

Bill McNulty

From: William McNulty <wmcnulty@ocpcrpa.org>
Sent: Friday, September 25, 2015 2:16 PM
To: Sid Kashi; James Downey
Cc: Charles Kilmer
Subject: Signal Optimization Analysis for Cherry Street at Standish Avenue
Attachments: Cherry at Standish Existing 2013 AM LOS - Report.pdf; Cherry at Standish Existing 2013 PM LOS - Report.pdf; Cherry at Standish Potential AM LOS w Timing Improvements - Report.pdf; Cherry at Standish Potential AM LOS w Timing Improvements No Lead - Report.pdf; Cherry at Standish Potential PM LOS w Timing Improvements - Report.pdf; Cherry at Standish Potential PM LOS w Timing Improvements No Lead - Report.pdf; Cherry at Standish Collision Diagram.pdf; Crash Rate for Cherry at Standish.pdf; Cherry Street & Standish Avenue_AM.pdf; Cherry Street & Standish Avenue_PM.pdf

Hello Sid and James,

Per your request, we have assessed the existing signal operations and level of service at the intersection of Cherry Street and Standish Avenue, along with estimation of level of service with phase optimization and/or phase changes. Turning movement count data with corresponding level of service analysis as well as crash analysis is attached. The following table summarizes the results of this analysis. Our findings conclude that the existing phase plan for this traffic signal is operating at a level close to optimal. Note that “optimal” phasing was selected using Synchro estimation methodology. A more detailed engineering analysis of these signals may yield differing results. We assessed 3 scenarios: Existing, Optimized Timing with existing phasing, and Optimized Timing while removing the westbound lead green time.

	Existing		Optimized - No Phase Changes		Optimized - No Westbound Lead	
	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS
Morning Peak Hour	24.5	C	22.3	C	19.7	B
Afternoon Peak Hour	27.1	C	25.7	C	27.2	C

Field observation indicated that the intersection surrounding area becomes congested during school arrival and dismissal times. However, this congestion is relatively short-lived and clears quickly once school has begun in the morning and shortly after school dismissal.

We also looked at the crash history for this intersection. The crash rate for the intersection is above the MassDOT District 5 average for signalized intersections. After sketching out the crashes in a collision diagram, it is noted that there are several angled collisions between vehicles traveling westbound on Cherry Street and northbound on Standish Avenue. Recurring angled collisions at signalized intersections may be indicative of red-light running, which could be the result of either visibility issues or driver behavior.

Preential improvements the Town may consider to improve safety at the location:

- Replace antiquated post-mounted signal system with overhead signals (either on mast arms or guide wire)
- Use brighter, LED signals for better visibility
- Install backplates on traffic signals
- Trim tree canopy to minimize shadowing/blocking of traffic signals
- Increased traffic law enforcement (red-light running and speeding)

Should you have any questions about the findings of this traffic study, please do not hesitate to contact me.

-Bill

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Bill McNulty, Senior Transportation Planner

Old Colony Planning Council

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Community: Plymouth
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 Board # & Staff: DB-400 (5) / SB
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File Name : Cherry Street & Standish Avenue_AM
 Site Code : 239
 Start Date : 10/30/2013
 Page No : 1

Groups Printed- Cars - Buses - Trucks

Start Time	Standish Avenue Southbound					Cherry Street Westbound					Standish Avenue Northbound					Cherry Street Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
07:00 AM	3	12	0	0	15	0	17	1	0	18	4	15	6	2	27	3	23	4	0	30	90
07:15 AM	3	7	0	1	11	0	21	2	0	23	12	14	12	2	40	4	23	2	0	29	103
07:30 AM	12	18	0	3	33	0	20	11	1	32	17	22	10	1	50	9	34	5	1	49	164
07:45 AM	7	14	1	6	28	1	23	11	0	35	8	20	7	0	35	3	31	9	2	45	143
Total	25	51	1	10	87	1	81	25	1	108	41	71	35	5	152	19	111	20	3	153	500
08:00 AM	11	14	1	1	27	2	14	11	0	27	18	27	13	0	58	8	31	6	0	45	157
08:15 AM	7	9	0	1	17	1	33	7	1	42	26	24	9	0	59	4	34	5	1	44	162
08:30 AM	9	7	2	0	18	1	29	8	1	39	23	18	16	3	60	7	38	12	11	68	185
08:45 AM	23	30	4	17	74	1	24	15	3	43	9	30	9	0	48	16	19	40	10	85	250
Total	50	60	7	19	136	5	100	41	5	151	76	99	47	3	225	35	122	63	22	242	754
Grand Total	75	111	8	29	223	6	181	66	6	259	117	170	82	8	377	54	233	83	25	395	1254
Apprch %	33.6	49.8	3.6	13		2.3	69.9	25.5	2.3		31	45.1	21.8	2.1		13.7	59	21	6.3		
Total %	6	8.9	0.6	2.3	17.8	0.5	14.4	5.3	0.5	20.7	9.3	13.6	6.5	0.6	30.1	4.3	18.6	6.6	2	31.5	
Cars	71	104	8	0	183	6	171	61	0	238	112	161	81	0	354	50	220	78	0	348	1123
% Cars	94.7	93.7	100	0	82.1	100	94.5	92.4	0	91.9	95.7	94.7	98.8	0	93.9	92.6	94.4	94	0	88.1	89.6
Buses	2	6	0	10	18	0	4	3	1	8	3	5	1	2	11	3	4	3	16	26	63
% Buses	2.7	5.4	0	34.5	8.1	0	2.2	4.5	16.7	3.1	2.6	2.9	1.2	25	2.9	5.6	1.7	3.6	64	6.6	5
Trucks	2	1	0	19	22	0	6	2	5	13	2	4	0	6	12	1	9	2	9	21	68
% Trucks	2.7	0.9	0	65.5	9.9	0	3.3	3	83.3	5	1.7	2.4	0	75	3.2	1.9	3.9	2.4	36	5.3	5.4

