(g_s), s				15.3	0.0	25.4	0.0	27.8	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s				15.3	0.0	25.4	0.0	27.8	0.0	0.0	0.0	0.0
Prop In Lane				1.00		1.00	0.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				817	0	660	0	2601	0	0	2601	
V/C Ratio(X)				0.55	0.00	0.85	0.00	0.57	0.00	0.00	0.57	
Avail Cap(c_a), veh/h				1100	0	888	0	2601	0	0	2601	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				48.2	0.0	52.2	0.0	11.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh				0.6	0.0	6.0	0.0	0.9	0.0	0.0	0.9	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				7.2	0.0	10.1	0.0	10.3	0.0	0.0	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				48.8	0.0	58.2	0.0	11.9	0.0	0.0	0.9	0.0
LnGrp LOS				D	A	E	A	B	A	A	A	
Approach Vol, veh/h					1013			1473			1483	
Approach Delay, s/veh					54.0			11.9			0.9	
Approach LOS					D			B			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		102.8				102.8		37.2				
Change Period (Y+Rc), s		* 6.2				* 6.2		6.0				
Max Green Setting (Gmax), s		* 86				* 86		42.0				
Max Q Clear Time (g_c+I1), s		29.8				2.0		27.4				
Green Ext Time (p_c), s		14.6				15.5		3.8				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay				18.6								
HCM 6th LOS				B								
<b>Notes</b>												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.												

HCM 6th Signalized Intersection Summary  
5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Future Conditions (Opening Day)  
PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	335	0	246	0	0	0	0	1404	604	0	1298	0
Future Volume (veh/h)	335	0	246	0	0	0	0	1404	604	0	1298	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No						No			No		
Adj Sat Flow, veh/h/ln	1953	1953	1953				0	1984	1984	0	1984	0
Adj Flow Rate, veh/h	441	0	90				0	1526	0	0	1381	0
Peak Hour Factor	0.84	0.84	0.84				0.92	0.92	0.92	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	1	1	0	1	0
Cap, veh/h	528	0	235				0	2907		0	2907	0
Arrive On Green	0.14	0.00	0.14				0.00	0.77	0.00	0.00	0.77	0.00
Sat Flow, veh/h	3720	0	1655				0	3870	1682	0	3969	0
Grp Volume(v), veh/h	441	0	90				0	1526	0	0	1381	0
Grp Sat Flow(s),veh/h/ln	1860	0	1655				0	1885	1682	0	1885	0
Q Serve(g_s), s	16.2	0.0	6.9				0.0	21.8	0.0	0.0	18.5	0.0
Cycle Q Clear(g_c), s	16.2	0.0	6.9				0.0	21.8	0.0	0.0	18.5	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	528	0	235				0	2907		0	2907	0
V/C Ratio(X)	0.84	0.00	0.38				0.00	0.52		0.00	0.48	0.00
Avail Cap(c_a), veh/h	850	0	378				0	2907		0	2907	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	58.5	0.0	54.5				0.0	6.2	0.0	0.0	5.8	0.0
Incr Delay (d2), s/veh	4.0	0.0	1.0				0.0	0.7	0.0	0.0	0.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.0	0.0	3.0				0.0	6.8	0.0	0.0	5.8	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.5	0.0	55.5				0.0	6.8	0.0	0.0	6.4	0.0
LnGrp LOS	E	A	E				A	A		A	A	A
Approach Vol, veh/h	531						1526			1381		
Approach Delay, s/veh	61.3						6.8			6.4		
Approach LOS	E						A			A		
Timer - Assigned Phs	2		4		6							
Phs Duration (G+Y+Rc), s	114.1		25.9		114.1							
Change Period (Y+Rc), s	* 6.2		6.0		* 6.2							
Max Green Setting (Gmax), s	* 96		32.0		* 96							
Max Q Clear Time (g_c+I1), s	23.8		18.2		20.5							
Green Ext Time (p_c), s	16.2		1.7		13.4							

Intersection Summary

HCM 6th Ctrl Delay	15.1
HCM 6th LOS	B

























Notes

User approved volume balancing among the lanes for turning movement.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
 Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.



HCM 6th Signalized Intersection Summary  
 1: Rochester Road (M-150) & Auburn Road

