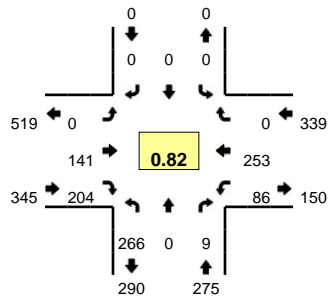


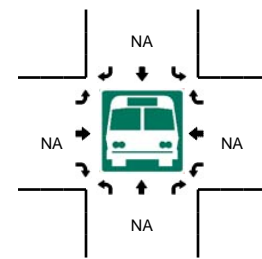
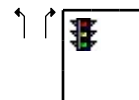
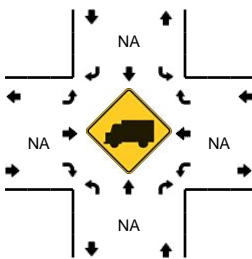
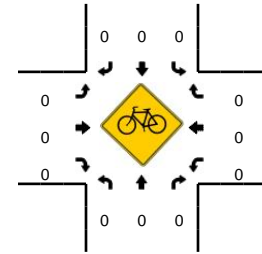
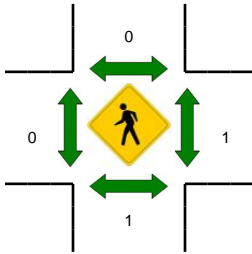
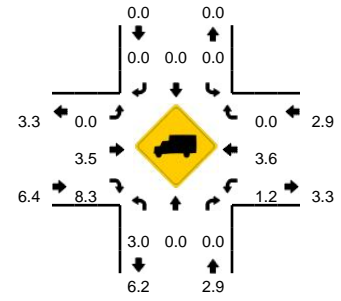
APPENDIX A – 2016 TURNING MOVEMENT COUNTS

LOCATION: N Broad St -- Carleton Rd E
CITY/STATE: Hillsdale, MI

QC JOB #: 13719801
DATE: Thu, Feb 18 2016



Peak-Hour: 7:30 AM -- 8:30 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

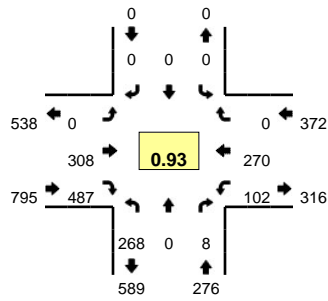


15-Min Count Period Beginning At	N Broad St (Northbound)				N Broad St (Southbound)				Carleton Rd E (Eastbound)				Carleton Rd E (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	33	0	0	0	0	0	0	0	0	17	37	0	11	32	0	0	130	
7:15 AM	61	0	3	0	0	0	0	0	0	24	53	0	12	46	0	0	199	
7:30 AM	65	0	3	0	0	0	0	0	0	32	46	0	15	64	0	0	225	
7:45 AM	93	0	4	0	0	0	0	0	0	38	44	0	31	84	0	0	294	848
8:00 AM	59	0	2	0	0	0	0	0	0	37	51	0	17	60	0	0	226	944
8:15 AM	49	0	0	0	0	0	0	0	0	34	63	0	23	45	0	0	214	959
8:30 AM	33	0	3	0	0	0	0	0	0	23	42	0	12	40	0	0	153	887
8:45 AM	40	0	2	0	0	0	0	0	0	34	62	0	14	51	0	0	203	796
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	372	0	16	0	0	0	0	0	0	152	176	0	124	336	0	0	1176	
Heavy Trucks	12	0	0		0	0	0		0	0	4		0	28	0		44	
Pedestrians	0				0				0				0				0	
Bicycles	0				0				0				0				0	
Railroad																	0	
Stopped Buses																	0	

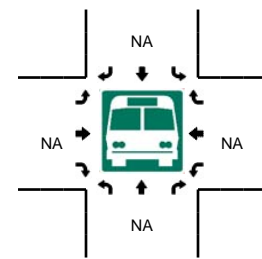
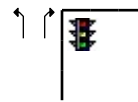
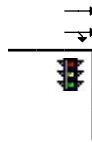
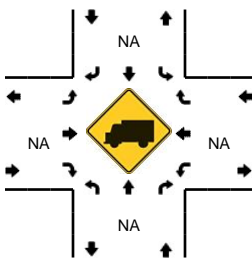
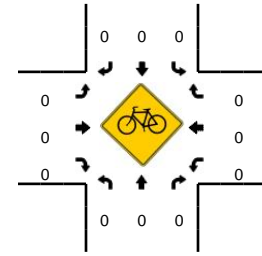
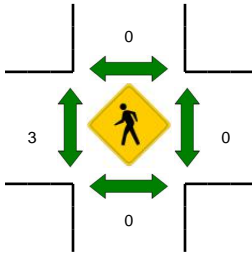
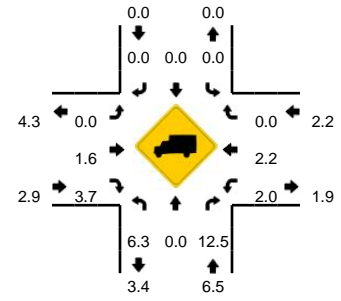
Comments:

LOCATION: N Broad St -- Carleton Rd E
CITY/STATE: Hillsdale, MI

QC JOB #: 13719802
DATE: Thu, Feb 18 2016



Peak-Hour: 3:15 PM -- 4:15 PM
Peak 15-Min: 3:30 PM -- 3:45 PM



15-Min Count Period Beginning At	N Broad St (Northbound)				N Broad St (Southbound)				Carleton Rd E (Eastbound)				Carleton Rd E (Westbound)				Total	Hourly Totals	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
2:00 PM	66	0	2	0	0	0	0	0	0	0	66	94	0	15	50	0	0	293	
2:15 PM	65	0	1	0	0	0	0	0	0	0	56	97	0	18	60	0	0	297	
2:30 PM	70	0	3	0	0	0	0	0	0	0	56	107	0	17	72	0	0	325	
2:45 PM	55	0	2	0	0	0	0	0	0	0	60	109	0	21	57	0	0	304	1219
3:00 PM	60	0	3	0	0	0	0	0	0	0	68	97	1	23	69	0	0	321	1247
3:15 PM	62	0	2	0	0	0	0	0	0	0	76	129	0	35	72	0	0	376	1326
3:30 PM	62	0	1	0	0	0	0	0	0	0	88	135	0	24	80	0	0	390	1391
3:45 PM	71	0	2	0	0	0	0	0	0	0	67	102	0	28	61	0	0	331	1418
4:00 PM	73	0	3	0	0	0	0	0	0	0	77	121	0	15	57	0	0	346	1443
4:15 PM	67	0	5	0	0	0	0	0	0	0	78	100	0	20	65	0	0	335	1402
4:30 PM	63	0	1	0	0	0	0	0	0	0	60	105	0	19	65	0	0	313	1325
4:45 PM	50	0	0	0	0	0	0	0	0	0	75	91	0	31	63	0	0	310	1304
5:00 PM	72	0	5	0	0	0	0	0	0	0	68	127	0	19	72	0	0	363	1321
5:15 PM	53	0	5	0	0	0	0	0	0	0	65	98	0	10	50	0	0	281	1267
5:30 PM	51	0	4	0	0	0	0	0	0	0	50	82	0	20	39	0	0	246	1200
5:45 PM	35	0	1	0	0	0	0	0	0	0	60	103	0	27	39	0	0	265	1155
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total		
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U			
All Vehicles	248	0	4	0	0	0	0	0	0	352	540	0	96	320	0	0	1560		
Heavy Trucks	12	0	0		0	0	0		0	4	32		0	8	0		56		
Pedestrians	0				0				0				0				0		
Bicycles	0				0				0				0				0		
Railroad																			
Stopped Buses																			

Comments:

Site Code: 13719803
 Location: Broad/Howell St -- North/Hillsdale St
 Date: 2/18/2016

Start Time	N Broad St Southbound						Hillsdale St from Northeast						North St Westbound						N Broad St Northbound						N Howell St from Southwest						North St Eastbound						
	Right	Right to N Howell St	Thru	Left	Left to Hillsdale St	Peds	Right to N Broad St	Right to North St	Right to N Howell St	Left to N Broad St	Left to North St	Peds	Right to Hillsdale St	Right	Thru	Left to N Howell St	Left	Peds	Right	Right to Hillsdale St	Thru	Left	Left to N Howell St	Peds	Right to N Broad St	Right to North St	Right to Hillsdale St	Left to N Broad St	Left to North St	Peds	Right to N Howell St	Right	Thru	Left to Hillsdale St	Left	Peds	
7:00	0	3	9	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:05	0	3	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:10	0	3	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	7	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:15	0	6	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:20	0	6	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	7	16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:25	0	7	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	0	5	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	12	24	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:35	0	8	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	7	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:40	1	9	8	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	7	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45	0	8	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	6	32	0	0	2	0	0	0	0	0	0	3	0	0	0	0	0	0
7:50	0	12	14	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	13	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7:55	0	8	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	23	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
8:00	1	7	9	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	4	6	19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:05	0	5	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	11	21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:10	0	15	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	8	20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15	0	8	18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	7	22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:20	0	13	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	3	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:25	1	12	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:30	0	6	7	0	0	3	0	0	0	0	0	3	0	0	0	0	0	0	3	7	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
8:35	0	7	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:40	0	5	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	3	12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:45	0	13	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	6	14	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8:50	1	16	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	2	5	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:55	0	8	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	9	15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	4	193	288	1	0	4	0	0	0	0	0	5	0	0	0	0	0	7	57	156	428	1	1	3	0	0	0	0	0	0	0	0	0	0	0	7	

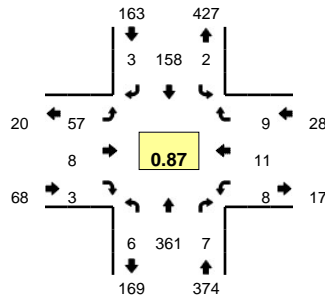
15 minute combinations

Start Time	N Broad St						Hillsdale St						North St						N Broad St						N Howell St						North St							
	Right	Right to N Howell St	Thru	Left	Left to Hillsdale St	Peds	Right to N Broad St	Right to North St	Right to N Howell St	Left to N Broad St	Left to North St	Peds	Right to Hillsdale St	Right	Thru	Left to N Howell St	Left	Peds	Right	Right to Hillsdale St	Thru	Left	Left to N Howell St	Peds	Right to N Broad St	Right to North St	Right to Hillsdale St	Left to N Broad St	Left to North St	Peds	Right to N Howell St	Right	Thru	Left to Hillsdale St	Left	Peds		
7:00	0	9	34	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	14	30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
7:15	0	19	40	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	23	56	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:30	1	22	33	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	5	26	67	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:45	0	28	45	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	13	22	95	0	0	3	0	0	0	0	0	3	0	0	0	0	0	0	1	
8:00	1	27	37	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2	9	25	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
8:15	1	33	42	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	11	13	45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
8:30	0	18	26	0	0	3	0	0	0	0	0	3	0	0	0	0	0	0	6	13	33	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	
8:45	1	37	31	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	8	20	42	1	1	0	0	0	0	0	0	1	0	0	0	0	0	1		

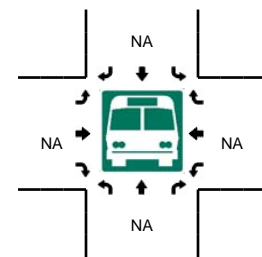
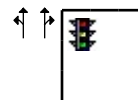
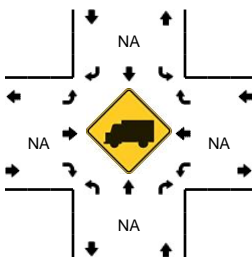
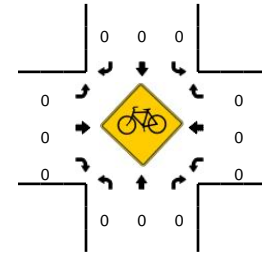
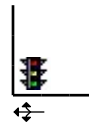
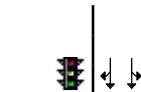
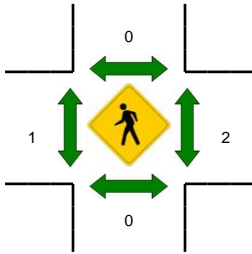
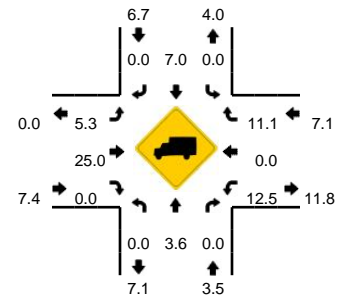
Start Time	N Broad St Southbound						Hillsdale St from Northeast						North St Westbound						N Broad St Northbound						N Howell St from Southwest						North St Eastbound								
	Right	Right to N	Thru	Left	Left to Hillsdal	Peds	Right to N Broad	Right to North St	Right to N	Left to N Broad	Left to North St	Peds	Right to Hillsdal	Right	Thru	Left to N	Left	Peds	Right	Right to Hillsdal	Thru	Left	Left to N	Peds	Right to N Broad	Right to North St	Right to Hillsdal	Left to N Broad	Left to North St	Peds	Right to N	Right	Thru	Left to Hillsdal	Left	Peds			
14:00	2	44	60	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	3	10	22	63	2	0	0	1	0	0	0	0	0	0	0	5	0	0	0	0	1
14:15	3	34	68	3	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	10	15	60	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
14:30	2	35	80	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	5	18	70	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0
14:45	0	58	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	20	55	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	1
15:00	2	44	67	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	1	11	23	58	0	1	4	0	0	0	0	0	0	0	2	6	0	0	0	1	
15:15	2	46	107	1	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	18	17	60	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	2
15:30	4	48	98	3	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	13	12	60	1	0	1	0	0	0	0	0	0	0	7	0	0	0	0	2	
15:45	1	48	82	0	0	3	0	0	0	0	0	3	0	0	0	0	0	0	3	10	28	75	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0	1
16:00	5	36	96	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	9	25	67	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
16:15	1	42	76	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1	11	20	67	1	0	0	0	0	0	0	0	0	0	0	7	0	0	0	0	0
16:30	1	32	92	1	0	0	0	0	0	0	0	1	0	0	0	0	0	0	3	6	21	60	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2
16:45	1	43	72	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	2	13	19	44	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0
17:00	2	42	98	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	2	10	24	72	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	6
17:15	2	29	78	0	0	6	0	0	0	0	0	3	0	0	0	0	0	0	3	5	28	60	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	1
17:30	3	31	70	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5	23	54	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0
17:45	3	41	85	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	14	29	0	0	1	0	0	0	0	0	0	1	7	0	0	0	0	4	
	34	653	1299	11	3	14	0	0	0	0	0	16	0	0	0	0	0	0	24	147	329	954	4	1	7	0	0	0	0	0	0	5	52	0	0	0	0	22	