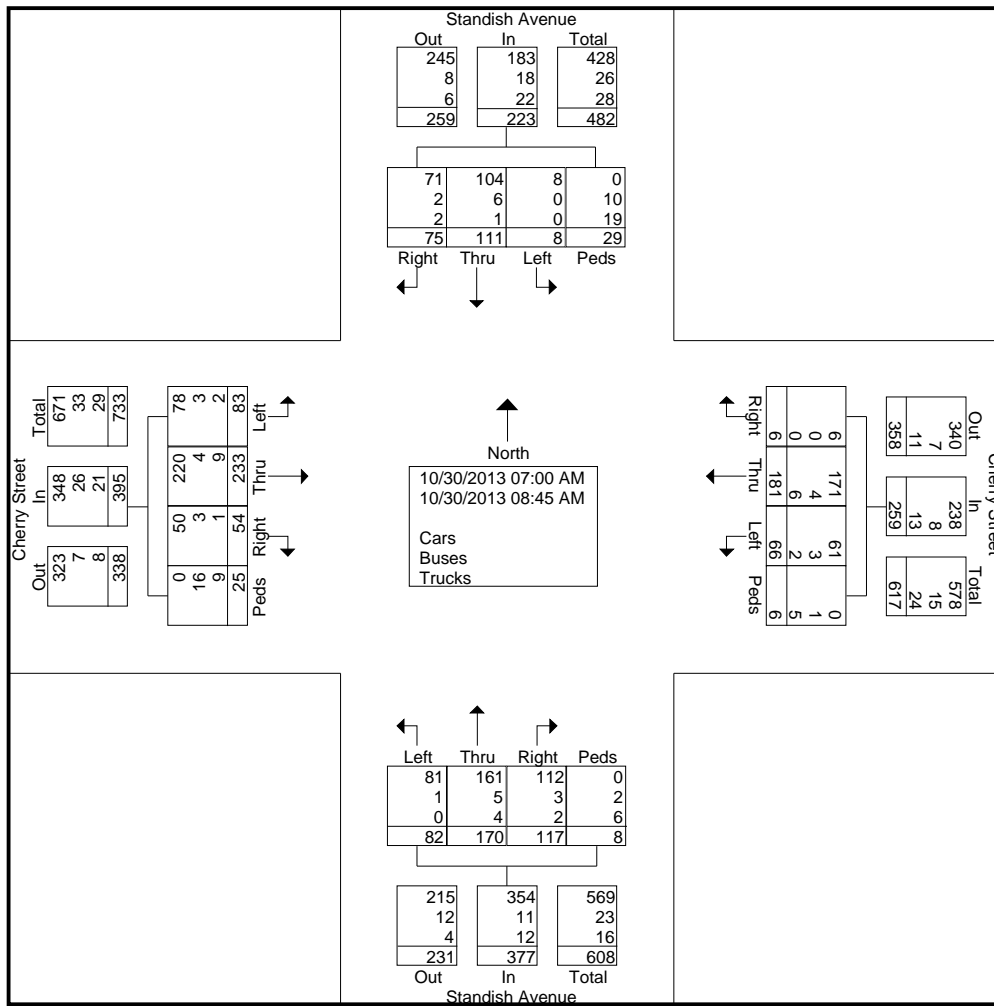


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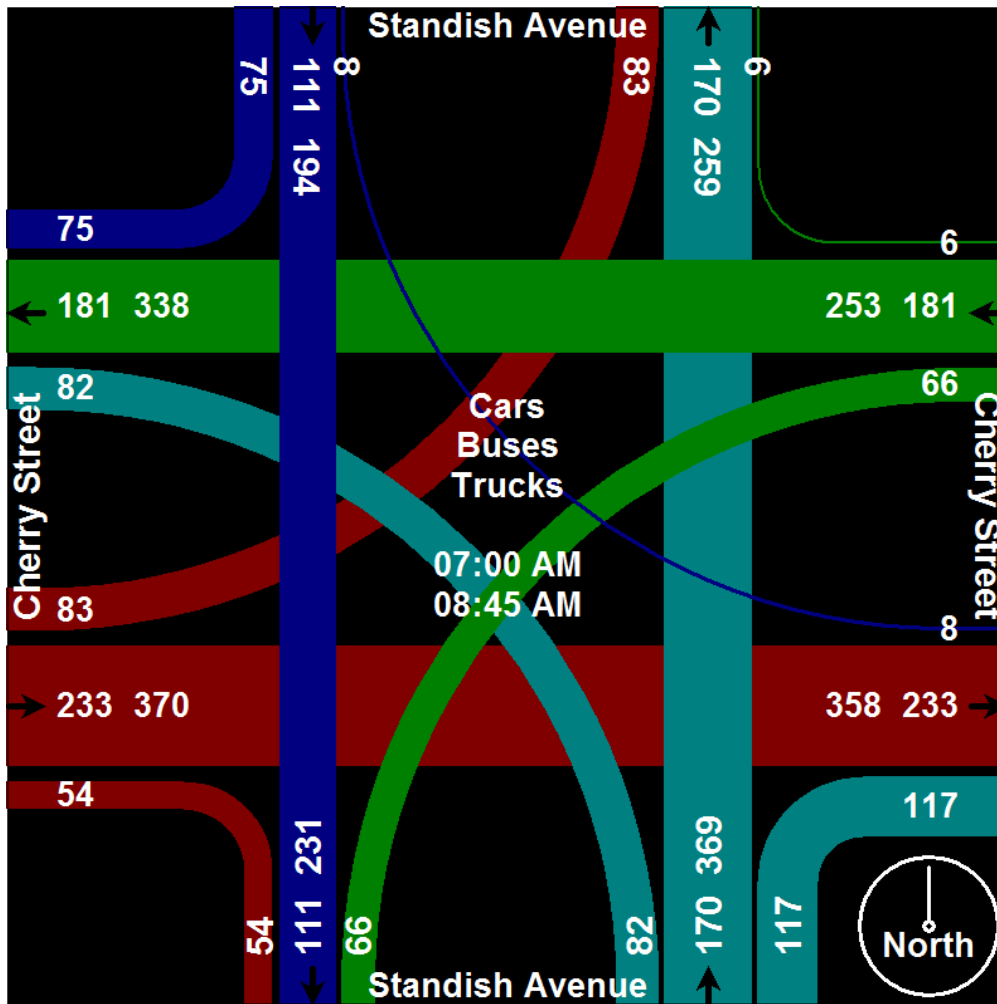


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	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 08:00 AM																					
08:00 AM	11	14	1	1	27	2	14	11	0	27	18	27	13	0	58	8	31	6	0	45	157
08:15 AM	7	9	0	1	17	1	33	7	1	42	26	24	9	0	59	4	34	5	1	44	162
08:30 AM	9	7	2	0	18	1	29	8	1	39	23	18	16	3	60	7	38	12	11	68	185
08:45 AM	23	30	4	17	74	1	24	15	3	43	9	30	9	0	48	16	19	40	10	85	250
Total Volume	50	60	7	19	136	5	100	41	5	151	76	99	47	3	225	35	122	63	22	242	754
% App. Total	36.8	44.1	5.1	14		3.3	66.2	27.2	3.3		33.8	44	20.9	1.3		14.5	50.4	26	9.1		
PHF	.543	.500	.438	.279	.459	.625	.758	.683	.417	.878	.731	.825	.734	.250	.938	.547	.803	.394	.500	.712	.754
Cars	47	59	7	0	113	5	96	38	0	139	73	97	47	0	217	34	117	60	0	211	680
% Cars	94.0	98.3	100	0	83.1	100	96.0	92.7	0	92.1	96.1	98.0	100	0	96.4	97.1	95.9	95.2	0	87.2	90.2
Buses	2	1	0	5	8	0	3	2	0	5	2	2	0	1	5	1	2	1	14	18	36
% Buses	4.0	1.7	0	26.3	5.9	0	3.0	4.9	0	3.3	2.6	2.0	0	33.3	2.2	2.9	1.6	1.6	63.6	7.4	4.8
Trucks	1	0	0	14	15	0	1	1	5	7	1	0	0	2	3	0	3	2	8	13	38
% Trucks	2.0	0	0	73.7	11.0	0	1.0	2.4	100	4.6	1.3	0	0	66.7	1.3	0	2.5	3.2	36.4	5.4	5.0