Future Conditions (Opening Day)  
 SAT MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	213	265	125	260	297	149	169	1353	186	185	1396	209
Future Volume (veh/h)	213	265	125	260	297	149	169	1353	186	185	1396	209
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	2000	2000	2000	1984	1984	1984
Adj Flow Rate, veh/h	296	368	174	274	313	157	178	1424	196	197	1485	222
Peak Hour Factor	0.72	0.72	0.72	0.95	0.95	0.95	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	1	1	1
Cap, veh/h	275	477	213	275	477	213	169	1713	764	167	1699	758
Arrive On Green	0.15	0.13	0.13	0.15	0.13	0.13	0.09	0.45	0.45	0.09	0.45	0.45
Sat Flow, veh/h	1890	3770	1682	1890	3770	1682	1905	3800	1695	1890	3770	1682
Grp Volume(v), veh/h	296	368	174	274	313	157	178	1424	196	197	1485	222
Grp Sat Flow(s),veh/h/ln	1890	1885	1682	1890	1885	1682	1905	1900	1695	1890	1885	1682
Q Serve(g_s), s	20.4	13.2	14.1	20.3	11.1	12.6	12.4	46.1	10.1	12.4	50.0	11.7
Cycle Q Clear(g_c), s	20.4	13.2	14.1	20.3	11.1	12.6	12.4	46.1	10.1	12.4	50.0	11.7
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	275	477	213	275	477	213	169	1713	764	167	1699	758
V/C Ratio(X)	1.07	0.77	0.82	0.99	0.66	0.74	1.06	0.83	0.26	1.18	0.87	0.29
Avail Cap(c_a), veh/h	275	630	281	275	630	281	169	1713	764	167	1699	758
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.8	59.2	59.6	59.7	58.3	58.9	63.8	33.8	23.9	63.8	34.8	24.3
Incr Delay (d2), s/veh	75.5	4.3	13.2	52.8	1.5	7.0	84.6	4.9	0.8	125.1	6.6	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.3	6.4	6.7	13.5	5.3	5.7	9.8	21.2	4.1	11.6	23.1	4.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	135.3	63.5	72.8	112.5	59.8	65.9	148.4	38.6	24.7	188.9	41.4	25.3
LnGrp LOS	F	E	E	F	E	E	F	D	C	F	D	C
Approach Vol, veh/h		838			744			1798			1904	
Approach Delay, s/veh		90.8			80.5			48.0			54.8	
Approach LOS		F			F			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	69.7	27.0	24.3	19.0	69.7	27.0	24.3				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 12	* 57	* 20	* 23	* 12	* 57	* 20	* 23				
Max Q Clear Time (g_c+I1), s	14.4	48.1	22.3	16.1	14.4	52.0	22.4	14.6				
Green Ext Time (p_c), s	0.0	6.2	0.0	1.6	0.0	4.1	0.0	1.5				

Intersection Summary

HCM 6th Ctrl Delay	61.8
HCM 6th LOS	E

Notes

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

HCM 6th Signalized Intersection Summary  
 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Future Conditions (Opening Day)  
 SAT MD Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↖	↖	↑↑	↗
Traffic Volume (veh/h)	105	10	104	201	9	72	100	1507	114	113	1629	107
Future Volume (veh/h)	105	10	104	201	9	72	100	1507	114	113	1629	107
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	2000	2000	2000	1984	1984	1984	1984	1984	1984
Adj Flow Rate, veh/h	140	13	134	221	10	36	105	1586	99	119	1715	113
Peak Hour Factor	0.75	0.75	0.75	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	1	1	1	1	1	1
Cap, veh/h	237	24	246	150	60	216	245	2847	1270	274	2712	177
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	1381	152	1566	1260	381	1372	257	3770	1682	295	3593	235
Grp Volume(v), veh/h	140	0	147	221	0	46	105	1586	99	119	893	935
Grp Sat Flow(s),veh/h/ln	1381	0	1718	1260	0	1753	257	1885	1682	295	1885	1942
Q Serve(g_s), s	13.7	0.0	11.0	11.0	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	16.8	0.0	11.0	22.0	0.0	3.2	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.91	1.00		0.78	1.00		1.00	1.00		0.12
Lane Grp Cap(c), veh/h	237	0	270	150	0	275	245	2847	1270	274	1423	1466
V/C Ratio(X)	0.59	0.00	0.54	1.47	0.00	0.17	0.43	0.56	0.08	0.43	0.63	0.64
Avail Cap(c_a), veh/h	237	0	270	150	0	275	245	2847	1270	274	1423	1466
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.4	0.0	54.4	66.4	0.0	51.1	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	3.8	0.0	2.3	245.0	0.0	0.3	5.4	0.8	0.1	4.9	2.1	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	0.0	5.0	15.7	0.0	1.4	0.4	0.3	0.0	0.4	0.8	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.2	0.0	56.6	311.4	0.0	51.4	5.4	0.8	0.1	4.9	2.1	2.1
LnGrp LOS	E	A	E	F	A	D	A	A	A	A	A	A
Approach Vol, veh/h		287			267			1790			1947	
Approach Delay, s/veh		59.3			266.6			1.0			2.3	
Approach LOS		E			F			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		112.0		28.0		112.0		28.0				
Change Period (Y+Rc), s		* 6.3		6.0		* 6.3		6.0				
Max Green Setting (Gmax), s*		1.1E2		22.0		* 1.1E2		22.0				
Max Q Clear Time (g_c+1), s		2.0		18.8		2.0		24.0				
Green Ext Time (p_c), s		28.4		0.4		33.3		0.0				