LOCATION: N Broad St -- McCollum St
CITY/STATE: Hillsdale, MI

QC JOB #: 13719805
DATE: Thu, Feb 18 2016



Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

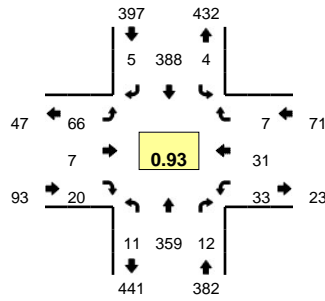


15-Min Count Period Beginning At	N Broad St (Northbound)				N Broad St (Southbound)				McCollum St (Eastbound)				McCollum St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	42	2	0	0	34	0	0	7	0	0	0	3	2	1	0	91	
7:15 AM	2	77	0	0	0	42	1	0	9	1	0	0	1	2	2	0	137	
7:30 AM	0	88	1	0	0	36	0	0	21	2	2	0	1	3	1	0	155	
7:45 AM	2	109	4	0	0	41	0	0	17	1	1	0	0	3	3	0	181	564
8:00 AM	2	87	2	0	2	39	2	0	10	4	0	0	6	3	3	0	160	633
8:15 AM	2	65	0	0	1	43	1	0	4	1	2	0	1	5	0	0	125	621
8:30 AM	3	53	3	0	0	29	1	0	7	2	3	0	3	7	1	1	113	579
8:45 AM	1	63	0	0	1	36	1	0	12	0	2	0	5	3	1	0	125	523
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	8	436	16	0	0	164	0	0	68	4	4	0	0	12	12	0	724	
Heavy Trucks	0	16	0	0	0	4	0	0	8	0	0	0	0	0	0	0	28	
Pedestrians	0	0	0	0	0	0	0	0	0	4	0	0	0	0	0	0	4	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

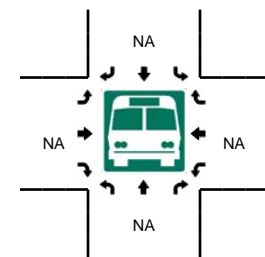
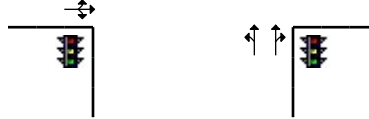
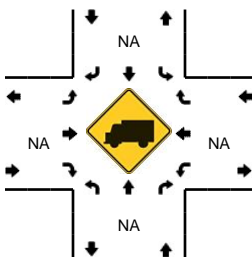
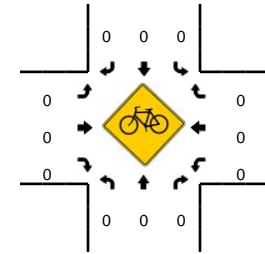
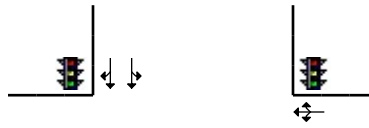
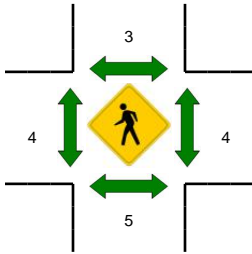
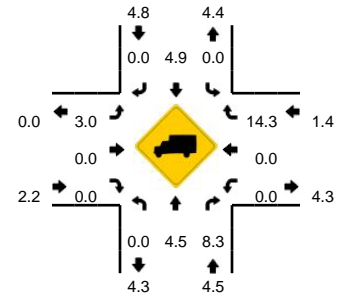
Comments:

LOCATION: N Broad St -- McCollum St
CITY/STATE: Hillsdale, MI

QC JOB #: 13719806
DATE: Thu, Feb 18 2016



Peak-Hour: 3:15 PM -- 4:15 PM
Peak 15-Min: 3:15 PM -- 3:30 PM



15-Min Count Period Beginning At	N Broad St (Northbound)				N Broad St (Southbound)				McCollum St (Eastbound)				McCollum St (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
2:00 PM	2	92	2	0	2	58	4	0	10	1	7	0	2	7	1	0	188	
2:15 PM	1	76	1	0	0	69	0	0	9	2	1	0	2	5	1	0	167	
2:30 PM	3	82	3	0	1	83	0	0	10	2	3	0	5	5	2	0	199	
2:45 PM	5	77	1	0	1	69	2	0	13	1	2	0	4	3	0	0	178	732
3:00 PM	2	82	2	0	0	69	2	0	12	2	8	0	1	6	1	0	187	731
3:15 PM	4	91	4	0	1	113	1	0	14	5	5	0	6	7	2	0	253	817
3:30 PM	1	77	3	0	1	97	2	0	11	2	4	0	12	8	1	0	219	837
3:45 PM	2	94	5	0	0	81	1	0	23	0	4	0	7	9	1	0	227	886
4:00 PM	4	97	0	0	2	97	1	0	18	0	7	0	8	7	3	0	244	943
4:15 PM	5	91	1	0	0	75	2	0	14	4	1	0	2	7	2	0	204	894
4:30 PM	3	80	4	0	3	90	1	0	11	1	1	0	8	6	1	0	209	884
4:45 PM	3	70	5	0	2	67	0	0	7	2	2	0	8	5	2	0	173	830
5:00 PM	1	95	1	0	0	99	1	0	15	3	3	0	9	12	3	0	242	828
5:15 PM	2	88	2	0	0	77	1	0	7	2	3	0	3	3	5	0	193	817
5:30 PM	1	76	2	0	0	69	2	0	8	1	2	0	4	5	0	0	170	778
5:45 PM	0	40	3	0	5	80	1	0	12	3	1	0	5	2	1	0	153	758
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	16	364	16	0	4	452	4	0	56	20	20	0	24	28	8	0	1012	
Heavy Trucks	0	20	4		0	28	0		8	0	0		0	0	4		64	
Pedestrians		8				4				8				0			20	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

Comments:

7409 SW Tech Center Dr, Ste B150
Tigard, OR 97224
971-223-0003
www.qualitycounts.net



Site Code: 13719807
Location: Broad St - Bacon/Cook St
Date: 2/18/2016

Start Time	N Broad St Southbound				Cook St From Northeast				E Bacon St Westbound				S Broad St Northbound				E Bacon St Eastbound												
	Right	Thru	Left	Left to Cook	Right to Broad	Right to Bacon	Left to Broad	Left to Bacon	Right to Cook	Right	Thru	Left	Peds	Right to Cook	Right	Thru	Left	Peds	Right to Cook	Right	Thru	Left to Cook	Left	Peds					
7:00	1	6	0	0	0	0	0	0	0	0	0	0	0	0	0	6	0	0	0	0	0	8	1	0	2	5	0	0	
7:05	1	16	0	0	0	0	0	0	0	0	0	0	0	0	0	5	2	0	4	0	0	9	1	0	0	3	2	1	0
7:10	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	19	5	0	1	2	0	2	0
7:15	0	12	0	0	0	0	0	0	0	0	0	0	0	0	0	9	4	0	1	0	0	22	2	0	1	2	0	3	0
7:20	0	13	0	0	0	0	0	0	0	0	0	0	0	0	1	9	2	0	0	0	0	20	2	0	2	2	0	4	0
7:25	0	12	0	0	0	0	0	0	0	0	0	0	0	0	4	1	0	0	1	0	0	23	2	0	2	3	1	3	0
7:30	2	13	0	0	0	0	0	0	0	0	0	0	0	0	6	3	0	1	0	0	38	5	0	2	3	0	2	0	
7:35	0	12	1	0	0	0	0	0	0	0	0	0	0	0	15	4	0	0	0	0	16	8	0	3	4	0	1	0	
7:40	1	10	0	0	0	0	0	0	0	0	0	0	0	0	18	0	0	3	0	0	31	4	0	4	5	0	1	0	
7:45	0	6	0	0	0	0	0	0	0	0	0	0	0	0	2	6	4	0	2	0	25	7	0	2	4	0	6	1	
7:50	1	14	0	0	0	0	0	0	0	0	0	0	0	0	12	3	0	5	0	0	47	5	0	4	7	0	5	0	
7:55	0	19	0	1	0	0	0	0	0	0	0	0	0	0	9	4	0	3	0	0	25	3	0	3	5	1	0	0	
8:00	1	8	1	0	0	0	0	0	0	0	0	0	0	0	2	5	4	1	2	0	26	2	0	3	14	0	6	0	
8:05	3	9	0	0	0	0	0	0	0	0	0	0	0	0	4	5	0	5	0	0	20	2	0	0	4	1	5	0	
8:10	5	13	0	0	0	0	0	0	0	0	0	0	0	0	1	8	0	0	3	0	28	1	0	1	2	1	2	0	
8:15	1	16	2	0	0	0	0	0	0	0	0	0	0	0	2	6	1	0	1	0	21	3	0	0	4	0	1	0	
8:20	1	8	0	0	0	0	0	0	0	0	0	0	0	0	1	4	3	0	0	0	15	4	0	1	4	0	1	0	
8:25	3	10	1	0	0	0	0	0	0	0	0	0	0	0	7	2	0	2	0	0	14	3	0	1	3	1	6	0	
8:30	2	5	1	1	0	0	0	0	0	0	0	0	0	0	2	7	3	0	0	0	14	2	0	0	2	1	3	0	
8:35	0	9	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0	4	0	0	13	1	0	0	1	0	4	0	
8:40	1	10	0	0	0	0	0	0	0	0	0	0	0	0	4	2	0	2	2	0	17	2	0	1	2	0	2	1	
8:45	0	6	0	0	1	0	0	0	0	0	0	0	0	0	2	3	4	1	2	1	15	3	0	3	1	0	1	0	
8:50	3	15	1	1	0	0	0	0	0	0	0	0	0	0	8	0	0	0	0	0	13	4	0	2	2	0	7	1	
8:55	2	5	0	2	0	0	0	0	0	0	0	0	0	0	1	5	0	0	3	0	19	4	0	3	2	0	1	0	
Totals	28	258	7	5	1	0	0	0	0	1	14	167	51	4	46	4	498	76	0	41	86	8	67	3	0	0	0	3	