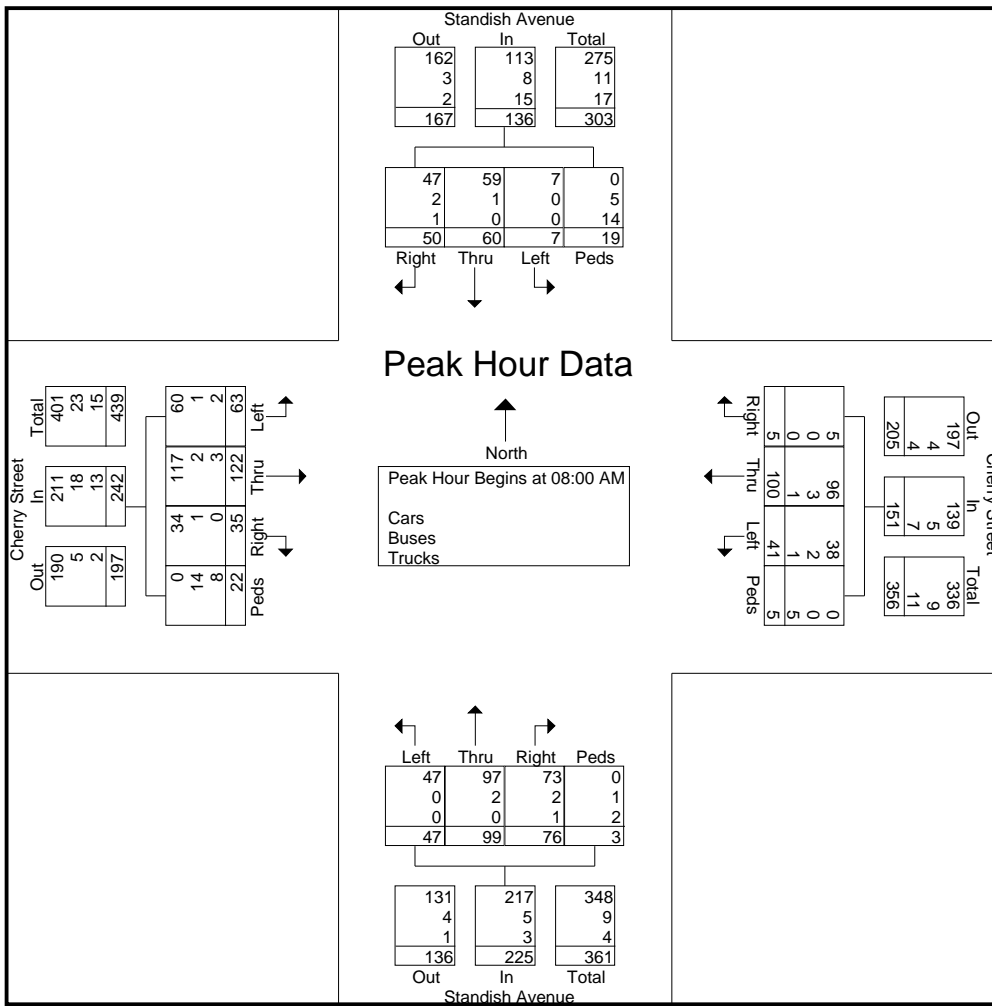


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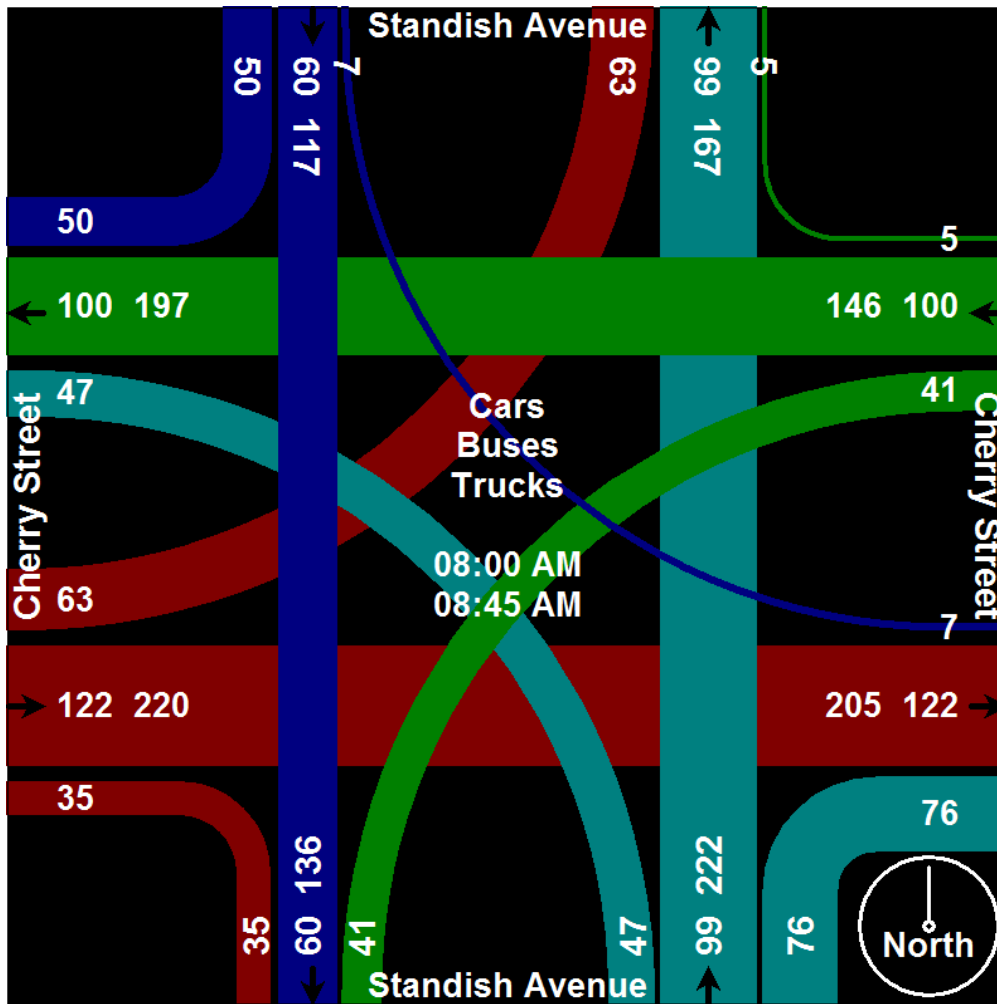


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Groups Printed- Cars - Buses - Trucks