Intersection Summary

HCM 6th Ctrl Delay	22.0
HCM 6th LOS	C

Notes

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

HCM 6th TWSC  
 3: Rochester Road (M-150) & Hickory Lawn Road

Future Conditions (Opening Day)  
 SAT MD Peak Hour

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↑↑	↑↑	
Traffic Vol, veh/h	0	13	11	1721	1930	4
Future Vol, veh/h	0	13	11	1721	1930	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	65	65	95	95	91	91
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	20	12	1812	2121	4

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	3053	1063	2125	0	-	0
Stage 1	2123	-	-	-	-	-
Stage 2	930	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	10	223	260	-	-	-
Stage 1	80	-	-	-	-	-
Stage 2	349	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	10	223	260	-	-	-
Mov Cap-2 Maneuver	60	-	-	-	-	-
Stage 1	76	-	-	-	-	-
Stage 2	349	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.7	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	260	-	223	-	-
HCM Lane V/C Ratio	0.045	-	0.09	-	-
HCM Control Delay (s)	19.5	-	22.7	-	-
HCM Lane LOS	C	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

HCM 6th Signalized Intersection Summary  
 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Future Conditions (Opening Day)  
 SAT MD Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations				↔		↔		↕			↕	↔
Traffic Volume (veh/h)	0	0	0	322	0	450	0	1329	0	0	1585	403
Future Volume (veh/h)	0	0	0	322	0	450	0	1329	0	0	1585	403
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No		No		No			No	
Adj Sat Flow, veh/h/ln				1984	0	1984	0	1984	0	0	1984	1984
Adj Flow Rate, veh/h				350	0	482	0	1429	0	0	1668	0
Peak Hour Factor				0.92	0.92	0.92	0.93	0.93	0.93	0.95	0.95	0.95
Percent Heavy Veh, %				1	0	1	0	1	0	0	1	1
Cap, veh/h				714	0	576	0	2708	0	0	2708	
Arrive On Green				0.19	0.00	0.19	0.00	0.72	0.00	0.00	1.00	0.00
Sat Flow, veh/h				3666	0	2960	0	3969	0	0	3870	1682
Grp Volume(v), veh/h				350	0	482	0	1429	0	0	1668	0
Grp Sat Flow(s),veh/h/ln				1833	0	1480	0	1885	0	0	1885	1682
Q Serve(g_s), s				11.9	0.0	21.9	0.0	24.1	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s				11.9	0.0	21.9	0.0	24.1	0.0	0.0	0.0	0.0
Prop In Lane				1.00		1.00	0.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				714	0	576	0	2708	0	0	2708	
V/C Ratio(X)				0.49	0.00	0.84	0.00	0.53	0.00	0.00	0.62	
Avail Cap(c_a), veh/h				1152	0	930	0	2708	0	0	2708	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				50.2	0.0	54.2	0.0	9.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh				0.5	0.0	3.7	0.0	0.7	0.0	0.0	1.1	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				5.6	0.0	8.5	0.0	8.6	0.0	0.0	0.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				50.7	0.0	57.9	0.0	9.7	0.0	0.0	1.1	0.0
LnGrp LOS				D	A	E	A	A	A	A	A	
Approach Vol, veh/h					832			1429			1668	
Approach Delay, s/veh					54.9			9.7			1.1	
Approach LOS					D			A			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		106.7				106.7		33.3				
Change Period (Y+Rc), s		* 6.2				* 6.2		6.0				
Max Green Setting (Gmax), s		* 84				* 84		44.0				
Max Q Clear Time (g_c+I1), s		26.1				2.0		23.9				
Green Ext Time (p_c), s		13.9				19.8		3.3				