7409 SW Tech Center Dr, Ste B150
 J, OR 97224

Site Code: 13719808

Location: Broad St - Bacon/Cook St

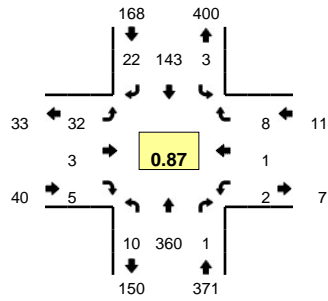
Date: 2/18/2016



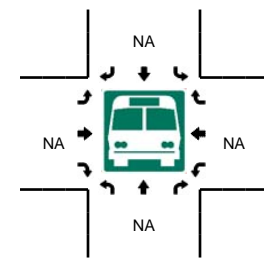
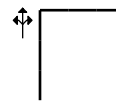
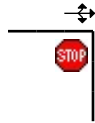
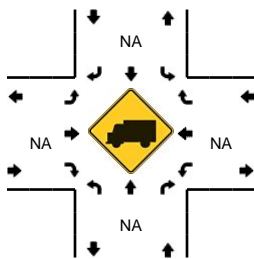
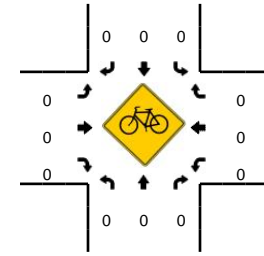
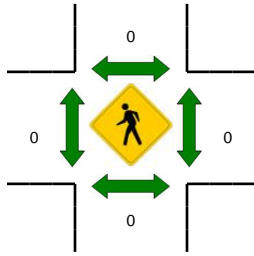
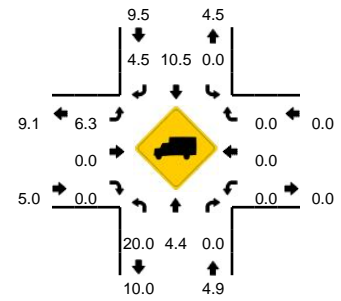
Start Time	N Broad St Southbound			Cook St From Northeast			E Bacon St Westbound			S Broad St Northbound			E Bacon St Eastbound											
	Right	Thru	Left	Right to	Left to Broad	Left to	Right to	Thru	Left	Right to	Thru	Left	Right to	Thru	Left									
14:00	3	18	1	0	0	0	0	0	0	0	13	6	0	0	25	4	0	2	7	0				
14:05	3	24	0	0	0	0	0	0	0	0	8	1	1	0	16	3	1	3	3	0				
14:10	0	14	1	0	0	0	0	0	0	0	9	1	0	3	16	5	0	4	7	15				
14:15	3	27	0	0	0	0	0	0	0	0	3	0	0	7	13	3	0	3	6	0				
14:20	1	20	0	1	0	0	0	0	0	0	1	7	3	0	22	2	0	3	4	10				
14:25	0	18	1	0	0	0	0	0	0	0	1	5	2	0	18	3	0	0	3	7				
14:30	2	22	1	0	0	0	0	0	0	0	6	0	0	3	0	21	0	0	4	1				
14:35	2	20	2	0	0	0	0	0	0	0	2	5	2	0	16	0	2	4	8	1				
14:40	3	34	2	0	0	0	0	0	0	0	7	1	0	1	0	25	5	0	5	6				
14:45	3	17	0	0	0	0	0	0	0	0	1	4	2	1	0	12	3	0	3	1				
14:50	0	19	1	0	0	0	0	0	0	0	7	1	0	2	1	21	2	0	5	4				
14:55	2	25	2	0	0	0	0	0	0	0	8	1	0	3	0	18	1	1	6	2				
15:00	1	17	0	0	0	0	0	0	0	0	6	3	1	5	0	19	7	1	2	7				
15:05	1	20	0	0	0	0	0	0	0	0	1	5	2	0	3	0	21	9	1	10				
15:10	4	24	0	0	0	0	0	0	0	0	7	1	0	3	0	21	8	0	13	7				
15:15	3	34	2	0	0	0	0	0	0	0	1	6	1	0	8	0	26	4	0	5				
15:20	2	41	1	0	0	0	0	0	0	0	7	3	0	4	0	23	4	0	3	8				
15:25	2	44	0	0	0	0	0	0	0	0	0	7	3	0	1	0	23	6	1	5				
15:30	2	32	0	0	0	0	0	0	0	0	2	7	1	0	6	1	20	6	0	9				
15:35	2	34	1	0	0	0	0	0	0	0	10	6	0	3	0	21	3	0	5	8				
15:40	2	26	2	1	0	0	0	0	0	0	6	1	0	2	2	19	2	0	6	12				
15:45	1	31	1	1	0	0	0	0	0	0	1	5	1	1	3	0	30	4	2	4				
15:50	1	33	1	0	0	0	0	0	0	0	11	3	0	6	0	15	6	0	6	7				
15:55	5	19	0	0	0	0	0	0	0	0	1	3	2	0	3	0	22	7	2	7				
16:00	2	32	1	0	0	0	0	0	0	0	1	3	2	0	5	0	29	4	0	7				
16:05	3	37	2	0	0	0	0	0	0	0	4	4	0	4	0	13	2	0	3	6				
16:10	3	26	1	0	0	0	0	0	0	0	4	2	0	5	0	23	4	0	4	13				
16:15	0	29	0	0	0	0	0	0	0	0	9	0	0	2	0	20	3	0	4	9				
16:20	0	29	0	0	0	0	0	0	0	0	7	0	0	1	0	25	8	0	4	0				
16:25	2	20	0	1	0	0	0	0	0	0	7	1	0	2	0	26	2	0	1	10				
16:30	2	28	2	0	0	0	0	0	0	0	1	7	3	0	3	0	16	1	1	5				
16:35	3	26	0	0	0	0	0	0	0	0	1	9	1	0	3	0	21	3	0	5				
16:40	2	36	1	0	0	0	0	0	0	0	4	3	0	2	0	26	5	1	4	5				
16:45	1	22	0	0	0	0	0	0	0	0	1	6	0	0	2	0	18	2	0	6				
16:50	1	23	0	0	0	0	0	0	0	0	0	15	3	0	2	0	14	5	0	2				
16:55	0	24	1	0	0	0	0	0	0	0	0	11	1	0	1	0	19	5	0	3				
17:00	1	31	1	0	0	0	0	0	0	0	7	2	0	2	0	18	3	1	4	9				
17:05	0	32	0	0	0	0	0	0	0	0	7	6	0	6	0	27	5	2	9	14				
17:10	1	44	0	0	0	0	0	0	0	0	5	0	0	3	0	19	4	0	6	3				
17:15	0	30	1	0	0	0	0	0	0	0	7	1	1	2	0	21	4	4	5	7				
17:20	3	25	1	0	0	0	0	0	0	0	6	1	0	1	0	29	1	0	0	2				
17:25	0	21	1	0	0	0	0	0	0	0	4	2	0	4	0	22	7	1	3	4				
17:30	2	22	2	0	0	0	0	0	0	0	4	2	0	4	0	22	3	0	8	5				
17:35	2	22	0	0	0	0	0	0	0	0	5	1	0	2	0	14	4	0	4	8				
17:40	0	24	0	0	0	0	0	0	0	0	6	3	0	3	0	24	4	0	3	5				
17:45	1	24	0	0	0	0	0	0	0	0	6	1	1	0	0	14	2	1	2	4				
17:50	2	27	0	0	0	0	0	0	0	0	7	3	0	1	0	14	3	0	2	4				
17:55	0	26	1	0	0	0	0	0	0	0	8	0	0	1	1	5	0	0	2	8				
Totals	79	1272	34	3	7	1	0	0	0	0	23	320	89	6	133	5	962	181	22	208	305	17	321	4

LOCATION: Hudson Rd -- Steamburg Rd
CITY/STATE: Hillsdale, MI

QC JOB #: 13719809
DATE: Thu, Feb 18 2016



Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

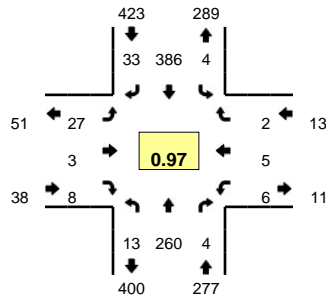


15-Min Count Period Beginning At	Hudson Rd (Northbound)				Hudson Rd (Southbound)				Steamburg Rd (Eastbound)				Steamburg Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	1	47	0	0	0	23	2	0	6	0	1	0	0	0	1	0	81	
7:15 AM	5	69	0	0	1	33	3	0	10	1	2	0	1	0	1	0	126	
7:30 AM	0	102	0	0	0	38	6	0	13	0	1	0	0	1	3	0	164	
7:45 AM	2	115	1	0	0	28	9	0	6	2	2	0	1	0	4	0	170	541
8:00 AM	3	74	0	0	2	44	4	0	3	0	0	0	0	0	0	0	130	590
8:15 AM	2	57	0	0	0	32	1	0	3	2	1	0	1	1	1	0	101	565
8:30 AM	2	54	0	0	0	24	2	0	7	0	1	0	0	0	0	0	90	491
8:45 AM	2	52	2	0	0	35	4	0	6	0	2	0	1	0	1	0	105	426
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
All Vehicles	8	460	4	0	0	112	36	0	24	8	8	0	4	0	16	0	680	
Heavy Trucks	0	8	0	0	0	12	0	0	4	0	0	0	0	0	0	0	24	
Pedestrians	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Railroad																		
Stopped Buses																		

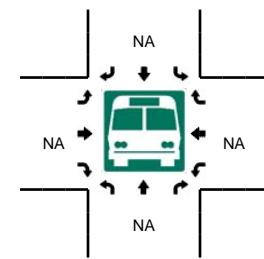
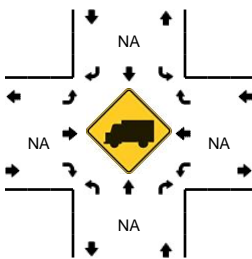
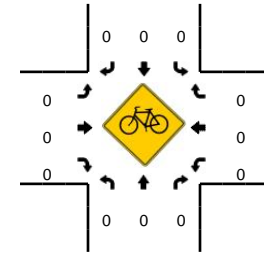
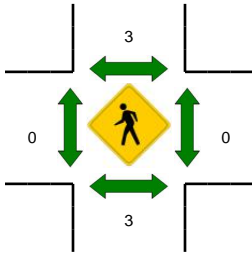
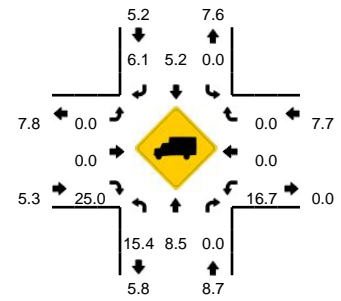
Comments:

LOCATION: Hudson Rd -- Steamburg Rd
CITY/STATE: Hillsdale, MI

QC JOB #: 13719810
DATE: Thu, Feb 18 2016



Peak-Hour: 3:15 PM -- 4:15 PM
Peak 15-Min: 3:15 PM -- 3:30 PM



15-Min Count Period Beginning At	Hudson Rd (Northbound)				Hudson Rd (Southbound)				Steamburg Rd (Eastbound)				Steamburg Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
2:00 PM	0	56	0	0	0	53	3	0	5	0	1	0	0	2	1	0	121	
2:15 PM	0	67	0	0	0	60	0	0	3	0	2	0	1	1	0	0	134	
2:30 PM	1	62	1	0	0	67	3	0	6	1	2	0	0	1	0	0	144	
2:45 PM	1	57	0	0	0	70	3	1	2	1	0	0	0	0	0	0	135	534
3:00 PM	4	61	4	0	1	86	6	0	3	0	1	0	0	0	0	0	166	579
3:15 PM	2	74	0	0	0	97	9	0	4	1	4	0	0	2	1	0	194	639
3:30 PM	4	62	0	0	2	101	8	0	8	1	1	0	4	1	0	0	192	687
3:45 PM	4	62	2	0	1	96	8	0	9	1	2	0	2	0	1	0	188	740
4:00 PM	3	62	2	0	1	92	8	0	6	0	1	0	0	2	0	0	177	751
4:15 PM	0	72	0	0	0	81	7	0	3	1	1	0	1	3	0	0	169	726
4:30 PM	1	52	1	0	2	83	6	0	3	1	1	0	1	0	1	0	152	686
4:45 PM	1	53	4	0	1	70	8	0	3	0	0	0	1	0	0	0	141	639
5:00 PM	4	59	2	0	0	102	13	0	2	0	1	0	0	0	1	0	184	646
5:15 PM	2	53	1	0	0	90	6	0	1	0	1	0	0	0	0	0	154	631
5:30 PM	1	58	0	0	0	69	8	0	6	1	1	0	0	2	1	0	147	626
5:45 PM	2	40	1	0	1	65	3	0	8	0	0	0	0	2	3	0	125	610
Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total	
All Vehicles	8	296	0	0	0	388	36	0	16	4	16	0	0	8	4	0	776	
Heavy Trucks	0	16	0	0	0	20	4	0	0	0	8	0	0	0	0	0	48	
Pedestrians		0				0				0				0			0	
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0	
Railroad																		
Stopped Buses																		

Comments:

APPENDIX B – SIGNAL TIMING PERMITS

TRAFFIC SIGNAL TIMING PERMIT

APPROACH	1	2	3	4	5	6	7	8
MINIMUM GREEN PASSAGE	10	0.0	50	0	5.5	2.5		
MAXIMUM NO. 1	10	0.0	30	0	5.5	2.5		
MAXIMUM NO. 2	10	0.0	30	0	5.5	2.5		
YELLOW CHANGE	10	0.0	30	0	5.5	2.5		
RED CLEARANCE	10	0.0	30	0	5.5	2.5		
WALK	7	31	2	0	4	0		
PEDESTRIAN CLEARANCE	7	31	2	0	4	0		
EXTENDED PED. CLEARANCE	7	31	2	0	4	0		
REST IN WALK	7	31	2	0	4	0		
INITIALIZATION	4	0	3	2	0	0		
NON-ACT RESPONSE	4	0	3	2	0	0		
VEHICLE RECALL	4	0	3	2	0	0		
PEDESTRIAN RECALL	4	0	3	2	0	0		
NON-LOCK MEMORY	4	0	3	2	0	0		
DUAL ENTRY	4	0	3	2	0	0		
DIAL 1	70	42	28	1				
DIAL 2	70	42	28	1				
DIAL 3	70	42	28	1				
DIAL SPLIT	70	42	28	1				
DIAL SPLIT	70	42	28	1				
DIAL SPLIT	70	42	28	1				
DIAL SPLIT	70	42	28	1				
DIAL SPLIT	70	42	28	1				
DIAL SPLIT	70	42	28	1				
MODE								