Start Time	Standish Avenue Southbound					Cherry Street Westbound					Standish Avenue Northbound					Cherry Street Eastbound					Int. Total
	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Factor	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0		
03:00 PM	7	14	2	0	23	3	58	26	0	87	16	23	15	2	56	17	51	12	2	82	248
03:15 PM	14	15	2	19	50	0	47	21	3	71	12	25	13	6	56	12	49	7	21	89	266
03:30 PM	17	28	6	51	102	2	41	27	0	70	15	25	13	6	59	14	56	11	24	105	336
03:45 PM	13	16	1	7	37	2	39	27	1	69	13	20	19	0	52	17	47	9	0	73	231
Total	51	73	11	77	212	7	185	101	4	297	56	93	60	14	223	60	203	39	47	349	1081
04:00 PM	12	18	0	0	30	1	42	24	0	67	4	20	8	0	32	17	55	12	0	84	213
04:15 PM	7	14	2	0	23	0	34	29	1	64	13	26	10	0	49	13	43	5	1	62	198
04:30 PM	10	14	1	1	26	2	32	26	1	61	10	19	9	0	38	27	49	12	0	88	213
04:45 PM	4	18	0	0	22	0	40	26	0	66	10	18	11	2	41	18	34	14	0	66	195
Total	33	64	3	1	101	3	148	105	2	258	37	83	38	2	160	75	181	43	1	300	819
05:00 PM	9	18	3	0	30	3	71	40	0	114	17	17	12	0	46	18	60	14	0	92	282
05:15 PM	9	14	0	0	23	4	42	22	0	68	12	12	6	0	30	16	48	18	0	82	203
05:30 PM	8	8	2	0	18	2	19	13	0	34	17	20	6	0	43	14	31	4	0	49	144
05:45 PM	7	12	0	0	19	2	25	16	0	43	18	17	12	0	47	22	45	10	1	78	187
Total	33	52	5	0	90	11	157	91	0	259	64	66	36	0	166	70	184	46	1	301	816
Grand Total	117	189	19	78	403	21	490	297	6	814	157	242	134	16	549	205	568	128	49	950	2716
Apprch %	29	46.9	4.7	19.4		2.6	60.2	36.5	0.7		28.6	44.1	24.4	2.9		21.6	59.8	13.5	5.2		
Total %	4.3	7	0.7	2.9	14.8	0.8	18	10.9	0.2	30	5.8	8.9	4.9	0.6	20.2	7.5	20.9	4.7	1.8	35	
Cars	116	187	19	0	322	21	485	288	0	794	155	237	134	0	526	205	558	126	0	889	2531
% Cars	99.1	98.9	100	0	79.9	100	99	97	0	97.5	98.7	97.9	100	0	95.8	100	98.2	98.4	0	93.6	93.2
Buses	1	1	0	64	66	0	2	3	4	9	1	3	0	9	13	0	1	2	21	24	112
% Buses	0.9	0.5	0	82.1	16.4	0	0.4	1	66.7	1.1	0.6	1.2	0	56.2	2.4	0	0.2	1.6	42.9	2.5	4.1
Trucks	0	1	0	14	15	0	3	6	2	11	1	2	0	7	10	0	9	0	28	37	73
% Trucks	0	0.5	0	17.9	3.7	0	0.6	2	33.3	1.4	0.6	0.8	0	43.8	1.8	0	1.6	0	57.1	3.9	2.7

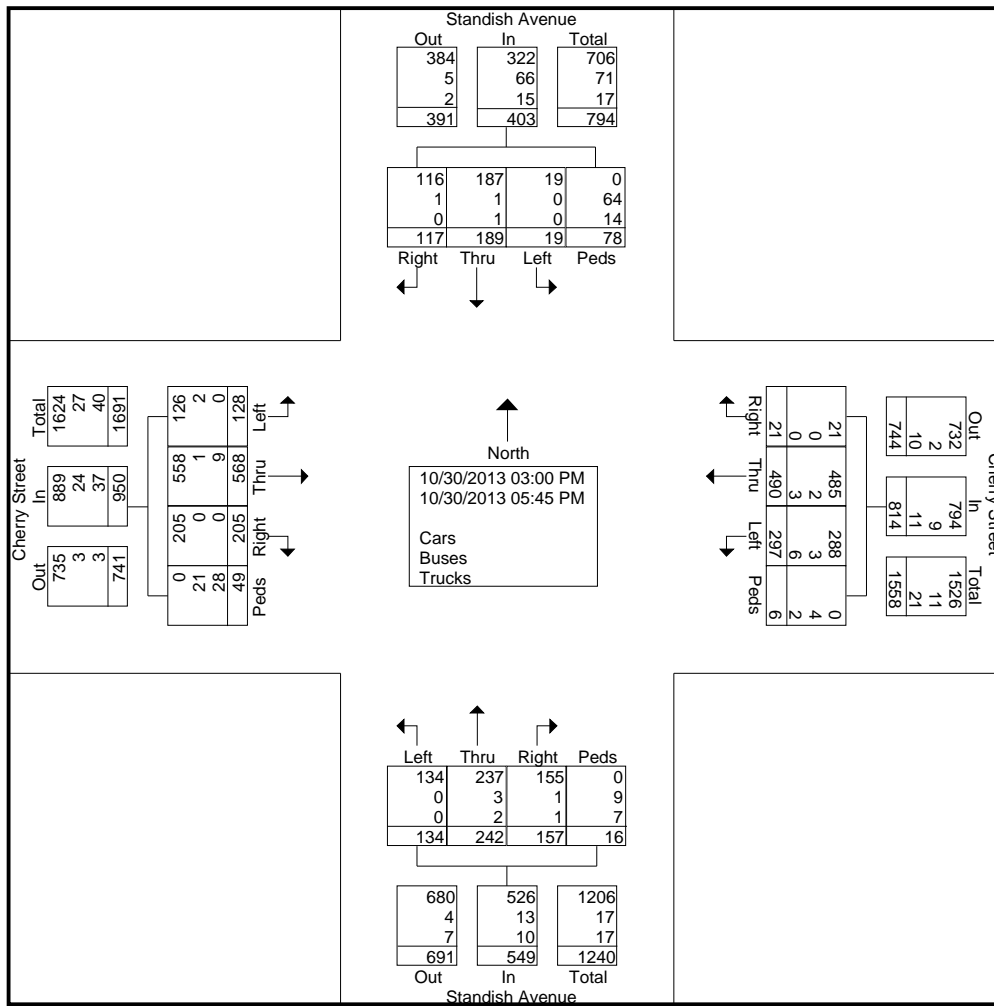


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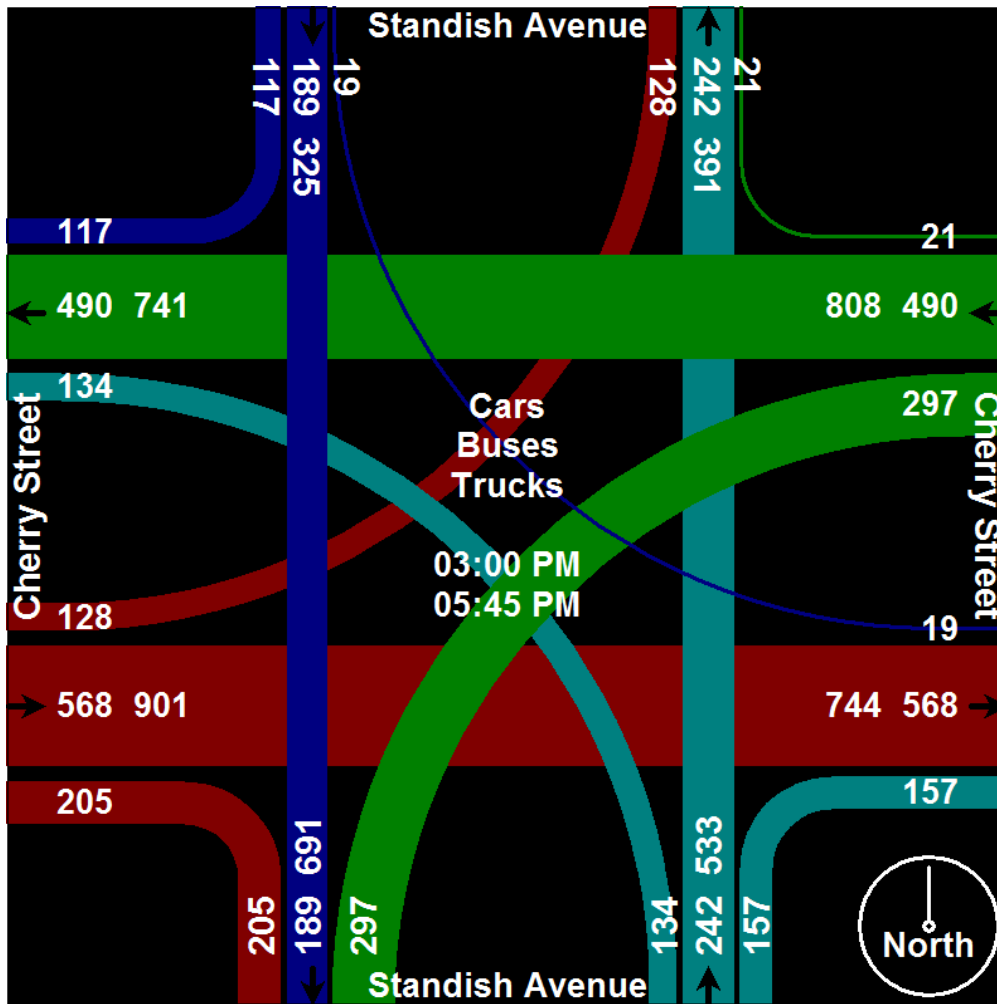