Intersection Summary

HCM 6th Ctrl Delay	15.6
HCM 6th LOS	B

Notes

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

HCM 6th Signalized Intersection Summary  
5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Future Conditions (Opening Day)  
SAT MD Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	362	0	194	0	0	0	0	1235	420	0	1477	0
Future Volume (veh/h)	362	0	194	0	0	0	0	1235	420	0	1477	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No						No			No		
Adj Sat Flow, veh/h/ln	1984	1984	1984				0	1984	1984	0	1984	0
Adj Flow Rate, veh/h	451	0	85				0	1357	0	0	1588	0
Peak Hour Factor	0.88	0.88	0.88				0.91	0.91	0.91	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1				0	1	1	0	1	0
Cap, veh/h	546	0	243				0	2897		0	2897	0
Arrive On Green	0.14	0.00	0.14				0.00	0.77	0.00	0.00	0.77	0.00
Sat Flow, veh/h	3780	0	1682				0	3870	1682	0	3969	0
Grp Volume(v), veh/h	451	0	85				0	1357	0	0	1588	0
Grp Sat Flow(s),veh/h/ln	1890	0	1682				0	1885	1682	0	1885	0
Q Serve(g_s), s	16.2	0.0	6.4				0.0	18.2	0.0	0.0	23.6	0.0
Cycle Q Clear(g_c), s	16.2	0.0	6.4				0.0	18.2	0.0	0.0	23.6	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	546	0	243				0	2897		0	2897	0
V/C Ratio(X)	0.83	0.00	0.35				0.00	0.47		0.00	0.55	0.00
Avail Cap(c_a), veh/h	1188	0	529				0	2897		0	2897	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	58.2	0.0	54.0				0.0	5.9	0.0	0.0	6.5	0.0
Incr Delay (d2), s/veh	3.3	0.0	0.9				0.0	0.5	0.0	0.0	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.1	0.0	2.8				0.0	5.8	0.0	0.0	7.5	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.4	0.0	54.8				0.0	6.4	0.0	0.0	7.2	0.0
LnGrp LOS	E	A	D				A	A		A	A	A
Approach Vol, veh/h	536						1357			1588		
Approach Delay, s/veh	60.4						6.4			7.2		
Approach LOS	E						A			A		
Timer - Assigned Phs	2		4		6							
Phs Duration (G+Y+Rc), s	113.8		26.2		113.8							
Change Period (Y+Rc), s	* 6.2		6.0		* 6.2							
Max Green Setting (Gmax), s	* 84		44.0		* 84							
Max Q Clear Time (g_c+I1), s	20.2		18.2		25.6							
Green Ext Time (p_c), s	12.8		2.0		17.0							

Intersection Summary

























HCM 6th Ctrl Delay	15.1
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.  
 \* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.  
 Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary  
 1: Rochester Road (M-150) & Auburn Road

Future Conditions (Opening Day)  
 SAT PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	209	235	118	240	221	128	179	1197	157	146	1137	165
Future Volume (veh/h)	209	235	118	240	221	128	179	1197	157	146	1137	165
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Adj Flow Rate, veh/h	222	250	126	276	254	147	188	1260	165	155	1210	176
Peak Hour Factor	0.94	0.94	0.94	0.87	0.87	0.87	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	248	366	163	278	426	190	169	1827	815	169	1827	815
Arrive On Green	0.13	0.10	0.10	0.15	0.11	0.11	0.09	0.48	0.48	0.09	0.48	0.48
Sat Flow, veh/h	1905	3800	1695	1905	3800	1695	1905	3800	1695	1905	3800	1695
Grp Volume(v), veh/h	222	250	126	276	254	147	188	1260	165	155	1210	176
Grp Sat Flow(s),veh/h/ln	1905	1900	1695	1905	1900	1695	1905	1900	1695	1905	1900	1695
Q Serve(g_s), s	16.1	8.9	10.2	20.3	8.9	11.8	12.4	36.1	7.8	11.3	34.0	8.4
Cycle Q Clear(g_c), s	16.1	8.9	10.2	20.3	8.9	11.8	12.4	36.1	7.8	11.3	34.0	8.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	248	366	163	278	426	190	169	1827	815	169	1827	815
V/C Ratio(X)	0.90	0.68	0.77	0.99	0.60	0.77	1.11	0.69	0.20	0.92	0.66	0.22
Avail Cap(c_a), veh/h	278	635	283	278	635	283	169	1827	815	169	1827	815
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.0	61.2	61.8	59.7	59.2	60.4	63.8	28.2	20.9	63.3	27.7	21.1
Incr Delay (d2), s/veh	27.3	2.3	7.5	52.4	1.3	7.5	103.3	2.2	0.6	46.4	1.9	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.4	4.3	4.6	13.6	4.3	5.4	10.7	16.0	0.1	7.5	15.1	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	87.2	63.5	69.3	112.1	60.5	67.9	167.1	30.4	21.5	109.7	29.6	21.7
LnGrp LOS	F	E	E	F	E	E	F	C	C	F	C	C
Approach Vol, veh/h		598			677			1613			1541	
Approach Delay, s/veh		73.5			83.2			45.4			36.7	
Approach LOS		E			F			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	73.9	27.0	20.1	19.0	73.9	24.8	22.3				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 12	* 57	* 20	* 23	* 12	* 57	* 20	* 23				
Max Q Clear Time (g_c+I1), s	13.3	38.1	22.3	12.2	14.4	36.0	18.1	13.8				
Green Ext Time (p_c), s	0.0	8.8	0.0	1.3	0.0	8.9	0.1	1.3				
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			52.0									
HCM 6th LOS			D									
<b>Notes</b>												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary  
 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Future Conditions (Opening Day)  
 SAT PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (veh/h)	78	10	91	148	7	54	90	1385	75	70	1419	83
Future Volume (veh/h)	78	10	91	148	7	54	90	1385	75	70	1419	83
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Adj Flow Rate, veh/h	130	17	147	172	8	26	96	1473	62	78	1577	92
Peak Hour Factor	0.60	0.60	0.60	0.86	0.86	0.86	0.94	0.94	0.94	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	248	28	243	136	65	211	279	2869	1280	311	2756	160
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	1396	179	1544	1241	414	1344	302	3800	1695	344	3650	212
Grp Volume(v), veh/h	130	0	164	172	0	34	96	1473	62	78	817	852
Grp Sat Flow(s),veh/h/ln	1396	0	1722	1241	0	1758	302	1900	1695	344	1900	1962
Q Serve(g_s), s	12.4	0.0	12.4	9.6	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	14.7	0.0	12.4	22.0	0.0	2.3	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.90	1.00		0.76	1.00		1.00	1.00		0.11
Lane Grp Cap(c), veh/h	248	0	271	136	0	276	279	2869	1280	311	1435	1481
V/C Ratio(X)	0.52	0.00	0.61	1.26	0.00	0.12	0.34	0.51	0.05	0.25	0.57	0.58
Avail Cap(c_a), veh/h	248	0	271	136	0	276	279	2869	1280	311	1435	1481
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	57.0	0.0	55.0	67.0	0.0	50.7	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	2.0	0.0	3.8	163.5	0.0	0.2	3.3	0.7	0.1	1.9	1.6	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	0.0	5.7	11.1	0.0	1.1	0.3	0.3	0.0	0.2	0.7	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	59.0	0.0	58.8	230.5	0.0	50.9	3.3	0.7	0.1	1.9	1.6	1.6
LnGrp LOS	E	A	E	F	A	D	A	A	A	A	A	A
Approach Vol, veh/h		294		206		1631		1747				
Approach Delay, s/veh		58.9		200.8		0.8		1.7				
Approach LOS		E		F		A		A				
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		112.0		28.0		112.0		28.0				
Change Period (Y+Rc), s		* 6.3		6.0		* 6.3		6.0				
Max Green Setting (Gmax), s*		1.1E2		22.0		* 1.1E2		22.0				
Max Q Clear Time (g_c+1), s		2.0		16.7		2.0		24.0				
Green Ext Time (p_c), s		22.1		0.6		22.7		0.0				