PHASE	1	2	3	4	5	6	7	8
1								
2 M-99 (WILL CARLETON ROAD)								
3								
4 M-99 (BROAD STREET)								
5								
6								
7								
8								

PHASE	D1/S1/O1: NORMAL	Load Bays	Phases Overlapped	T.G. (s)	Y (s)	R (s)	-GY	+GRN
1								
2 M-99 (WILL CARLETON ROAD)								
3								
4 M-99 (BROAD STREET)								
5								
6								
7								
8								

TIMING INSTALLED	
REMARKS	<p>BASE-MOUNTED, EPAC TYPE CONTROLLER.</p> <p>THIS SUBJECT INTERSECTION HAS UNDERGONE THE INSTALLATION OF COUNTDOWN PEDESTRIAN INDICATIONS.</p> <p>THE INSTALLATION OF THE COUNTDOWN PEDESTRIAN INDICATIONS WILL BE PERFORMED VIA WORK ORDER.</p> <p>FIXED-TIME OPERATION.</p>
PREPARED BY: HHHH	DATE: 03/02/09
FLASH HOURS:	<input type="checkbox"/> DAILY <input type="checkbox"/> NONE <input checked="" type="checkbox"/>
NIGHT FLASH:	
FY =	FR =
CONFLICT FLASH:	
FY = M-99 (WILL CARLETON ROAD)	FR = M-99 (BROAD STREET)
CONTROLLER TYPE:	<input type="checkbox"/> PRE-EMPT <input checked="" type="checkbox"/> EPAC <input type="checkbox"/> Other: COUNTDOWN PEDS <input checked="" type="checkbox"/>
LOCATION:	M-99 (WILL CARLETON RD.) AT BROAD ST.
CITY/TWP:	HILLSDALE CITY
COUNTY:	HILLSDALE
MILE POINT	CONTROL SECTION-SPOT #
0.00	30041-01-013
Job # (if Applicable):	

ADVANCED TIMING PARAMETERS FORM

SYSTEM INFORMATION		LEFT-TURN PHASING										RING AND BARRIER STRUCTURE										
Phase # / Description Controller Type: <input checked="" type="checkbox"/> EPAC <input type="checkbox"/> Other:		Permissive-Protected					Protected-Only					B1		B2		B3		B4				
		Lead	Lag	Split	Lead	Lag	R1	R2	R3	R4	2	4										
VEHICULAR AND PEDESTRIAN DETECTION																						
Vehicular Detection Movements and Call Delay (s)											Pedestrian Detection Push-Button Crossing Locations											
Approach	Left	Thru	Right	Loop	Video	Other																
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>																
PHASE 1 2 3 4 5 6 7 8 O1 O2 O3																						
DIAL	SPLIT	CYCLE																				
DIAL	SPLIT	CYCLE																				
DIAL	SPLIT	CYCLE																				
DIAL	SPLIT	CYCLE																				
DIAL	SPLIT	CYCLE																				
DIAL	SPLIT	CYCLE																				
DIAL	SPLIT	CYCLE																				
DIAL	SPLIT	CYCLE																				
ADDITIONAL DIAL SPLIT DATA																						
COORDINATION DATA																						
Operation Mode 1 Coordination Mode 0 Maximum Mode 0 Correction Mode 2 Offset Mode 0 Force Mode 0 Max Dwell 0 Yield Period 0																						
REMARKS:																						
ADDITIONAL OVERLAP DATA																						
Overlap Phase											Load		Phases		Y (s)		R (s)		-G/Y		+GRN	
=																						
=																						
=																						
=																						
PREPARED BY: HHH											DATE: 03/02/09		LOCATION: M-99 (WILL CARLETON RD.) AT BROAD ST.									
<input checked="" type="checkbox"/> MDOT											<input type="checkbox"/> County		<input type="checkbox"/> City		<input type="checkbox"/> Consultant		CONTROL SECTION-SPOT #					
																	30041-01-013					

CLEAR PAGE 2

ADVANCED TIMING PARAMETERS FORM

SYSTEM INFORMATION		LEFT-TURN PHASING										RING AND BARRIER STRUCTURE																			
Phase # / Description Contoller Type: <input checked="" type="checkbox"/> EPAC <input type="checkbox"/> Other:		Permissive-Protected				Protected-Only				B1		B2		B3		B4															
		Lead	Lag	Split	Lag	Lead	Lag	Split	Lag	R1	R2	4																			
VEHICULAR AND PEDESTRIAN DETECTION		VEHICULAR AND PEDESTRIAN DETECTION										DISAPPEARING LEGEND CASE SIGNS																			
System Type: <input type="checkbox"/> Closed Loop <input type="checkbox"/> Stand By <input type="checkbox"/> Group 1 <input type="checkbox"/> Group 2 Address: <input checked="" type="checkbox"/> TBC <input type="checkbox"/> TBC/GPS <input type="checkbox"/> None <input type="checkbox"/> Other:		Vehicular Detection					Pedestrian Detection																								
		Movements and Call Delay (s)					Push-Button Crossing Locations																								
If TBC, Synch by: <input checked="" type="checkbox"/> TOD <input type="checkbox"/> Event 33		Left		Right		Loop		Video		Other		2		3		4		5		6		7		8		O1		O2		O3	
		Thru		Thru		Thru		Thru		Thru		PHASE		PHASE		PHASE		PHASE		PHASE		PHASE		PHASE		PHASE		PHASE		PHASE	
Interconnect Type: <input type="checkbox"/> Hardwire <input type="checkbox"/> Fiber-Optic <input type="checkbox"/> Radio <input type="checkbox"/> Phone Drop <input checked="" type="checkbox"/> None <input type="checkbox"/> Other:		CYCLE		CYCLE		CYCLE		CYCLE		CYCLE		CYCLE		CYCLE		CYCLE		CYCLE		CYCLE		CYCLE		CYCLE		CYCLE		CYCLE			
		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT	
REMARKS: Optimized by Parsons.		DIAL		DIAL		DIAL		DIAL		DIAL		DIAL		DIAL		DIAL		DIAL		DIAL		DIAL		DIAL		DIAL		DIAL			
		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT		SPLIT			
If Phone Drop, Phone #		Overlap Phase		=		=		=		=		=		=		=		=		=		=		=		=		=			
		Load		Phases		Yield		T.G. (s)		Y (s)		R (s)		-G/Y		+GRN															
Contoller Status: <input type="checkbox"/> Master <input type="checkbox"/> Slave <input type="checkbox"/> Isolated <input checked="" type="checkbox"/> TBC		PREPARED BY: CRS		DATE: 02/28/12		<input type="checkbox"/> MDOT <input type="checkbox"/> County <input type="checkbox"/> City <input checked="" type="checkbox"/> Consultant		LOCATION:		M-99 (Broad Street) at McCollum Street		CONTROL SECTION-SPOT #		30041-01-002																	
		If Slave, Master Location:																													
Master Spot # :																															

CLEAR PAGE 2

PREEMPTION INFORMATION FORM

Preempt System Data					
Ring	1	2	3	4	
MIN GRN/WLK (s)					
Priority	PE1/2	PE2/3	PE3/4	PE4/5	PE5/6
Status					
REMARKS :					

Preemption Description:	Time (s)	Phases															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Preempt # =																	
SEL Ped Ci																	
SEL Yellow																	
SEL Red Ci																	
TRACK Green																	
TRACK Ped Ci																	
TRACK Yellow																	
TRACK Red CL																	
DWELL Green																	
RET Ped Ci																	
RET Yellow																	
RET Red Ci																	

Preemption Description:	Time (s)	Phases															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Preempt # =																	
SEL Ped Ci																	
SEL Yellow																	
SEL Red Ci																	
TRACK Green																	
TRACK Ped Ci																	
TRACK Yellow																	
TRACK Red CL																	
DWELL Green																	
RET Ped Ci																	
RET Yellow																	
RET Red Ci																	

Preemption Description:	Time (s)	Phases															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Preempt # =																	
SEL Ped Ci																	
SEL Yellow																	
SEL Red Ci																	
TRACK Green																	
TRACK Ped Ci																	
TRACK Yellow																	
TRACK Red CL																	
DWELL Green																	
RET Ped Ci																	
RET Yellow																	
RET Red Ci																	

Preemption Description:	Time (s)	Phases															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Preempt # =																	
SEL Ped Ci																	
SEL Yellow																	
SEL Red Ci																	
TRACK Green																	
TRACK Ped Ci																	
TRACK Yellow																	
TRACK Red CL																	
DWELL Green																	
RET Ped Ci																	
RET Yellow																	
RET Red Ci																	

PREPARED BY: CRS DATE: 02/28/12

LOCATION:
M-99 (Broad Street) at McCollum Street

CONTROL SECTION-SPOT #
30041-01-002

CLEAR PAGE 3

TRAFFIC SIGNAL TIMING PERMIT

APPROACH	PHASE	1	2	3	4	5	6	7	8	
			EB/WB							
MINIMUM GREEN PASSAGE		10	7							
MAXIMUM NO. 1		0.0	0.0							
MAXIMUM NO. 2		48	32							
YELLOW CHANGE		0	0							
RED CLEARANCE		3.5	3.5							
		2.5	2.5							
WALK		7	7							
PEDESTRIAN CLEARANCE		17	18							
EXTENDED PED. CLEARANCE		0	0							
REST IN WALK		0	0							
INITIALIZATION		4	1							
NON-ACT RESPONSE		0	0							
VEHICLE RECALL		3	3							
PEDESTRIAN RECALL		2	2							
NON-LOCK MEMORY		0	0							
DUAL ENTRY		0	0							
	CYCLE							O1	O2	O3
DIAL 1	SPLIT	80	48		32			40		
DIAL 2	SPLIT	80	48		32			33		
DIAL 3	SPLIT	80	48		32			5		
DIAL	SPLIT									
DIAL	SPLIT									
DIAL	SPLIT									
DIAL	SPLIT									
	MODE		1		0					

PHASE

1 "Hours of Operation"

2 M-99 (Broad Street) D1/S1/O1: NORMAL
D2/S1/O1: 06:00-09:00 (Monday-Friday)
D3/S1/O1: 14:00-18:00 (Monday-Friday)

3

4 Bacon Street

5

6

7

8

OVERLAPS

Overlap Phase	Load Bays	Phases Overlapped	T.G. (s)	Y (s)	R (s)	-GY	+GRN
=							
=							
=							
=							

TIMING INSTALLED

REMARKS
Revised min. green for phase 4, max 1, ped clearance for phase 2, extended ped clearance, splits, offsets, hours of operation, flash hours.

Optimized by Parsons.

PREPARED BY: CRS **DATE:** 02/28/12

FLASH HOURS:
21:00 to 06:00 DAILY NONE

NIGHT FLASH: _____

FY = M-99 (Broad) **FR =** Bacon Street

CONFLICT FLASH: _____

FY = M-99 (Broad) **FR =** Bacon Street

CONTROLLER TYPE: PRE-EMPT
 EPAC COUNTDOWN PEDS
 Other: _____

LOCATION:
M-99 (Broad Street) at Bacon Street
CITY/TWP: Hillisdale
COUNTY : Hillisdale

MILE POINT **CONTROL SECTION-SPOT #**
0.28 **30041-01-003**

Job # (if Applicable): 104457C

ADVANCED TIMING PARAMETERS FORM

SYSTEM INFORMATION	LEFT-TURN PHASING								RING AND BARRIER STRUCTURE							
Phase # / Description Controller Type: <input checked="" type="checkbox"/> EPAC <input type="checkbox"/> Other:	Permissive-Protected				Protected-Only				B1		B2		B3		B4	
	Lead	Lag	Split	Lag	Lead	Lag	R1	R2	R3	R4	2	4				
VEHICULAR AND PEDESTRIAN DETECTION																
Vehicular Detection								Pedestrian Detection								
Approach	Movements and Call Delay (s)				Type				Push-Button Crossing Locations							
	Left	Thru	Right	Loop	Video	Other										
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>										
ADDITIONAL DIAL SPLIT DATA																
	PHASE		1	2	3	4	5	6	7	8	O1	O2	O3	COORDINATION DATA		
DIAL	SPLIT	CYCLE												Operation Mode	1	
DIAL	SPLIT	CYCLE												Coordination Mode	0	
DIAL	SPLIT	CYCLE												Maximum Mode	0	
DIAL	SPLIT	CYCLE												Correction Mode	2	
DIAL	SPLIT	CYCLE												Offset Mode	0	
DIAL	SPLIT	CYCLE												Force Mode	0	
DIAL	SPLIT	CYCLE												Max Dwell	0	
DIAL	SPLIT	CYCLE												Yield Period	0	
ADDITIONAL OVERLAP DATA																
REMARKS: Optimized by Parsons.																
Overlap Phase = = = =																
Load Bays Overlapped T.G. (s) Y (s) R (s) -G/Y +GRN = = = =																
PREPARED BY: CRS DATE: 02/28/12 LOCATION: M-99 (Broad Street) at Bacon Street <input type="checkbox"/> MDOT <input type="checkbox"/> County <input type="checkbox"/> City <input checked="" type="checkbox"/> Consultant CONTROL SECTION-SPOT # 30041-01-003																