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	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	Right	Thru	Left	Peds	App. Total	
Peak Hour Analysis From 03:00 PM to 05:45 PM - Peak 1 of 1																					
Peak Hour for Entire Intersection Begins at 03:00 PM																					
03:00 PM	7	14	2	0	23	3	58	26	0	87	16	23	15	2	56	17	51	12	2	82	248
03:15 PM	14	15	2	19	50	0	47	21	3	71	12	25	13	6	56	12	49	7	21	89	266
03:30 PM	17	28	6	51	102	2	41	27	0	70	15	25	13	6	59	14	56	11	24	105	336
03:45 PM	13	16	1	7	37	2	39	27	1	69	13	20	19	0	52	17	47	9	0	73	231
Total Volume	51	73	11	77	212	7	185	101	4	297	56	93	60	14	223	60	203	39	47	349	1081
% App. Total	24.1	34.4	5.2	36.3		2.4	62.3	34	1.3		25.1	41.7	26.9	6.3		17.2	58.2	11.2	13.5		
PHF	.750	.652	.458	.377	.520	.583	.797	.935	.333	.853	.875	.930	.789	.583	.945	.882	.906	.813	.490	.831	.804
Cars	50	71	11	0	132	7	183	98	0	288	54	90	60	0	204	60	199	39	0	298	922
% Cars	98.0	97.3	100	0	62.3	100	98.9	97.0	0	97.0	96.4	96.8	100	0	91.5	100	98.0	100	0	85.4	85.3
Buses	1	1	0	63	65	0	1	1	4	6	1	2	0	8	11	0	1	0	21	22	104
% Buses	2.0	1.4	0	81.8	30.7	0	0.5	1.0	100	2.0	1.8	2.2	0	57.1	4.9	0	0.5	0	44.7	6.3	9.6
Trucks	0	1	0	14	15	0	1	2	0	3	1	1	0	6	8	0	3	0	26	29	55
% Trucks	0	1.4	0	18.2	7.1	0	0.5	2.0	0	1.0	1.8	1.1	0	42.9	3.6	0	1.5	0	55.3	8.3	5.1