Intersection Summary

HCM 6th Ctrl Delay	16.2
HCM 6th LOS	B

Notes

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

HCM 6th TWSC  
 3: Rochester Road (M-150) & Hickory Lawn Road

Future Conditions (Opening Day)  
 SAT PM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑↑	↑↑	
Traffic Vol, veh/h	0	6	4	1550	1657	1
Future Vol, veh/h	0	6	4	1550	1657	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	95	95	92	92
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	10	4	1632	1801	1

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	2626	901	1802	0	0
Stage 1	1802	-	-	-	-
Stage 2	824	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	*23	*434	*651	-	-
Stage 1	*409	-	-	-	-
Stage 2	*418	-	-	-	-
Platoon blocked, %	1	1	1	-	-
Mov Cap-1 Maneuver	*23	*434	*651	-	-
Mov Cap-2 Maneuver	*198	-	-	-	-
Stage 1	*406	-	-	-	-
Stage 2	*418	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	13.5	0	0
HCM LOS	B		


















Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	* 651	-	434	-	-
HCM Lane V/C Ratio	0.006	-	0.023	-	-
HCM Control Delay (s)	10.6	-	13.5	-	-
HCM Lane LOS	B	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

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



HCM 6th Signalized Intersection Summary  
 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Future Conditions (Opening Day)  
 SAT PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	342	0	420	0	1189	0	0	1171	371
Future Volume (veh/h)	0	0	0	342	0	420	0	1189	0	0	1171	371
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No			No			No		
Adj Sat Flow, veh/h/ln				2000	0	2000	0	2000	0	0	2000	2000
Adj Flow Rate, veh/h				376	0	459	0	1252	0	0	1259	0
Peak Hour Factor				0.91	0.91	0.91	0.95	0.95	0.95	0.93	0.93	0.93
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				688	0	556	0	2761	0	0	2761	
Arrive On Green				0.19	0.00	0.19	0.00	0.73	0.00	0.00	1.00	0.00
Sat Flow, veh/h				3695	0	2983	0	4000	0	0	3900	1695
Grp Volume(v), veh/h				376	0	459	0	1252	0	0	1259	0
Grp Sat Flow(s),veh/h/ln				1848	0	1492	0	1900	0	0	1900	1695
Q Serve(g_s), s				12.9	0.0	20.7	0.0	18.8	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s				12.9	0.0	20.7	0.0	18.8	0.0	0.0	0.0	0.0
Prop In Lane				1.00		1.00	0.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				688	0	556	0	2761	0	0	2761	
V/C Ratio(X)				0.55	0.00	0.83	0.00	0.45	0.00	0.00	0.46	
Avail Cap(c_a), veh/h				1161	0	938	0	2761	0	0	2761	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				51.6	0.0	54.8	0.0	7.8	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh				0.7	0.0	3.2	0.0	0.5	0.0	0.0	0.5	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				6.1	0.0	8.1	0.0	6.6	0.0	0.0	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				52.3	0.0	58.0	0.0	8.3	0.0	0.0	0.5	0.0
LnGrp LOS				D	A	E	A	A	A	A	A	
Approach Vol, veh/h					835			1252			1259	
Approach Delay, s/veh					55.4			8.3			0.5	
Approach LOS					E			A			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		107.9				107.9		32.1				
Change Period (Y+Rc), s		* 6.2				* 6.2		6.0				
Max Green Setting (Gmax), s		* 84				* 84		44.0				
Max Q Clear Time (g_c+I1), s		20.8				2.0		22.7				
Green Ext Time (p_c), s		11.1				11.3		3.4				