CLEAR PAGE 2

PREEMPTION INFORMATION FORM

Preemption Description:													Preempt System Data											
Preempt # =	Time (s)	Phases	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	Ring	1	2	3	4	
SEL Ped Ci		Vehicle																	MIN					
SEL Yellow																			GRN/WLK (s)					
SEL Red Ci																								
TRACK Green																			Priority	PE1/2	PE2/3	PE3/4	PE4/5	PE5/6
TRACK Ped Ci		Ped																	Status					
TRACK Yellow																								
TRACK Red CL																								
DWELL Green		Overlap	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P						
RET Ped Ci		Vehicle																						
RET Yellow																								
RET Red Ci																								
Preemption Description:																								
Preempt # =	Time (s)	Phases	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16						
SEL Ped Ci		Vehicle																						
SEL Yellow																								
SEL Red Ci																								
TRACK Green																								
TRACK Ped Ci		Ped																						
TRACK Yellow																								
TRACK Red CL																								
DWELL Green		Overlap	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P						
RET Ped Ci		Vehicle																						
RET Yellow																								
RET Red Ci																								
Preemption Description:																								
Preempt # =	Time (s)	Phases	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16						
SEL Ped Ci		Vehicle																						
SEL Yellow																								
SEL Red Ci																								
TRACK Green																								
TRACK Ped Ci		Ped																						
TRACK Yellow																								
TRACK Red CL																								
DWELL Green		Overlap	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P						
RET Ped Ci		Vehicle																						
RET Yellow																								
RET Red Ci																								

REMARKS :

PREPARED BY: CRS DATE: 02/28/12

LOCATION:
M-99 (Broad Street) at Bacon Street

CONTROL SECTION-SPOT #
30041-01-003

















CLEAR PAGE 3

APPENDIX C – INTERSECTION CAPACITY WORKSHEETS

HCM Signalized Intersection Capacity Analysis
1002: M-99 (Broad St) & McCollum St

AM EXISTING

6/16/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	8	3	8	11	9	6	352	7	2	158	3
Future Volume (vph)	57	8	3	8	11	9	6	352	7	2	158	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frbp, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.96			1.00			1.00	
Flt Protected		0.96			0.99			1.00			1.00	
Satd. Flow (prot)		1438			1420			3202			3116	
Flt Permitted		0.75			0.93			0.95			0.95	
Satd. Flow (perm)		1119			1342			3048			2967	
Peak-hour factor, PHF	0.67	0.67	0.67	0.65	0.65	0.65	0.81	0.81	0.81	0.91	0.91	0.91
Adj. Flow (vph)	85	12	4	12	17	14	7	435	9	2	174	3
RTOR Reduction (vph)	0	2	0	0	9	0	0	2	0	0	2	0
Lane Group Flow (vph)	0	99	0	0	34	0	0	449	0	0	178	0
Confl. Peds. (#/hr)							1		2	2		1
Heavy Vehicles (%)	5%	25%	0%	13%	0%	11%	0%	4%	0%	0%	7%	0%
Parking (#/hr)		10			10			10			10	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)		28.0			28.0			40.0			40.0	
Effective Green, g (s)		28.0			28.0			40.0			40.0	
Actuated g/C Ratio		0.35			0.35			0.50			0.50	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		391			469			1524			1483	
v/s Ratio Prot												
v/s Ratio Perm		c0.09			0.03			c0.15			0.06	
v/c Ratio		0.25			0.07			0.29			0.12	
Uniform Delay, d1		18.5			17.3			11.7			10.6	
Progression Factor		1.00			1.00			0.51			1.00	
Incremental Delay, d2		1.6			0.3			0.5			0.2	
Delay (s)		20.1			17.6			6.4			10.8	
Level of Service		C			B			A			B	
Approach Delay (s)		20.1			17.6			6.4			10.8	
Approach LOS		C			B			A			B	
Intersection Summary												
HCM 2000 Control Delay			9.9									A
HCM 2000 Volume to Capacity ratio			0.28									
Actuated Cycle Length (s)			80.0								12.0	
Intersection Capacity Utilization			39.3%									A
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 1003: M-99 (Broad St) & Bacon St & Cook St

AM EXISTING

6/16/2016

Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL2	SBL				
Lane Configurations																
Traffic Volume (vph)	38	4	55	27	34	105	6	43	321	26	1	2				
Future Volume (vph)	38	4	55	27	34	105	6	43	321	26	1	2				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900				
Total Lost time (s)	6.0		6.0			6.0			6.0							
Lane Util. Factor	1.00		1.00			1.00			0.95							
Frbp, ped/bikes	1.00		1.00			1.00			1.00							
Flpb, ped/bikes	1.00		1.00			1.00			1.00							
Frt	1.00		0.95			0.99			0.99							
Flt Protected	0.95		1.00			0.99			0.99							
Satd. Flow (prot)	1770		1772			1639			3479							
Flt Permitted	0.65		0.99			0.91			0.90							
Satd. Flow (perm)	1212		1754			1511			3151							
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.83	0.83	0.83	0.81	0.81	0.81	0.94	0.94				
Adj. Flow (vph)	48	5	70	34	41	127	7	53	396	32	1	2				
RTOR Reduction (vph)	0	0	20	0	0	0	0	0	19	0	0	0				
Lane Group Flow (vph)	48	0	89	0	0	175	0	0	462	0	0	0				
Confl. Peds. (#/hr)								1		1		1				
Parking (#/hr)						1										
Turn Type	Perm	Perm	NA		Perm	NA		Perm	NA		Perm	Perm				
Protected Phases			4			4			2							
Permitted Phases	4	4			4			2			2	2				
Actuated Green, G (s)	26.0		26.0			26.0			42.0							
Effective Green, g (s)	26.0		26.0			26.0			42.0							
Actuated g/C Ratio	0.32		0.32			0.32			0.52							
Clearance Time (s)	6.0		6.0			6.0			6.0							
Lane Grp Cap (vph)	393		570			491			1654							
v/s Ratio Prot																
v/s Ratio Perm	0.04		0.05			c0.12			c0.15							
v/c Ratio	0.12		0.16			0.36			0.28							
Uniform Delay, d1	19.0		19.2			20.6			10.6							
Progression Factor	1.00		1.00			1.00			1.00							
Incremental Delay, d2	0.6		0.6			2.0			0.4							
Delay (s)	19.6		19.8			22.6			11.0							
Level of Service	B		B			C			B							
Approach Delay (s)			19.7			22.6			11.0							
Approach LOS			B			C			B							
Intersection Summary																
HCM 2000 Control Delay			13.6			HCM 2000 Level of Service			B							
HCM 2000 Volume to Capacity ratio			0.31													
Actuated Cycle Length (s)			80.0			Sum of lost time (s)			12.0							
Intersection Capacity Utilization			68.1%			ICU Level of Service			C							
Analysis Period (min)			15													
c Critical Lane Group																

HCM Signalized Intersection Capacity Analysis
 1003: M-99 (Broad St) & Bacon St & Cook St

AM EXISTING

6/16/2016

Movement	SBT	SBR
Lane Configurations		
Traffic Volume (vph)	141	13
Future Volume (vph)	141	13
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	6.0	
Lane Util. Factor	0.95	
Frbp, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	0.99	
Flt Protected	1.00	
Satd. Flow (prot)	3224	
Flt Permitted	0.95	
Satd. Flow (perm)	3062	
Peak-hour factor, PHF	0.94	0.94
Adj. Flow (vph)	150	14
RTOR Reduction (vph)	7	0
Lane Group Flow (vph)	160	0
Confl. Peds. (#/hr)		1
Parking (#/hr)	10	
Turn Type	NA	
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	42.0	
Effective Green, g (s)	42.0	
Actuated g/C Ratio	0.52	
Clearance Time (s)	6.0	
Lane Grp Cap (vph)	1607	
v/s Ratio Prot		
v/s Ratio Perm	0.05	
v/c Ratio	0.10	
Uniform Delay, d1	9.5	
Progression Factor	0.63	
Incremental Delay, d2	0.1	
Delay (s)	6.2	
Level of Service	A	
Approach Delay (s)	6.2	
Approach LOS	A	
Intersection Summary		

HCM Signalized Intersection Capacity Analysis
 1013: M-99 (Broad St) & Carleton Rd

AM EXISTING

6/16/2016

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Traffic Volume (vph)	141	204	86	253	266	9
Future Volume (vph)	141	204	86	253	266	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.0			8.0	8.0	8.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, ped/bikes	0.99			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.91			1.00	1.00	0.85
Flt Protected	1.00			0.99	0.95	1.00
Satd. Flow (prot)	3069			3453	1752	1593
Flt Permitted	1.00			0.74	0.95	1.00
Satd. Flow (perm)	3069			2591	1752	1593
Peak-hour factor, PHF	0.88	0.88	0.72	0.72	0.71	0.71
Adj. Flow (vph)	160	232	119	351	375	13
RTOR Reduction (vph)	119	0	0	0	0	9
Lane Group Flow (vph)	273	0	0	470	375	4
Confl. Peds. (#/hr)		1	1			1
Heavy Vehicles (%)	4%	8%	1%	4%	3%	0%
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2			2	4	
Permitted Phases			2			4
Actuated Green, G (s)	34.0			34.0	20.0	20.0
Effective Green, g (s)	34.0			34.0	20.0	20.0
Actuated g/C Ratio	0.49			0.49	0.29	0.29
Clearance Time (s)	8.0			8.0	8.0	8.0
Lane Grp Cap (vph)	1490			1258	500	455
v/s Ratio Prot	0.09				c0.21	
v/s Ratio Perm				c0.18		0.00
v/c Ratio	0.18			0.37	0.75	0.01
Uniform Delay, d1	10.2			11.3	22.7	17.9
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.3			0.9	9.9	0.0
Delay (s)	10.4			12.2	32.7	17.9
Level of Service	B			B	C	B
Approach Delay (s)	10.4			12.2	32.2	
Approach LOS	B			B	C	

















Intersection Summary

HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 1002: M-99 (Broad St) & McCollum St

PM EXISTING

6/16/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	7	20	33	31	7	11	359	12	4	388	5
Future Volume (vph)	66	7	20	33	31	7	11	359	12	4	388	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0			6.0			6.0	
Lane Util. Factor		1.00			1.00			0.95			0.95	
Frbp, ped/bikes		1.00			1.00			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.99			1.00			1.00	
Flt Protected		0.97			0.98			1.00			1.00	
Satd. Flow (prot)		1474			1532			3159			3175	
Flt Permitted		0.76			0.85			0.94			0.95	
Satd. Flow (perm)		1159			1329			2970			3021	
Peak-hour factor, PHF	0.85	0.85	0.85	0.86	0.86	0.86	0.92	0.92	0.92	0.85	0.85	0.85
Adj. Flow (vph)	78	8	24	38	36	8	12	390	13	5	456	6
RTOR Reduction (vph)	0	12	0	0	5	0	0	3	0	0	1	0
Lane Group Flow (vph)	0	98	0	0	77	0	0	412	0	0	466	0
Confl. Peds. (#/hr)	3		5	5		3	4		4	4		4
Heavy Vehicles (%)	3%	0%	0%	0%	0%	14%	0%	5%	8%	0%	5%	0%
Parking (#/hr)		10			10			10			10	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)		28.0			28.0			40.0			40.0	
Effective Green, g (s)		28.0			28.0			40.0			40.0	
Actuated g/C Ratio		0.35			0.35			0.50			0.50	
Clearance Time (s)		6.0			6.0			6.0			6.0	
Lane Grp Cap (vph)		405			465			1485			1510	
v/s Ratio Prot												
v/s Ratio Perm		c0.08			0.06			0.14			c0.15	
v/c Ratio		0.24			0.17			0.28			0.31	
Uniform Delay, d1		18.5			17.9			11.6			11.8	
Progression Factor		1.00			1.00			0.96			1.00	
Incremental Delay, d2		1.4			0.8			0.5			0.5	
Delay (s)		19.9			18.7			11.6			12.4	
Level of Service		B			B			B			B	
Approach Delay (s)		19.9			18.7			11.6			12.4	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			13.3									B
HCM 2000 Volume to Capacity ratio			0.28									
Actuated Cycle Length (s)			80.0						12.0			
Intersection Capacity Utilization			52.5%									A
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 1003: M-99 (Broad St) & Bacon St & Cook St