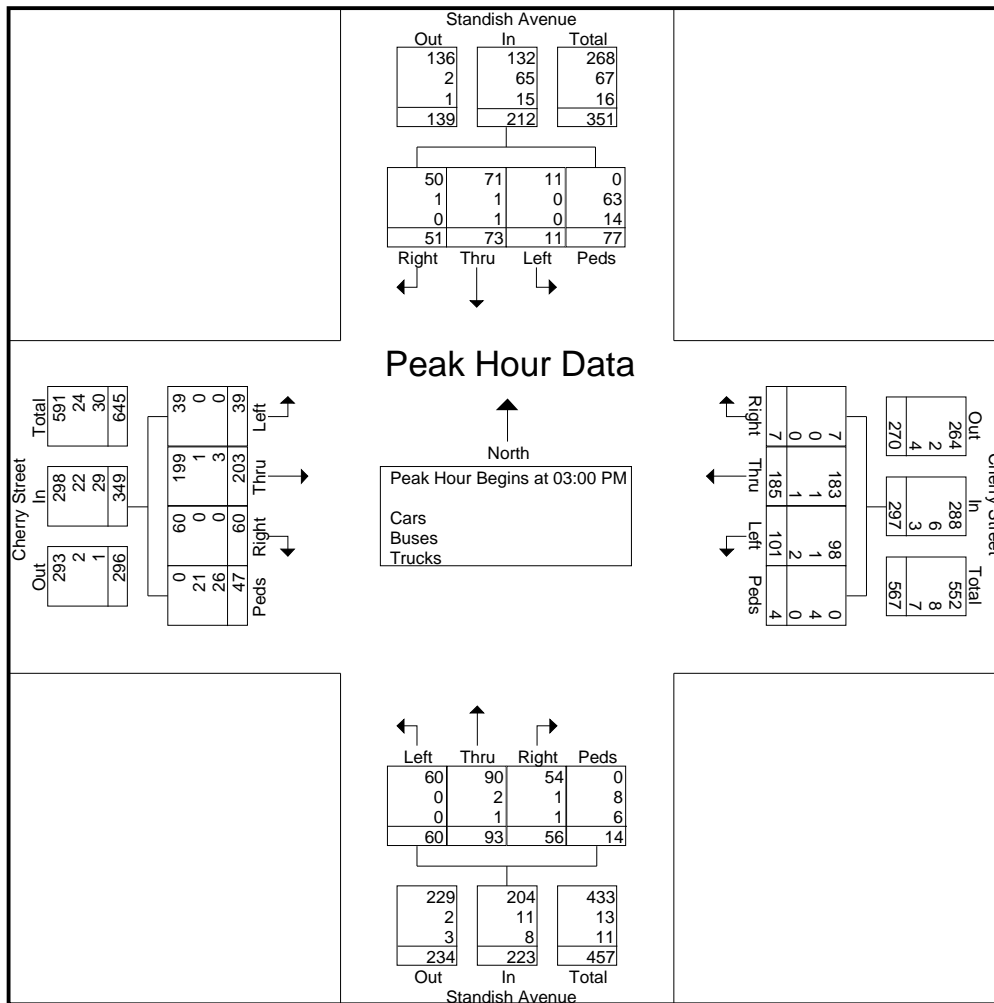


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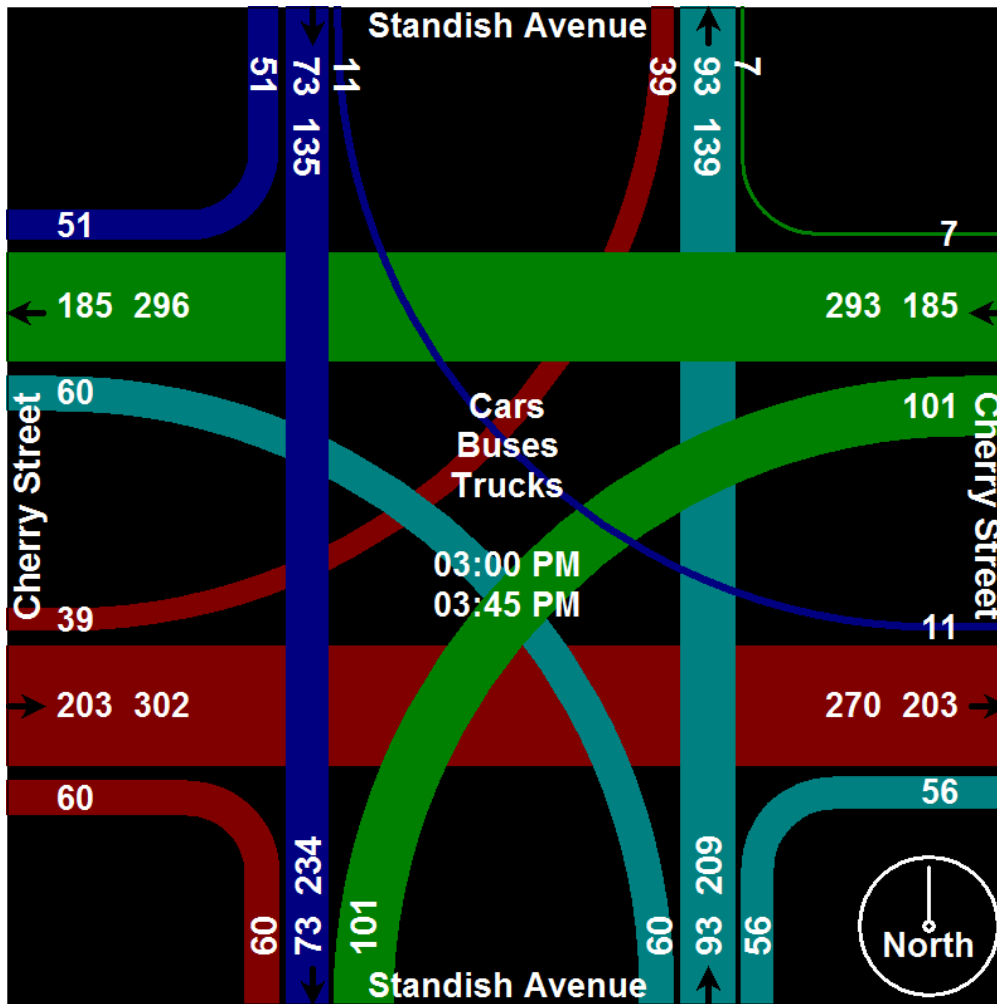


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Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

Cherry St at Standish Ave LOS Analysis
Existing 2013 AM Peak LOS



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	63	122	35	41	100	5	47	99	70	7	60	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.97			1.00			0.98			0.95	
Frt		0.979			0.995			0.956			0.942	
Flt Protected		0.986			0.986			0.989			0.997	
Satd. Flow (prot)	0	1742	0	0	1777	0	0	1736	0	0	1640	0
Flt Permitted		0.855			0.865			0.895			0.981	
Satd. Flow (perm)	0	1481	0	0	1557	0	0	1561	0	0	1611	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			3			27			42	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		434			586			318			272	
Travel Time (s)		9.9			13.3			7.2			6.2	
Confl. Peds. (#/hr)	41		25	8		24	25		8	24		41
Peak Hour Factor	0.71	0.71	0.71	0.88	0.88	0.88	0.94	0.94	0.94	0.46	0.46	0.46
Heavy Vehicles (%)	5%	4%	3%	7%	4%	0%	0%	2%	4%	0%	2%	6%
Adj. Flow (vph)	89	172	49	47	114	6	50	105	74	15	130	109
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	310	0	0	167	0	0	229	0	0	254	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	

Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

Lane Group	ø10
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	

Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

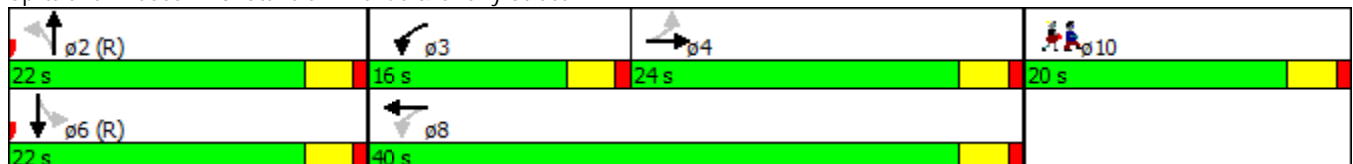
Cherry St at Standish Ave LOS Analysis
Existing 2013 AM Peak LOS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (s)	24.0	24.0		16.0	40.0		22.0	22.0		22.0	22.0	
Total Split (%)	29.3%	29.3%		19.5%	48.8%		26.8%	26.8%		26.8%	26.8%	
Maximum Green (s)	20.0	20.0		12.0	36.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.0			4.0			4.0			4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		20.3			34.3			39.7			39.7	
Actuated g/C Ratio		0.25			0.42			0.48			0.48	
v/c Ratio		0.83			0.25			0.30			0.32	
Control Delay		47.8			15.6			13.0			12.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		47.8			15.6			13.0			12.5	
LOS		D			B			B			B	
Approach Delay		47.8			15.6			13.0			12.5	
Approach LOS		D			B			B			B	

Intersection Summary

Area Type:	Other
Cycle Length:	82
Actuated Cycle Length:	82
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	80
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.83
Intersection Signal Delay:	24.5
Intersection Capacity Utilization:	42.1%
Analysis Period (min):	15
Intersection LOS:	C
ICU Level of Service:	A

Splits and Phases: 3: Standish Avenue & Cherry Street



Lane Group	ø10
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	24%
Maximum Green (s)	16.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

Cherry St at Standish Ave LOS Analysis
Existing 2013 PM Peak LOS



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (vph)	39	203	60	101	185	7	60	93	56	11	73	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.95			0.99			0.96			0.88	
Frt		0.973			0.997			0.964			0.949	
Flt Protected		0.994			0.983			0.986			0.996	
Satd. Flow (prot)	0	1762	0	0	1827	0	0	1749	0	0	1563	0
Flt Permitted		0.913			0.583			0.857			0.971	
Satd. Flow (perm)	0	1586	0	0	1080	0	0	1490	0	0	1511	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			2			21			34	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		434			586			318			272	
Travel Time (s)		9.9			13.3			7.2			6.2	
Confl. Peds. (#/hr)	124		61	18		81	61		18	81		124
Peak Hour Factor	0.83	0.83	0.83	0.85	0.85	0.85	0.95	0.95	0.95	0.52	0.52	0.52
Heavy Vehicles (%)	0%	2%	0%	3%	1%	0%	0%	3%	1%	0%	3%	1%
Adj. Flow (vph)	47	245	72	119	218	8	63	98	59	21	140	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	364	0	0	345	0	0	220	0	0	259	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	

Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

Lane Group	ø10
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	10
Permitted Phases	
Detector Phase	

Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

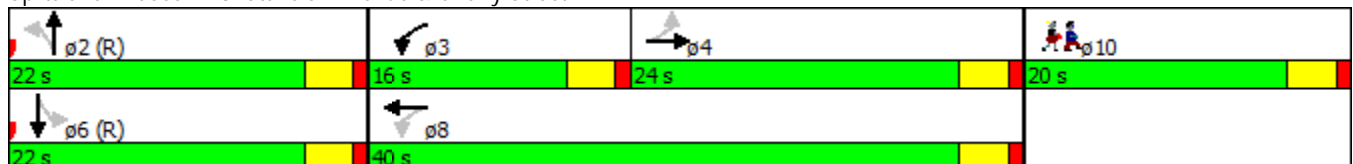
Cherry St at Standish Ave LOS Analysis
Existing 2013 PM Peak LOS

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (s)	24.0	24.0		16.0	40.0		22.0	22.0		22.0	22.0	
Total Split (%)	29.3%	29.3%		19.5%	48.8%		26.8%	26.8%		26.8%	26.8%	
Maximum Green (s)	20.0	20.0		12.0	36.0		18.0	18.0		18.0	18.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.0			4.0			4.0			4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		21.3			35.3			38.7			38.7	
Actuated g/C Ratio		0.26			0.43			0.47			0.47	
v/c Ratio		0.86			0.62			0.31			0.35	
Control Delay		49.6			22.0			13.8			13.7	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		49.6			22.0			13.8			13.7	
LOS		D			C			B			B	
Approach Delay		49.6			22.0			13.8			13.7	
Approach LOS		D			C			B			B	

Intersection Summary

Area Type:	Other
Cycle Length:	82
Actuated Cycle Length:	82
Offset:	0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle:	90
Control Type:	Actuated-Coordinated
Maximum v/c Ratio:	0.86
Intersection Signal Delay:	27.1
Intersection Capacity Utilization:	65.7%
Analysis Period (min):	15
Intersection LOS:	C
ICU Level of Service:	C

















Splits and Phases: 3: Standish Avenue & Cherry Street



Lane Group	ø10
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	24%
Maximum Green (s)	16.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

Cherry St at Standish Ave LOS Analysis
Potential AM Peak LOS w Signal Retiming

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	122	35	41	100	5	47	99	70	7	60	50
Future Volume (vph)	63	122	35	41	100	5	47	99	70	7	60	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.96			1.00			0.98			0.95	
Frt		0.979			0.995			0.956			0.942	
Flt Protected		0.986			0.986			0.989			0.997	
Satd. Flow (prot)	0	1739	0	0	1777	0	0	1735	0	0	1634	0
Flt Permitted		0.856			0.879			0.893			0.979	
Satd. Flow (perm)	0	1474	0	0	1583	0	0	1557	0	0	1602	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		11			3			27			42	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		434			586			318			272	
Travel Time (s)		9.9			13.3			7.2			6.2	
Confl. Peds. (#/hr)	41		25	8		24	25		8	24		41
Peak Hour Factor	0.71	0.71	0.71	0.88	0.88	0.88	0.94	0.94	0.94	0.46	0.46	0.46
Growth Factor	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%
Heavy Vehicles (%)	5%	4%	3%	7%	4%	0%	0%	2%	4%	0%	2%	6%
Adj. Flow (vph)	91	175	50	48	116	6	51	107	76	16	133	111
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	316	0	0	170	0	0	234	0	0	260	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	

Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

Cherry St at Standish Ave LOS Analysis
 Potential AM Peak LOS w Signal Retiming

Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	10

Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

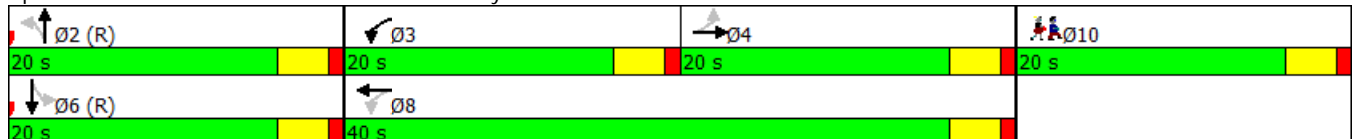
Cherry St at Standish Ave LOS Analysis
Potential AM Peak LOS w Signal Retiming

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (s)	20.0	20.0		20.0	40.0		20.0	20.0		20.0	20.0	
Total Split (%)	25.0%	25.0%		25.0%	50.0%		25.0%	25.0%		25.0%	25.0%	
Maximum Green (s)	16.0	16.0		16.0	36.0		16.0	16.0		16.0	16.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.0			4.0			4.0			4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		22.0			36.0			36.0			36.0	
Actuated g/C Ratio		0.28			0.45			0.45			0.45	
v/c Ratio		0.77			0.23			0.33			0.35	
Control Delay		39.9			14.2			14.0			13.5	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		39.9			14.2			14.0			13.5	
LOS		D			B			B			B	
Approach Delay		39.9			14.2			14.0			13.5	
Approach LOS		D			B			B			B	

Intersection Summary

Area Type: Other
 Cycle Length: 80
 Actuated Cycle Length: 80
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.77
 Intersection Signal Delay: 22.3
 Intersection Capacity Utilization 42.7%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service A

Splits and Phases: 3: Standish Avenue & Cherry Street



















Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

Cherry St at Standish Ave LOS Analysis
Potential AM Peak LOS w Signal Retiming

Lane Group	Ø10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	25%
Maximum Green (s)	16.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

Cherry St at Standish Ave LOS Analysis
Potential AM Peak LOS w Signal Retiming - No Lead

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	63	122	35	41	100	5	47	99	70	7	60	50
Future Volume (vph)	63	122	35	41	100	5	47	99	70	7	60	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.97			1.00			0.98			0.96	
Frt		0.979			0.995			0.956			0.942	
Flt Protected		0.986			0.986			0.989			0.997	
Satd. Flow (prot)	0	1743	0	0	1776	0	0	1738	0	0	1653	0
Flt Permitted		0.860			0.817			0.903			0.981	
Satd. Flow (perm)	0	1497	0	0	1469	0	0	1578	0	0	1623	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		15			3			39			61	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		434			586			318			272	
Travel Time (s)		9.9			13.3			7.2			6.2	
Confl. Peds. (#/hr)	41		25	8		24	25		8	24		41
Peak Hour Factor	0.71	0.71	0.71	0.88	0.88	0.88	0.94	0.94	0.94	0.46	0.46	0.46
Growth Factor	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%	102%
Heavy Vehicles (%)	5%	4%	3%	7%	4%	0%	0%	2%	4%	0%	2%	6%
Adj. Flow (vph)	91	175	50	48	116	6	51	107	76	16	133	111
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	316	0	0	170	0	0	234	0	0	260	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

Cherry St at Standish Ave LOS Analysis
 Potential AM Peak LOS w Signal Retiming - No Lead

Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	10

Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

Cherry St at Standish Ave LOS Analysis
Potential AM Peak LOS w Signal Retiming - No Lead

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (%)	33.3%	33.3%		33.3%	33.3%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.0			4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		14.8			14.8			37.2			37.2	
Actuated g/C Ratio		0.25			0.25			0.62			0.62	
v/c Ratio		0.83			0.47			0.24			0.25	
Control Delay		40.9			23.1			5.2			4.9	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		40.9			23.1			5.2			4.9	
LOS		D			C			A			A	
Approach Delay		40.9			23.1			5.2			4.9	
Approach LOS		D			C			A			A	