Intersection Summary

HCM 6th Ctrl Delay	17.2
HCM 6th LOS	B

Notes

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

HCM 6th Signalized Intersection Summary  
 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Future Conditions (Opening Day)  
 SAT PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	283	0	199	0	0	0	0	1105	412	0	1246	0
Future Volume (veh/h)	283	0	199	0	0	0	0	1105	412	0	1246	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No						No			No		
Adj Sat Flow, veh/h/ln	2000	2000	2000				0	1984	1984	0	1984	0
Adj Flow Rate, veh/h	340	0	84				0	1163	0	0	1354	0
Peak Hour Factor	0.94	0.94	0.94				0.95	0.95	0.95	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0				0	1	1	0	1	0
Cap, veh/h	428	0	190				0	3018		0	3018	0
Arrive On Green	0.11	0.00	0.11				0.00	0.80	0.00	0.00	0.80	0.00
Sat Flow, veh/h	3810	0	1695				0	3870	1682	0	3969	0
Grp Volume(v), veh/h	340	0	84				0	1163	0	0	1354	0
Grp Sat Flow(s),veh/h/ln	1905	0	1695				0	1885	1682	0	1885	0
Q Serve(g_s), s	12.2	0.0	6.5				0.0	12.5	0.0	0.0	15.6	0.0
Cycle Q Clear(g_c), s	12.2	0.0	6.5				0.0	12.5	0.0	0.0	15.6	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	428	0	190				0	3018		0	3018	0
V/C Ratio(X)	0.79	0.00	0.44				0.00	0.39		0.00	0.45	0.00
Avail Cap(c_a), veh/h	1197	0	533				0	3018		0	3018	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	60.6	0.0	58.0				0.0	4.0	0.0	0.0	4.3	0.0
Incr Delay (d2), s/veh	3.4	0.0	1.6				0.0	0.4	0.0	0.0	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	0.0	2.9				0.0	3.5	0.0	0.0	4.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.0	0.0	59.6				0.0	4.4	0.0	0.0	4.8	0.0
LnGrp LOS	E	A	E				A	A		A	A	A
Approach Vol, veh/h	424						1163			1354		
Approach Delay, s/veh	63.1						4.4			4.8		
Approach LOS	E						A			A		
Timer - Assigned Phs	2		4		6							
Phs Duration (G+Y+Rc), s	118.3		21.7		118.3							
Change Period (Y+Rc), s	* 6.2		6.0		* 6.2							
Max Green Setting (Gmax), s	* 84		44.0		* 84							
Max Q Clear Time (g_c+I1), s	14.5		14.2		17.6							
Green Ext Time (p_c), s	9.9		1.5		12.8							
<b>Intersection Summary</b>												
HCM 6th Ctrl Delay			13.1									
HCM 6th LOS			B									
<b>Notes</b>												
User approved volume balancing among the lanes for turning movement.												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												
Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.												

**Intersection: 1: Rochester Road (M-150) & Auburn Road**

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	254	237	268	170	414	273	248	180	179	251	263	190
Average Queue (ft)	118	111	110	104	221	151	143	70	81	128	129	48
95th Queue (ft)	206	185	235	176	390	231	227	145	163	219	225	124
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			4	14			5	0			3	0
Queuing Penalty (veh)			5	17			5	0			4	0

**Intersection: 1: Rochester Road (M-150) & Auburn Road**

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	153	377	422	280
Average Queue (ft)	66	205	214	51
95th Queue (ft)	127	314	341	168
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)			3	
Queuing Penalty (veh)			3	

**Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive**

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR	
Maximum Queue (ft)	90	78	131	54	77	69	79	36	56	119	148	
Average Queue (ft)	28	26	51	10	23	15	20	3	16	42	73	
95th Queue (ft)	74	61	107	35	59	50	63	17	43	99	139	
Link Distance (ft)	217	217	284	284		231	231	231		321	321	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					500				500			
Storage Blk Time (%)												
Queuing Penalty (veh)												

**Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road**

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	34	21
Average Queue (ft)	5	3
95th Queue (ft)	24	15
Link Distance (ft)	531	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	
Storage Blk Time (%)		
Queuing Penalty (veh)		

**Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp**

Movement	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	R	T	T	T	T
Maximum Queue (ft)	362	447	422	257	123	158	213	223
Average Queue (ft)	240	286	189	159	61	74	128	135
95th Queue (ft)	344	404	330	246	115	134	192	203
Link Distance (ft)	1030				150	150	311	311
Upstream Blk Time (%)					0	0		
Queuing Penalty (veh)					0	1		
Storage Bay Dist (ft)	250	250	250					
Storage Blk Time (%)	3	15	1	0				
Queuing Penalty (veh)	11	66	11	3				

**Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp**

Movement	EB	EB	EB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	T	T
Maximum Queue (ft)	326	388	325	131	140	178	185
Average Queue (ft)	154	226	168	56	49	82	107
95th Queue (ft)	271	325	279	111	109	160	183
Link Distance (ft)	936			1203	1203	229	229
Upstream Blk Time (%)						0	
Queuing Penalty (veh)						0	
Storage Bay Dist (ft)	250	250					
Storage Blk Time (%)	0	5	0	0			
Queuing Penalty (veh)	0	11	1	0			

**Zone Summary**

Zone wide Queuing Penalty: 138

**Intersection: 1: Rochester Road (M-150) & Auburn Road**

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	319	299	322	175	397	202	209	174	381	437	446	200
Average Queue (ft)	184	173	171	120	229	118	101	83	225	339	350	130
95th Queue (ft)	300	269	283	197	378	186	178	149	421	511	514	259
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)									0	17	20	
Queuing Penalty (veh)									0	144	173	
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			17	11			1	0	0	17	40	1
Queuing Penalty (veh)			27	22			1	0	1	27	77	4

**Intersection: 1: Rochester Road (M-150) & Auburn Road**

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	443	615	655	325
Average Queue (ft)	265	375	414	178
95th Queue (ft)	479	579	622	391
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)			25	
Queuing Penalty (veh)			40	

**Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive**

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (ft)	191	155	262	102	220	270	282	63	217	263	289
Average Queue (ft)	78	58	124	39	157	197	184	18	120	132	156
95th Queue (ft)	164	118	227	80	275	351	334	48	244	285	289
Link Distance (ft)	217	217	284	284		231	231	231		321	321
Upstream Blk Time (%)	4		1		16	34	9		0	3	2
Queuing Penalty (veh)	0		0		0	207	53		0	26	16
Storage Bay Dist (ft)					500				500		
Storage Blk Time (%)					16	34			0	3	
Queuing Penalty (veh)					131	34			0	2	

**Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road**

Movement	EB	NB	NB	NB
Directions Served	LR	L	T	T
Maximum Queue (ft)	34	132	450	454
Average Queue (ft)	7	19	208	171
95th Queue (ft)	28	161	631	564
Link Distance (ft)	531		532	532
Upstream Blk Time (%)		0	23	7
Queuing Penalty (veh)		0	211	67
Storage Bay Dist (ft)		500		
Storage Blk Time (%)			24	
Queuing Penalty (veh)			2	

**Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp**

Movement	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	R	T	T	T	T
Maximum Queue (ft)	326	410	621	399	208	206	325	337
Average Queue (ft)	160	234	314	221	142	154	177	202
95th Queue (ft)	307	431	775	426	224	231	281	310
Link Distance (ft)			1030		150	150	311	311
Upstream Blk Time (%)			4		19	21	0	1
Queuing Penalty (veh)			0		133	146	3	6
Storage Bay Dist (ft)	250	250		250				
Storage Blk Time (%)	2	6	19	17				
Queuing Penalty (veh)	8	28	117	104				

**Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp**

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	345	457	355	721	762	200	228	240
Average Queue (ft)	165	230	176	321	343	78	127	143
95th Queue (ft)	270	337	292	953	981	239	214	228
Link Distance (ft)		936		1203	1203		229	229
Upstream Blk Time (%)				2	11		0	1
Queuing Penalty (veh)				0	0		3	3
Storage Bay Dist (ft)	250		250			175		
Storage Blk Time (%)	1	7	0		13	0		
Queuing Penalty (veh)	2	20	1		78	1		

**Zone Summary**

Zone wide Queuing Penalty: 1917

**Intersection: 1: Rochester Road (M-150) & Auburn Road**

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	384	234	274	170	792	595	604	213	381	427	432	200
Average Queue (ft)	179	110	91	88	456	210	177	104	213	304	321	112
95th Queue (ft)	325	193	212	159	884	631	539	185	409	481	496	242
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)									0	7	10	
Queuing Penalty (veh)									0	59	86	
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			3	7	2	0	1	2	0	7	31	0
Queuing Penalty (veh)			5	12	3	0	1	2	1	12	58	1

**Intersection: 1: Rochester Road (M-150) & Auburn Road**

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	986	1286	1313	325
Average Queue (ft)	514	862	901	258
95th Queue (ft)	1139	1494	1516	440
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)		11	19	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)	0	18	52	
Queuing Penalty (veh)	0	32	108	

**Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive**

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (ft)	184	160	300	114	231	283	280	44	321	381	380
Average Queue (ft)	91	66	261	44	192	239	161	13	235	289	280
95th Queue (ft)	165	125	361	100	284	359	286	38	391	454	412
Link Distance (ft)	217	217	284	284		231	231	231		321	321
Upstream Blk Time (%)	0		44		35	62	1		19	39	7
Queuing Penalty (veh)	0		0		0	357	8		0	359	63
Storage Bay Dist (ft)					500				500		
Storage Blk Time (%)					35	62			19	39	
Queuing Penalty (veh)					263	62			153	44	

**Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road**

Movement	EB	NB	NB	NB	SB	SB
Directions Served	LR	L	T	T	T	TR
Maximum Queue (ft)	47	430	583	571	11	11
Average Queue (ft)	12	43	351	224	0	0
95th Queue (ft)	39	260	772	632	8	8
Link Distance (ft)	531		532	532	231	231
Upstream Blk Time (%)		0	44	5		
Queuing Penalty (veh)		0	378	40		
Storage Bay Dist (ft)		500				
Storage Blk Time (%)		0	45			
Queuing Penalty (veh)		0	5			

**Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp**

Movement	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	L	R	R	T	T	T	T	R
Maximum Queue (ft)	308	398	714	452	202	202	338	352	63
Average Queue (ft)	128	208	288	230	144	149	196	220	2
95th Queue (ft)	271	396	646	425	232	235	322	341	46
Link Distance (ft)			1030		150	150	311	311	311
Upstream Blk Time (%)			3		32	30	1	2	0
Queuing Penalty (veh)			0		208	194	8	12	0
Storage Bay Dist (ft)	250	250		250					
Storage Blk Time (%)	2	3	20	16					
Queuing Penalty (veh)	7	14	108	84					

**Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp**

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	306	489	334	797	818	200	262	264
Average Queue (ft)	175	241	158	339	340	62	131	145
95th Queue (ft)	292	413	291	961	990	213	246	253
Link Distance (ft)		936		1203	1203		229	229
Upstream Blk Time (%)		0		3	10		2	2
Queuing Penalty (veh)		0		0	0		14	16
Storage Bay Dist (ft)	250		250			175		
Storage Blk Time (%)	3	9	0		18	0		
Queuing Penalty (veh)	11	23	1		75	1		

**Zone Summary**

Zone wide Queuing Penalty: 2888



**Intersection: 1: Rochester Road (M-150) & Auburn Road**

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	310	161	206	168	424	159	186	201	357	405	399	200
Average Queue (ft)	184	90	73	77	234	89	71	101	236	218	212	69
95th Queue (ft)	300	147	151	143	401	143	144	179	360	366	355	184
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)									1	1	0	
Queuing Penalty (veh)									0	7	4	
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			2	5			1	2	1	1	10	0
Queuing Penalty (veh)			3	6			1	2	6	2	15	0

**Intersection: 1: Rochester Road (M-150) & Auburn Road**

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	270	472	512	325
Average Queue (ft)	149	267	292	122
95th Queue (ft)	253	397	432	299
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)			10	
Queuing Penalty (veh)			16	

**Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive**

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (ft)	139	122	260	70	156	210	227	38	153	205	260
Average Queue (ft)	57	50	133	24	66	85	109	10	62	93	138
95th Queue (ft)	114	98	234	54	131	171	193	33	131	166	224
Link Distance (ft)	217	217	284	284		231	231	231		321	321
Upstream Blk Time (%)			1		0	1	0				0
Queuing Penalty (veh)			0		0	3	1				0
Storage Bay Dist (ft)					500				500		
Storage Blk Time (%)					0	1					
Queuing Penalty (veh)					1	1					

**Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road**

Movement	EB	NB	NB	NB	SB
Directions Served	LR	L	T	T	T
Maximum Queue (ft)	34	27	42	46	7
Average Queue (ft)	5	3	2	3	0
95th Queue (ft)	23	17	30	32	5
Link Distance (ft)	531		532	532	231
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		500			
Storage Blk Time (%)					
Queuing Penalty (veh)					

**Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp**

Movement	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	R	T	T	T	T
Maximum Queue (ft)	231	285	294	254	187	190	270	285
Average Queue (ft)	116	166	182	151	100	104	156	165
95th Queue (ft)	211	250	259	227	175	191	247	264
Link Distance (ft)			1030		150	150	311	311
Upstream Blk Time (%)					2	3		0
Queuing Penalty (veh)					10	18		0
Storage Bay Dist (ft)	250	250		250				
Storage Blk Time (%)	0	1	1	0				
Queuing Penalty (veh)	0	4	8	0				

**Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp**

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	249	309	249	257	237	158	219	242
Average Queue (ft)	128	193	127	117	99	10	111	130
95th Queue (ft)	223	270	243	216	194	79	196	219
Link Distance (ft)		936		1203	1203		229	229
Upstream Blk Time (%)							0	0
Queuing Penalty (veh)							1	2
Storage Bay Dist (ft)	250		250			175		
Storage Blk Time (%)	0	2	0		1	0		
Queuing Penalty (veh)	0	5	0		3	0		

**Zone Summary**

Zone wide Queuing Penalty: 119