PM EXISTING


6/16/2016

Movement	EBL2	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Traffic Volume (vph)	88	88	8	29	29	73	1	52	234	3	51	2
Future Volume (vph)	88	88	8	29	29	73	1	52	234	3	51	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0				6.0			
Lane Util. Factor	1.00	1.00			1.00				0.95			
Frbp, ped/bikes	1.00	1.00			0.99				1.00			
Flpb, ped/bikes	1.00	1.00			1.00				1.00			
Frt	1.00	0.99			0.92				0.98			
Flt Protected	0.95	1.00			0.99				0.99			
Satd. Flow (prot)	1637	1738			1356				2919			
Flt Permitted	0.67	1.00			0.92				0.82			
Satd. Flow (perm)	1160	1738			1258				2418			
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.93	0.93	0.93	0.93	0.89
Adj. Flow (vph)	105	105	10	35	35	87	1	56	252	3	55	2
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	18	0	0	0
Lane Group Flow (vph)	105	111	0	0	158	0	0	0	348	0	0	0
Confl. Peds. (#/hr)	3		5	5		3				1	3	3
Heavy Vehicles (%)	10%	8%	5%	10%	7%	18%	2%	22%	22%	25%	4%	2%
Parking (#/hr)					1							
Turn Type	Perm	NA		Perm	NA			Perm	NA			Perm
Protected Phases		4			4				2			
Permitted Phases	4			4				2				2
Actuated Green, G (s)	26.0	26.0			26.0				42.0			
Effective Green, g (s)	26.0	26.0			26.0				42.0			
Actuated g/C Ratio	0.32	0.32			0.32				0.52			
Clearance Time (s)	6.0	6.0			6.0				6.0			
Lane Grp Cap (vph)	377	564			408				1269			
v/s Ratio Prot		0.06										
v/s Ratio Perm	0.09				0.13				0.14			
v/c Ratio	0.28	0.20			0.39				0.27			
Uniform Delay, d1	20.0	19.5			20.8				10.5			
Progression Factor	1.00	1.00			1.00				1.00			
Incremental Delay, d2	1.8	0.8			2.8				0.5			
Delay (s)	21.9	20.2			23.6				11.1			
Level of Service	C	C			C				B			
Approach Delay (s)		21.0			23.6				11.1			
Approach LOS		C			C				B			
Intersection Summary												
HCM 2000 Control Delay			12.3			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.33									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			67.9%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 1003: M-99 (Broad St) & Bacon St & Cook St

PM EXISTING

6/16/2016

Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	12	389	28
Future Volume (vph)	12	389	28
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)		6.0	
Lane Util. Factor		0.95	
Frbp, ped/bikes		1.00	
Flpb, ped/bikes		1.00	
Frt		0.99	
Flt Protected		1.00	
Satd. Flow (prot)		3237	
Flt Permitted		0.94	
Satd. Flow (perm)		3045	
Peak-hour factor, PHF	0.89	0.89	0.89
Adj. Flow (vph)	13	437	31
RTOR Reduction (vph)	0	6	0
Lane Group Flow (vph)	0	477	0
Confl. Peds. (#/hr)	1		
Heavy Vehicles (%)	2%	2%	2%
Parking (#/hr)		10	
Turn Type	Perm	NA	
Protected Phases		2	
Permitted Phases	2		
Actuated Green, G (s)		42.0	
Effective Green, g (s)		42.0	
Actuated g/C Ratio		0.52	
Clearance Time (s)		6.0	
Lane Grp Cap (vph)		1598	
v/s Ratio Prot			
v/s Ratio Perm		c0.16	
v/c Ratio		0.30	
Uniform Delay, d1		10.7	
Progression Factor		0.48	
Incremental Delay, d2		0.5	
Delay (s)		5.6	
Level of Service		A	
Approach Delay (s)		5.6	
Approach LOS		A	
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
 1013: M-99 (Broad St) & Carleton Rd

PM EXISTING

6/16/2016

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑	↖	↗
Traffic Volume (vph)	308	487	102	270	268	8
Future Volume (vph)	308	487	102	270	268	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.0			8.0	8.0	8.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, ped/bikes	1.00			1.00	1.00	1.00
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.91			1.00	1.00	0.85
Flt Protected	1.00			0.99	0.95	1.00
Satd. Flow (prot)	3176			3491	1703	1429
Flt Permitted	1.00			0.57	0.95	1.00
Satd. Flow (perm)	3176			2028	1703	1429
Peak-hour factor, PHF	0.88	0.88	0.85	0.85	0.88	0.88
Adj. Flow (vph)	350	553	120	318	305	9
RTOR Reduction (vph)	284	0	0	0	0	6
Lane Group Flow (vph)	619	0	0	438	305	3
Confl. Peds. (#/hr)					3	
Heavy Vehicles (%)	2%	4%	2%	2%	6%	13%
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2			2	4	
Permitted Phases			2			4
Actuated Green, G (s)	34.0			34.0	20.0	20.0
Effective Green, g (s)	34.0			34.0	20.0	20.0
Actuated g/C Ratio	0.49			0.49	0.29	0.29
Clearance Time (s)	8.0			8.0	8.0	8.0
Lane Grp Cap (vph)	1542			985	486	408
v/s Ratio Prot	0.19				c0.18	
v/s Ratio Perm				c0.22		0.00
v/c Ratio	0.40			0.44	0.63	0.01
Uniform Delay, d1	11.5			11.8	21.8	17.9
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.8			1.5	6.0	0.0
Delay (s)	12.3			13.3	27.8	17.9
Level of Service	B			B	C	B
Approach Delay (s)	12.3			13.3	27.5	
Approach LOS	B			B	C	



















Intersection Summary

HCM 2000 Control Delay	15.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1002: M-99 (Broad St) & McCollum St



















AM Alternative 1

6/16/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	57	8	3	8	11	9	6	352	7	2	158	3
Future Volume (vph)	57	8	3	8	11	9	6	352	7	2	158	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.96		1.00	1.00		1.00	1.00	
Flt Protected		0.96			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1438			1420		1803	1549		1802	1507	
Flt Permitted		0.75			0.93		0.65	1.00		0.42	1.00	
Satd. Flow (perm)		1119			1342		1225	1549		789	1507	
Peak-hour factor, PHF	0.67	0.67	0.67	0.65	0.65	0.65	0.81	0.81	0.81	0.91	0.91	0.91
Adj. Flow (vph)	85	12	4	12	17	14	7	435	9	2	174	3
RTOR Reduction (vph)	0	2	0	0	9	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	99	0	0	34	0	7	443	0	2	176	0
Confl. Peds. (#/hr)							1		2	2		1
Heavy Vehicles (%)	5%	25%	0%	13%	0%	11%	0%	4%	0%	0%	7%	0%
Parking (#/hr)		10			10			10			10	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)		28.0			28.0		40.0	40.0		40.0	40.0	
Effective Green, g (s)		28.0			28.0		40.0	40.0		40.0	40.0	
Actuated g/C Ratio		0.35			0.35		0.50	0.50		0.50	0.50	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)		391			469		612	774		394	753	
v/s Ratio Prot								c0.29			0.12	
v/s Ratio Perm		c0.09			0.03		0.01			0.00		
v/c Ratio		0.25			0.07		0.01	0.57		0.01	0.23	
Uniform Delay, d1		18.5			17.3		10.1	14.0		10.0	11.3	
Progression Factor		1.00			1.00		0.59	0.51		1.00	1.00	
Incremental Delay, d2		1.6			0.3		0.0	2.9		0.0	0.7	
Delay (s)		20.1			17.6		5.9	9.9		10.0	12.1	
Level of Service		C			B		A	A		B	B	
Approach Delay (s)		20.1			17.6			9.9			12.0	
Approach LOS		C			B			A			B	
Intersection Summary												
HCM 2000 Control Delay			12.1									B
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			80.0							12.0		
Intersection Capacity Utilization			39.3%									A
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 1003: M-99 (Broad St) & Bacon St & Cook St

AM Alternative 1
 6/16/2016

												
Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR2	SBL2	SBL
Lane Configurations												
Traffic Volume (vph)	38	4	55	27	34	105	6	43	321	26	1	2
Future Volume (vph)	38	4	55	27	34	105	6	43	321	26	1	2
Ideal Flow (vphp)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0		6.0			6.0		6.0	6.0			6.0
Lane Util. Factor	1.00		1.00			1.00		1.00	1.00			1.00
Frbp, ped/bikes	1.00		1.00			1.00		1.00	1.00			1.00
Flpb, ped/bikes	1.00		1.00			1.00		1.00	1.00			1.00
Frt	1.00		0.95			0.99		1.00	0.99			1.00
Flt Protected	0.95		1.00			0.99		0.95	1.00			0.95
Satd. Flow (prot)	1770		1772			1639		1767	1839			1768
Flt Permitted	0.65		0.99			0.91		0.65	1.00			0.44
Satd. Flow (perm)	1212		1754			1511		1215	1839			822
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.83	0.83	0.83	0.81	0.81	0.81	0.94	0.94
Adj. Flow (vph)	48	5	70	34	41	127	7	53	396	32	1	2
RTOR Reduction (vph)	0	0	20	0	0	0	0	0	19	0	0	0
Lane Group Flow (vph)	48	0	89	0	0	175	0	53	409	0	0	3
Confl. Peds. (#/hr)								1		1		1
Parking (#/hr)						1						
Turn Type	Perm	Perm	NA		Perm	NA		Perm	NA		Perm	Perm
Protected Phases			4			4			2			
Permitted Phases	4	4			4			2			2	2
Actuated Green, G (s)	26.0		26.0			26.0		42.0	42.0			42.0
Effective Green, g (s)	26.0		26.0			26.0		42.0	42.0			42.0
Actuated g/C Ratio	0.32		0.32			0.32		0.52	0.52			0.52
Clearance Time (s)	6.0		6.0			6.0		6.0	6.0			6.0
Lane Grp Cap (vph)	393		570			491		637	965			431
v/s Ratio Prot									c0.22			
v/s Ratio Perm	0.04		0.05			c0.12		0.04				0.00
v/c Ratio	0.12		0.16			0.36		0.08	0.42			0.01
Uniform Delay, d1	19.0		19.2			20.6		9.4	11.6			9.1
Progression Factor	1.00		1.00			1.00		1.00	1.00			0.72
Incremental Delay, d2	0.6		0.6			2.0		0.3	1.4			0.0
Delay (s)	19.6		19.8			22.6		9.7	13.0			6.6
Level of Service	B		B			C		A	B			A
Approach Delay (s)			19.7			22.6			12.6			
Approach LOS			B			C			B			
Intersection Summary												
HCM 2000 Control Delay			14.5			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			57.8%			ICU Level of Service			B			
Analysis Period (min)			15									
c Critical Lane Group												











HCM Signalized Intersection Capacity Analysis
 1003: M-99 (Broad St) & Bacon St & Cook St

AM Alternative 1
 6/16/2016

	↓	↙
Movement	SBT	SBR
Lane Configurations	↻	
Traffic Volume (vph)	141	13
Future Volume (vph)	141	13
Ideal Flow (vphpl)	1900	1900
Total Lost time (s)	6.0	
Lane Util. Factor	1.00	
Frbp, ped/bikes	1.00	
Flpb, ped/bikes	1.00	
Frt	0.99	
Flt Protected	1.00	
Satd. Flow (prot)	1560	
Flt Permitted	1.00	
Satd. Flow (perm)	1560	
Peak-hour factor, PHF	0.94	0.94
Adj. Flow (vph)	150	14
RTOR Reduction (vph)	4	0
Lane Group Flow (vph)	160	0
Confl. Peds. (#/hr)		1
Parking (#/hr)	10	
Turn Type	NA	
Protected Phases	2	
Permitted Phases		
Actuated Green, G (s)	42.0	
Effective Green, g (s)	42.0	
Actuated g/C Ratio	0.52	
Clearance Time (s)	6.0	
Lane Grp Cap (vph)	819	
v/s Ratio Prot	0.10	
v/s Ratio Perm		
v/c Ratio	0.20	
Uniform Delay, d1	10.1	
Progression Factor	0.61	
Incremental Delay, d2	0.5	
Delay (s)	6.6	
Level of Service	A	
Approach Delay (s)	6.6	
Approach LOS	A	
Intersection Summary		

HCM Signalized Intersection Capacity Analysis
 1013: M-99 (Broad St) & Carleton Rd

AM Alternative 1
 6/16/2016

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	141	204	43	253	266	9
Future Volume (vph)	141	204	43	253	266	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.0			8.0	8.0	8.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, ped/bikes	0.99			1.00	1.00	0.99
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.91			1.00	1.00	0.85
Flt Protected	1.00			0.99	0.95	1.00
Satd. Flow (prot)	3054			3460	1752	1593
Flt Permitted	1.00			0.83	0.95	1.00
Satd. Flow (perm)	3054			2898	1752	1593
Peak-hour factor, PHF	0.88	0.88	0.72	0.72	0.71	0.71
Adj. Flow (vph)	160	232	60	351	375	13
RTOR Reduction (vph)	119	0	0	0	0	9
Lane Group Flow (vph)	273	0	0	411	375	4
Confl. Peds. (#/hr)		1	1			1
Heavy Vehicles (%)	4%	8%	1%	4%	3%	0%
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2			2	4	
Permitted Phases			2			4
Actuated Green, G (s)	34.0			34.0	20.0	20.0
Effective Green, g (s)	34.0			34.0	20.0	20.0
Actuated g/C Ratio	0.49			0.49	0.29	0.29
Clearance Time (s)	8.0			8.0	8.0	8.0
Lane Grp Cap (vph)	1483			1407	500	455
v/s Ratio Prot	0.09				c0.21	
v/s Ratio Perm				c0.14		0.00
v/c Ratio	0.18			0.29	0.75	0.01
Uniform Delay, d1	10.2			10.8	22.7	17.9
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.3			0.5	9.9	0.0
Delay (s)	10.4			11.3	32.7	17.9
Level of Service	B			B	C	B
Approach Delay (s)	10.4			11.3	32.2	
Approach LOS	B			B	C	

















Intersection Summary

HCM 2000 Control Delay	17.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 2013: Howell St & M-99 (Broad St) & North St









AM Alternative 1

6/16/2016

												
Movement	EBL2	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	WBR2	SEL	SET
Lane Configurations												
Traffic Volume (vph)	5	2	3	5	1	5	16	18	2	2	5	140
Future Volume (vph)	5	2	3	5	1	5	16	18	2	2	5	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0					6.0			6.0	6.0
Lane Util. Factor			1.00					1.00			1.00	1.00
Frbp, ped/bikes			0.99					1.00			1.00	0.99
Flpb, ped/bikes			1.00					1.00			1.00	1.00
Frt			0.95					0.99			1.00	0.94
Flt Protected			0.98					0.98			0.95	1.00
Satd. Flow (prot)			1714					1798			1766	1470
Flt Permitted			0.89					0.92			0.47	1.00
Satd. Flow (perm)			1564					1701			872	1470
Peak-hour factor, PHF	0.75	0.92	0.75	0.75	0.75	0.92	0.92	0.92	0.92	0.92	0.87	0.87
Adj. Flow (vph)	7	2	4	7	1	5	17	20	2	2	6	161
RTOR Reduction (vph)	0	0	1	0	0	0	0	2	0	0	0	0
Lane Group Flow (vph)	0	0	20	0	0	0	0	44	0	0	6	272
Confl. Peds. (#/hr)					3						3	
Parking (#/hr)					10							10
Turn Type	Perm	Perm	NA			Perm	Perm	NA			Perm	NA
Protected Phases			2					6				4
Permitted Phases	2	2				6	6				4	
Actuated Green, G (s)			3.2					3.2			46.1	46.1
Effective Green, g (s)			3.2					3.2			46.1	46.1
Actuated g/C Ratio			0.05					0.05			0.75	0.75
Clearance Time (s)			6.0					6.0			6.0	6.0
Vehicle Extension (s)			3.0					3.0			3.0	3.0
Lane Grp Cap (vph)			81					88			655	1105
v/s Ratio Prot												0.18
v/s Ratio Perm			0.01					c0.03			0.01	
v/c Ratio			0.25					0.50			0.01	0.25
Uniform Delay, d1			27.9					28.3			1.9	2.3
Progression Factor			1.00					1.00			1.00	1.00
Incremental Delay, d2			1.6					4.4			0.0	0.5
Delay (s)			29.5					32.7			1.9	2.8
Level of Service			C					C			A	A
Approach Delay (s)			29.5					32.7				2.8
Approach LOS			C					C				A
Intersection Summary												
HCM 2000 Control Delay			5.9								A	
HCM 2000 Volume to Capacity ratio			0.46									
Actuated Cycle Length (s)			61.3							12.0		
Intersection Capacity Utilization			39.6%								A	
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 2013: Howell St & M-99 (Broad St) & North St

AM Alternative 1
 6/16/2016



















						
Movement	SER	SER2	NWL	NWT	NWR	NWR2
Lane Configurations						
Traffic Volume (vph)	94	3	5	270	91	38
Future Volume (vph)	94	3	5	270	91	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	6.0		
Lane Util. Factor			1.00	1.00		
Frbp, ped/bikes			1.00	0.99		
Flpb, ped/bikes			1.00	1.00		
Frt			1.00	0.96		
Flt Protected			0.95	1.00		
Satd. Flow (prot)			1765	1505		
Flt Permitted			0.59	1.00		
Satd. Flow (perm)			1100	1505		
Peak-hour factor, PHF	0.87	0.87	0.73	0.73	0.92	0.73
Adj. Flow (vph)	108	3	7	370	99	52
RTOR Reduction (vph)	0	0	0	2	0	0
Lane Group Flow (vph)	0	0	7	519	0	0
Confl. Peds. (#/hr)	3	3	3			2
Parking (#/hr)				10		
Turn Type			Perm	NA		
Protected Phases				8		
Permitted Phases			8			
Actuated Green, G (s)			46.1	46.1		
Effective Green, g (s)			46.1	46.1		
Actuated g/C Ratio			0.75	0.75		
Clearance Time (s)			6.0	6.0		
Vehicle Extension (s)			3.0	3.0		
Lane Grp Cap (vph)			827	1131		
v/s Ratio Prot				0.34		
v/s Ratio Perm			0.01			
v/c Ratio			0.01	0.46		
Uniform Delay, d1			1.9	2.9		
Progression Factor			1.00	1.00		
Incremental Delay, d2			0.0	1.3		
Delay (s)			1.9	4.2		
Level of Service			A	A		
Approach Delay (s)				4.2		
Approach LOS				A		

Intersection Summary

HCM Signalized Intersection Capacity Analysis
1002: M-99 (Broad St) & McCollum St

PM Alternative 1

6/16/2016

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	66	7	20	33	31	7	11	359	12	4	388	5
Future Volume (vph)	66	7	20	33	31	7	11	359	12	4	388	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.97			0.99		1.00	1.00		1.00	1.00	
Flt Protected		0.97			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1469			1528		1800	1528		1799	1536	
Flt Permitted		0.76			0.85		0.40	1.00		0.45	1.00	
Satd. Flow (perm)		1155			1326		758	1528		857	1536	
Peak-hour factor, PHF	0.85	0.85	0.85	0.86	0.86	0.86	0.92	0.92	0.92	0.85	0.85	0.85
Adj. Flow (vph)	78	8	24	38	36	8	12	390	13	5	456	6
RTOR Reduction (vph)	0	12	0	0	5	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	98	0	0	77	0	12	402	0	5	462	0
Confl. Peds. (#/hr)	3		5	5		3	4		4	4		4
Heavy Vehicles (%)	3%	0%	0%	0%	0%	14%	0%	5%	8%	0%	5%	0%
Parking (#/hr)		10			10			10			10	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			4			2			2	
Permitted Phases	4			4			2			2		
Actuated Green, G (s)		28.0			28.0		40.0	40.0		40.0	40.0	
Effective Green, g (s)		28.0			28.0		40.0	40.0		40.0	40.0	
Actuated g/C Ratio		0.35			0.35		0.50	0.50		0.50	0.50	
Clearance Time (s)		6.0			6.0		6.0	6.0		6.0	6.0	
Lane Grp Cap (vph)		404			464		379	764		428	768	
v/s Ratio Prot								0.26			c0.30	
v/s Ratio Perm		c0.08			0.06		0.02			0.01		
v/c Ratio		0.24			0.17		0.03	0.53		0.01	0.60	
Uniform Delay, d1		18.5			17.9		10.2	13.6		10.1	14.3	
Progression Factor		1.00			1.00		0.94	0.95		1.00	1.00	
Incremental Delay, d2		1.4			0.8		0.1	2.5		0.0	3.5	
Delay (s)		19.9			18.7		9.7	15.4		10.1	17.8	
Level of Service		B			B		A	B		B	B	
Approach Delay (s)		19.9			18.7			15.2			17.7	
Approach LOS		B			B			B			B	
Intersection Summary												
HCM 2000 Control Delay			17.0				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.45									
Actuated Cycle Length (s)			80.0				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			53.2%				ICU Level of Service			A		
Analysis Period (min)			15									
c Critical Lane Group												




HCM Signalized Intersection Capacity Analysis
 1003: M-99 (Broad St) & Bacon St & Cook St

PM Alternative 1
 6/16/2016

Movement	EBL2	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2	SBL2
Lane Configurations												
Traffic Volume (vph)	88	88	8	29	29	73	1	52	234	3	51	2
Future Volume (vph)	88	88	8	29	29	73	1	52	234	3	51	2
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0			6.0			6.0	6.0			
Lane Util. Factor	1.00	1.00			1.00			1.00	1.00			
Frbp, ped/bikes	1.00	1.00			0.99			1.00	1.00			
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00			
Frt	1.00	0.99			0.92			1.00	0.97			
Flt Protected	0.95	1.00			0.99			0.95	1.00			
Satd. Flow (prot)	1763	1834			1502			1770	1801			
Flt Permitted	0.67	1.00			0.92			0.41	1.00			
Satd. Flow (perm)	1250	1834			1394			760	1801			
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.93	0.93	0.93	0.93	0.89
Adj. Flow (vph)	105	105	10	35	35	87	1	56	252	3	55	2
RTOR Reduction (vph)	0	4	0	0	0	0	0	0	10	0	0	0
Lane Group Flow (vph)	105	111	0	0	158	0	0	56	301	0	0	0
Confl. Peds. (#/hr)	3		5	5		3				1	3	3
Parking (#/hr)					1							
Turn Type	Perm	NA		Perm	NA			Perm	NA			Perm
Protected Phases		4			4				2			
Permitted Phases	4			4				2				2
Actuated Green, G (s)	26.0	26.0			26.0			42.0	42.0			
Effective Green, g (s)	26.0	26.0			26.0			42.0	42.0			
Actuated g/C Ratio	0.32	0.32			0.32			0.52	0.52			
Clearance Time (s)	6.0	6.0			6.0			6.0	6.0			
Lane Grp Cap (vph)	406	596			453			399	945			
v/s Ratio Prot		0.06							0.17			
v/s Ratio Perm	0.08				0.11			0.07				
v/c Ratio	0.26	0.19			0.35			0.14	0.32			
Uniform Delay, d1	19.9	19.4			20.6			9.7	10.8			
Progression Factor	1.00	1.00			1.00			1.00	1.00			
Incremental Delay, d2	1.5	0.7			2.1			0.7	0.9			
Delay (s)	21.4	20.1			22.7			10.5	11.7			
Level of Service	C	C			C			B	B			
Approach Delay (s)		20.7			22.7				11.5			
Approach LOS		C			C				B			
Intersection Summary												
HCM 2000 Control Delay			13.1			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.48									
Actuated Cycle Length (s)			80.0			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			66.3%			ICU Level of Service			C			
Analysis Period (min)			15									
c Critical Lane Group												











HCM Signalized Intersection Capacity Analysis
 1003: M-99 (Broad St) & Bacon St & Cook St

PM Alternative 1
 6/16/2016

Movement	SBL	SBT	SBR
Lane Configurations			
Traffic Volume (vph)	12	389	28
Future Volume (vph)	12	389	28
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	6.0	6.0	
Lane Util. Factor	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.99	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1762	1568	
Flt Permitted	0.55	1.00	
Satd. Flow (perm)	1013	1568	
Peak-hour factor, PHF	0.89	0.89	0.89
Adj. Flow (vph)	13	437	31
RTOR Reduction (vph)	0	3	0
Lane Group Flow (vph)	15	465	0
Confl. Peds. (#/hr)	1		
Parking (#/hr)		10	
Turn Type	Perm	NA	
Protected Phases		2	
Permitted Phases	2		
Actuated Green, G (s)	42.0	42.0	
Effective Green, g (s)	42.0	42.0	
Actuated g/C Ratio	0.52	0.52	
Clearance Time (s)	6.0	6.0	
Lane Grp Cap (vph)	531	823	
v/s Ratio Prot		c0.30	
v/s Ratio Perm	0.01		
v/c Ratio	0.03	0.56	
Uniform Delay, d1	9.2	12.8	
Progression Factor	0.57	0.41	
Incremental Delay, d2	0.1	2.4	
Delay (s)	5.3	7.7	
Level of Service	A	A	
Approach Delay (s)		7.6	
Approach LOS		A	
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
 1013: M-99 (Broad St) & Carleton Rd

PM Alternative 1
 6/16/2016

















						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	313	505	52	276	285	9
Future Volume (vph)	313	505	52	276	285	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	8.0			8.0	8.0	8.0
Lane Util. Factor	0.95			0.95	1.00	1.00
Frbp, ped/bikes	1.00			1.00	1.00	1.00
Flpb, ped/bikes	1.00			1.00	1.00	1.00
Frt	0.91			1.00	1.00	0.85
Flt Protected	1.00			0.99	0.95	1.00
Satd. Flow (prot)	3173			3511	1703	1429
Flt Permitted	1.00			0.71	0.95	1.00
Satd. Flow (perm)	3173			2499	1703	1429
Peak-hour factor, PHF	0.88	0.88	0.85	0.85	0.88	0.88
Adj. Flow (vph)	356	574	61	325	324	10
RTOR Reduction (vph)	295	0	0	0	0	7
Lane Group Flow (vph)	635	0	0	386	324	3
Confl. Peds. (#/hr)					3	
Heavy Vehicles (%)	2%	4%	2%	2%	6%	13%
Turn Type	NA		Perm	NA	Prot	Perm
Protected Phases	2			2	4	
Permitted Phases			2			4
Actuated Green, G (s)	34.0			34.0	20.0	20.0
Effective Green, g (s)	34.0			34.0	20.0	20.0
Actuated g/C Ratio	0.49			0.49	0.29	0.29
Clearance Time (s)	8.0			8.0	8.0	8.0
Lane Grp Cap (vph)	1541			1213	486	408
v/s Ratio Prot	c0.20				c0.19	
v/s Ratio Perm				0.15		0.00
v/c Ratio	0.41			0.32	0.67	0.01
Uniform Delay, d1	11.6			10.9	22.1	17.9
Progression Factor	1.00			1.00	1.00	1.00
Incremental Delay, d2	0.8			0.7	7.1	0.0
Delay (s)	12.4			11.6	29.1	17.9
Level of Service	B			B	C	B
Approach Delay (s)	12.4			11.6	28.8	
Approach LOS	B			B	C	

Intersection Summary

HCM 2000 Control Delay	15.5	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			









HCM Signalized Intersection Capacity Analysis
2013: Howell St & M-99 (Broad St) & North St

PM Alternative 1
6/16/2016

												
Movement	EBL2	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	WBR2	SEL	SET
Lane Configurations												
Traffic Volume (vph)	8	2	10	10	17	5	23	19	3	2	8	361
Future Volume (vph)	8	2	10	10	17	5	23	19	3	2	8	361
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0					6.0			6.0	6.0
Lane Util. Factor			1.00					1.00			1.00	1.00
Frbp, ped/bikes			0.99					1.00			1.00	0.99
Flpb, ped/bikes			1.00					1.00			1.00	1.00
Frt			0.92					0.99			1.00	0.95
Flt Protected			0.99					0.97			0.95	1.00
Satd. Flow (prot)			1673					1792			1766	1494
Flt Permitted			0.93					0.79			0.50	1.00
Satd. Flow (perm)			1572					1463			936	1494
Peak-hour factor, PHF	0.92	0.92	0.62	0.62	0.62	0.92	0.92	0.92	0.92	0.92	0.91	0.91
Adj. Flow (vph)	9	2	16	16	27	5	25	21	3	2	9	397
RTOR Reduction (vph)	0	0	25	0	0	0	0	2	0	0	0	1
Lane Group Flow (vph)	0	0	45	0	0	0	0	54	0	0	9	582
Confl. Peds. (#/hr)					1						3	
Parking (#/hr)					10							10
Turn Type	Perm	Perm	NA			Perm	Perm	NA			Perm	NA
Protected Phases			2					6				4
Permitted Phases	2	2				6	6				4	
Actuated Green, G (s)			5.1					5.1			47.6	47.6
Effective Green, g (s)			5.1					5.1			47.6	47.6
Actuated g/C Ratio			0.08					0.08			0.74	0.74
Clearance Time (s)			6.0					6.0			6.0	6.0
Vehicle Extension (s)			3.0					3.0			3.0	3.0
Lane Grp Cap (vph)			123					115			688	1099
v/s Ratio Prot												c0.39
v/s Ratio Perm			0.03					c0.04			0.01	
v/c Ratio			0.37					0.47			0.01	0.53
Uniform Delay, d1			28.3					28.5			2.3	3.7
Progression Factor			1.00					1.00			1.00	1.00
Incremental Delay, d2			1.9					3.0			0.0	1.8
Delay (s)			30.1					31.5			2.3	5.5
Level of Service			C					C			A	A
Approach Delay (s)			30.1					31.5				5.5
Approach LOS			C					C				A
Intersection Summary												
HCM 2000 Control Delay			7.7									A
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			64.7							12.0		
Intersection Capacity Utilization			45.8%									A
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 2013: Howell St & M-99 (Broad St) & North St

















PM Alternative 1
 6/16/2016

						
Movement	SER	SER2	NWL	NWT	NWR	NWR2
Lane Configurations						
Traffic Volume (vph)	157	12	5	275	82	52
Future Volume (vph)	157	12	5	275	82	52
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)			6.0	6.0		
Lane Util. Factor			1.00	1.00		
Frbp, ped/bikes			1.00	0.99		
Flpb, ped/bikes			1.00	1.00		
Frt			1.00	0.95		
Flt Protected			0.95	1.00		
Satd. Flow (prot)			1765	1493		
Flt Permitted			0.42	1.00		
Satd. Flow (perm)			788	1493		
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.92	0.91
Adj. Flow (vph)	173	13	5	302	89	57
RTOR Reduction (vph)	0	0	0	3	0	0
Lane Group Flow (vph)	0	0	5	445	0	0
Confl. Peds. (#/hr)	1	5	5			5
Parking (#/hr)				10		
Turn Type			Perm	NA		
Protected Phases				8		
Permitted Phases			8			
Actuated Green, G (s)			47.6	47.6		
Effective Green, g (s)			47.6	47.6		
Actuated g/C Ratio			0.74	0.74		
Clearance Time (s)			6.0	6.0		
Vehicle Extension (s)			3.0	3.0		
Lane Grp Cap (vph)			579	1098		
v/s Ratio Prot				0.30		
v/s Ratio Perm			0.01			
v/c Ratio			0.01	0.40		
Uniform Delay, d1			2.3	3.2		
Progression Factor			1.00	1.00		
Incremental Delay, d2			0.0	1.1		
Delay (s)			2.3	4.3		
Level of Service			A	A		
Approach Delay (s)				4.3		
Approach LOS				A		

Intersection Summary

HCM Signalized Intersection Capacity Analysis
2013: Howell St & M-99 (Broad St) & North St

AM Alternative 2
6/16/2016

												
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	SEL	SET	SER	SER2
Lane Configurations												
Traffic Volume (vph)	5	5	5	1	5	16	20	2	5	145	94	3
Future Volume (vph)	5	5	5	1	5	16	20	2	5	145	94	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0					4.5		6.0	6.0		
Lane Util. Factor		1.00					1.00		1.00	1.00		
Frbp, ped/bikes		0.99					1.00		1.00	0.99		
Flpb, ped/bikes		1.00					1.00		1.00	1.00		
Frt		0.95					0.99		1.00	0.94		
Flt Protected		0.98					0.98		0.95	1.00		
Satd. Flow (prot)		1715					1809		1770	1472		
Flt Permitted		0.87					0.84		0.48	1.00		
Satd. Flow (perm)		1510					1551		885	1472		
Peak-hour factor, PHF	0.75	0.92	0.75	0.75	0.92	0.92	0.92	0.92	0.92	0.87	0.87	0.87
Adj. Flow (vph)	7	5	7	1	5	17	22	2	5	167	108	3
RTOR Reduction (vph)	0	1	0	0	0	0	2	0	0	0	0	0
Lane Group Flow (vph)	0	19	0	0	0	0	44	0	5	278	0	0
Confl. Peds. (#/hr)				3							3	3
Parking (#/hr)				10						10		
Turn Type	Perm	NA			Perm	Perm	NA		Perm	NA		
Protected Phases		2					6			4		
Permitted Phases	2				6	6			4			
Actuated Green, G (s)		3.3					4.8		52.7	52.7		
Effective Green, g (s)		3.3					4.8		52.7	52.7		
Actuated g/C Ratio		0.05					0.07		0.78	0.78		
Clearance Time (s)		6.0					4.5		6.0	6.0		
Vehicle Extension (s)		3.0					3.0		3.0	3.0		
Lane Grp Cap (vph)		73					109		685	1140		
v/s Ratio Prot										0.19		
v/s Ratio Perm		0.01					c0.03		0.01			
v/c Ratio		0.26					0.40		0.01	0.24		
Uniform Delay, d1		31.2					30.2		1.7	2.1		
Progression Factor		1.00					1.00		1.00	1.00		
Incremental Delay, d2		1.9					2.5		0.0	0.5		
Delay (s)		33.1					32.7		1.8	2.6		
Level of Service		C					C		A	A		
Approach Delay (s)		33.1					32.7			2.6		
Approach LOS		C					C			A		
Intersection Summary												
HCM 2000 Control Delay			5.6				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.44									
Actuated Cycle Length (s)			68.0				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			39.5%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 2013: Howell St & M-99 (Broad St) & North St

AM Alternative 2

















6/16/2016



Movement	NWL	NWT	NWR
Lane Configurations			
Traffic Volume (vph)	5	270	129
Future Volume (vph)	5	270	129
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	6.0	6.0	
Lane Util. Factor	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.96	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1764	1518	
Flt Permitted	0.59	1.00	
Satd. Flow (perm)	1094	1518	
Peak-hour factor, PHF	0.73	0.73	0.92
Adj. Flow (vph)	7	370	140
RTOR Reduction (vph)	0	8	0
Lane Group Flow (vph)	7	502	0
Confl. Peds. (#/hr)	3		
Parking (#/hr)		10	
Turn Type	Perm	NA	
Protected Phases		8	
Permitted Phases	8		
Actuated Green, G (s)	52.7	52.7	
Effective Green, g (s)	52.7	52.7	
Actuated g/C Ratio	0.78	0.78	
Clearance Time (s)	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	
Lane Grp Cap (vph)	847	1176	
v/s Ratio Prot		c0.33	
v/s Ratio Perm	0.01		
v/c Ratio	0.01	0.43	
Uniform Delay, d1	1.7	2.6	
Progression Factor	1.00	1.00	
Incremental Delay, d2	0.0	1.1	
Delay (s)	1.8	3.7	
Level of Service	A	A	
Approach Delay (s)		3.7	
Approach LOS		A	
Intersection Summary			

HCM Signalized Intersection Capacity Analysis
2013: Howell St & M-99 (Broad St) & North St

PM Alternative 2
6/16/2016

												
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	SEL	SET	SER	SER2
Lane Configurations												
Traffic Volume (vph)	10	10	10	17	5	23	22	2	10	364	157	12
Future Volume (vph)	10	10	10	17	5	23	22	2	10	364	157	12
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0					6.0		6.0	6.0		
Lane Util. Factor		1.00					1.00		1.00	1.00		
Frbp, ped/bikes		0.99					1.00		1.00	0.99		
Flpb, ped/bikes		1.00					1.00		1.00	1.00		
Frt		0.92					1.00		1.00	0.95		
Flt Protected		0.99					0.97		0.95	1.00		
Satd. Flow (prot)		1673					1805		1766	1495		
Flt Permitted		0.93					0.79		0.50	1.00		
Satd. Flow (perm)		1572					1473		935	1495		
Peak-hour factor, PHF	0.92	0.62	0.62	0.62	0.92	0.92	0.92	0.92	0.91	0.91	0.91	0.91
Adj. Flow (vph)	11	16	16	27	5	25	24	2	11	400	173	13
RTOR Reduction (vph)	0	25	0	0	0	0	2	0	0	1	0	0
Lane Group Flow (vph)	0	45	0	0	0	0	54	0	11	585	0	0
Confl. Peds. (#/hr)				1					3		1	5
Parking (#/hr)				10						10		
Turn Type	Perm	NA			Perm	Perm	NA		Perm	NA		
Protected Phases		2					6			4		
Permitted Phases	2				6	6			4			
Actuated Green, G (s)		5.1					5.1		48.6	48.6		
Effective Green, g (s)		5.1					5.1		48.6	48.6		
Actuated g/C Ratio		0.08					0.08		0.74	0.74		
Clearance Time (s)		6.0					6.0		6.0	6.0		
Vehicle Extension (s)		3.0					3.0		3.0	3.0		
Lane Grp Cap (vph)		122					114		691	1105		
v/s Ratio Prot										c0.39		
v/s Ratio Perm		0.03					c0.04		0.01			
v/c Ratio		0.37					0.48		0.02	0.53		
Uniform Delay, d1		28.8					29.0		2.3	3.7		
Progression Factor		1.00					1.00		1.00	1.00		
Incremental Delay, d2		1.9					3.1		0.0	1.8		
Delay (s)		30.7					32.1		2.3	5.5		
Level of Service		C					C		A	A		
Approach Delay (s)		30.7					32.1			5.4		
Approach LOS		C					C			A		
Intersection Summary												
HCM 2000 Control Delay			7.7				HCM 2000 Level of Service			A		
HCM 2000 Volume to Capacity ratio			0.52									
Actuated Cycle Length (s)			65.7				Sum of lost time (s)		12.0			
Intersection Capacity Utilization			46.0%				ICU Level of Service		A			
Analysis Period (min)			15									
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 2013: Howell St & M-99 (Broad St) & North St

PM Alternative 2
 6/16/2016



Movement	NWL	NWT	NWR
Lane Configurations			
Traffic Volume (vph)	5	275	134
Future Volume (vph)	5	275	134
Ideal Flow (vphpl)	1900	1900	1900
Total Lost time (s)	6.0	6.0	
Lane Util. Factor	1.00	1.00	
Frbp, ped/bikes	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	
Frt	1.00	0.95	
Flt Protected	0.95	1.00	
Satd. Flow (prot)	1764	1492	
Flt Permitted	0.42	1.00	
Satd. Flow (perm)	785	1492	
Peak-hour factor, PHF	0.91	0.91	0.91
Adj. Flow (vph)	5	302	147
RTOR Reduction (vph)	0	12	0
Lane Group Flow (vph)	5	437	0
Confl. Peds. (#/hr)	5		5
Parking (#/hr)		10	
Turn Type	Perm	NA	
Protected Phases		8	
Permitted Phases	8		
Actuated Green, G (s)	48.6	48.6	
Effective Green, g (s)	48.6	48.6	
Actuated g/C Ratio	0.74	0.74	
Clearance Time (s)	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	
Lane Grp Cap (vph)	580	1103	
v/s Ratio Prot		0.29	
v/s Ratio Perm	0.01		
v/c Ratio	0.01	0.40	
Uniform Delay, d1	2.2	3.1	
Progression Factor	1.00	1.00	
Incremental Delay, d2	0.0	1.1	
Delay (s)	2.3	4.2	
Level of Service	A	A	
Approach Delay (s)		4.2	
Approach LOS		A	
Intersection Summary			