Intersection Summary

Area Type: Other
 Cycle Length: 60
 Actuated Cycle Length: 60
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 60
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 19.7
 Intersection Capacity Utilization 42.7%
 Analysis Period (min) 15
 Intersection LOS: B
 ICU Level of Service A

Splits and Phases: 3: Standish Avenue & Cherry Street



















Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

Cherry St at Standish Ave LOS Analysis
Potential AM Peak LOS w Signal Retiming - No Lead

Lane Group	Ø10
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	33%
Maximum Green (s)	16.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

Cherry St at Standish Ave LOS Analysis
Potential PM Peak LOS w Signal Retiming

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	203	60	101	185	7	60	93	56	11	73	51
Future Volume (vph)	39	203	60	101	185	7	60	93	56	11	73	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.95			0.99			0.96			0.88	
Frt		0.973			0.997			0.964			0.949	
Flt Protected		0.994			0.983			0.986			0.996	
Satd. Flow (prot)	0	1764	0	0	1827	0	0	1748	0	0	1556	0
Flt Permitted		0.914			0.596			0.855			0.970	
Satd. Flow (perm)	0	1591	0	0	1104	0	0	1486	0	0	1502	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		13			2			19			31	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		434			586			318			272	
Travel Time (s)		9.9			13.3			7.2			6.2	
Confl. Peds. (#/hr)	124		61	18		81	61		18	81		124
Peak Hour Factor	0.83	0.83	0.83	0.85	0.85	0.85	0.95	0.95	0.95	0.52	0.52	0.52
Heavy Vehicles (%)	0%	2%	0%	3%	1%	0%	0%	3%	1%	0%	3%	1%
Adj. Flow (vph)	47	245	72	119	218	8	63	98	59	21	140	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	364	0	0	345	0	0	220	0	0	259	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		4		3	8			2			6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

Cherry St at Standish Ave LOS Analysis
 Potential PM Peak LOS w Signal Retiming

Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	10
Permitted Phases	

Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

Cherry St at Standish Ave LOS Analysis
Potential PM Peak LOS w Signal Retiming

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (s)	27.0	27.0		20.0	47.0		23.0	23.0		23.0	23.0	
Total Split (%)	30.0%	30.0%		22.2%	52.2%		25.6%	25.6%		25.6%	25.6%	
Maximum Green (s)	23.0	23.0		16.0	43.0		19.0	19.0		19.0	19.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.0			4.0			4.0			4.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		25.4			39.4			42.6			42.6	
Actuated g/C Ratio		0.28			0.44			0.47			0.47	
v/c Ratio		0.79			0.61			0.31			0.36	
Control Delay		41.9			22.3			15.7			15.8	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		41.9			22.3			15.7			15.8	
LOS		D			C			B			B	
Approach Delay		41.9			22.3			15.7			15.8	
Approach LOS		D			C			B			B	

Intersection Summary

Area Type: Other
 Cycle Length: 90
 Actuated Cycle Length: 90
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.79
 Intersection Signal Delay: 25.7
 Intersection Capacity Utilization 65.7%
 Analysis Period (min) 15
 Intersection LOS: C
 ICU Level of Service C

Splits and Phases: 3: Standish Avenue & Cherry Street

Ø2 (R) 23 s	Ø3 20 s	Ø4 27 s	Ø10 20 s
Ø6 (R) 23 s	Ø8 47 s		

















Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

Cherry St at Standish Ave LOS Analysis
Potential PM Peak LOS w Signal Retiming

Lane Group	Ø10
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	22%
Maximum Green (s)	16.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	

Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

Cherry St at Standish Ave LOS Analysis
Potential PM Peak LOS w Signal Retiming - No Lead

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	203	60	101	185	7	60	93	56	11	73	51
Future Volume (vph)	39	203	60	101	185	7	60	93	56	11	73	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.97			0.99			0.97			0.89	
Frt		0.973			0.997			0.964			0.949	
Flt Protected		0.994			0.983			0.986			0.996	
Satd. Flow (prot)	0	1773	0	0	1826	0	0	1751	0	0	1583	0
Flt Permitted		0.923			0.657			0.866			0.973	
Satd. Flow (perm)	0	1626	0	0	1215	0	0	1509	0	0	1534	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		20			2			27			45	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		434			586			318			272	
Travel Time (s)		9.9			13.3			7.2			6.2	
Confl. Peds. (#/hr)	124		61	18		81	61		18	81		124
Peak Hour Factor	0.83	0.83	0.83	0.85	0.85	0.85	0.95	0.95	0.95	0.52	0.52	0.52
Heavy Vehicles (%)	0%	2%	0%	3%	1%	0%	0%	3%	1%	0%	3%	1%
Adj. Flow (vph)	47	245	72	119	218	8	63	98	59	21	140	98
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	364	0	0	345	0	0	220	0	0	259	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		

Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

Cherry St at Standish Ave LOS Analysis
 Potential PM Peak LOS w Signal Retiming - No Lead

Lane Group	Ø10
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Ped Bike Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Heavy Vehicles (%)	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Enter Blocked Intersection	
Lane Alignment	
Median Width(ft)	
Link Offset(ft)	
Crosswalk Width(ft)	
Two way Left Turn Lane	
Headway Factor	
Turning Speed (mph)	
Number of Detectors	
Detector Template	
Leading Detector (ft)	
Trailing Detector (ft)	
Detector 1 Position(ft)	
Detector 1 Size(ft)	
Detector 1 Type	
Detector 1 Channel	
Detector 1 Extend (s)	
Detector 1 Queue (s)	
Detector 1 Delay (s)	
Detector 2 Position(ft)	
Detector 2 Size(ft)	
Detector 2 Type	
Detector 2 Channel	
Detector 2 Extend (s)	
Turn Type	
Protected Phases	10
Permitted Phases	

Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

Cherry St at Standish Ave LOS Analysis
 Potential PM Peak LOS w Signal Retiming - No Lead

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	4	4		8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		10.0	10.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		20.0	20.0		20.0	20.0	
Total Split (s)	25.0	25.0		25.0	25.0		20.0	20.0		20.0	20.0	
Total Split (%)	38.5%	38.5%		38.5%	38.5%		30.8%	30.8%		30.8%	30.8%	
Maximum Green (s)	21.0	21.0		21.0	21.0		16.0	16.0		16.0	16.0	
Yellow Time (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0			0.0	
Total Lost Time (s)		4.0			4.0			4.0			4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		C-Max	C-Max		C-Max	C-Max	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)		20.0			20.0			37.0			37.0	
Actuated g/C Ratio		0.31			0.31			0.57			0.57	
v/c Ratio		0.71			0.92			0.25			0.29	
Control Delay		27.2			54.6			7.4			7.3	
Queue Delay		0.0			0.0			0.0			0.0	
Total Delay		27.2			54.6			7.4			7.3	
LOS		C			D			A			A	
Approach Delay		27.2			54.6			7.4			7.3	
Approach LOS		C			D			A			A	

Intersection Summary

Area Type: Other
 Cycle Length: 65
 Actuated Cycle Length: 65
 Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 65
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.92
 Intersection Signal Delay: 27.2 Intersection LOS: C
 Intersection Capacity Utilization 65.7% ICU Level of Service C
 Analysis Period (min) 15

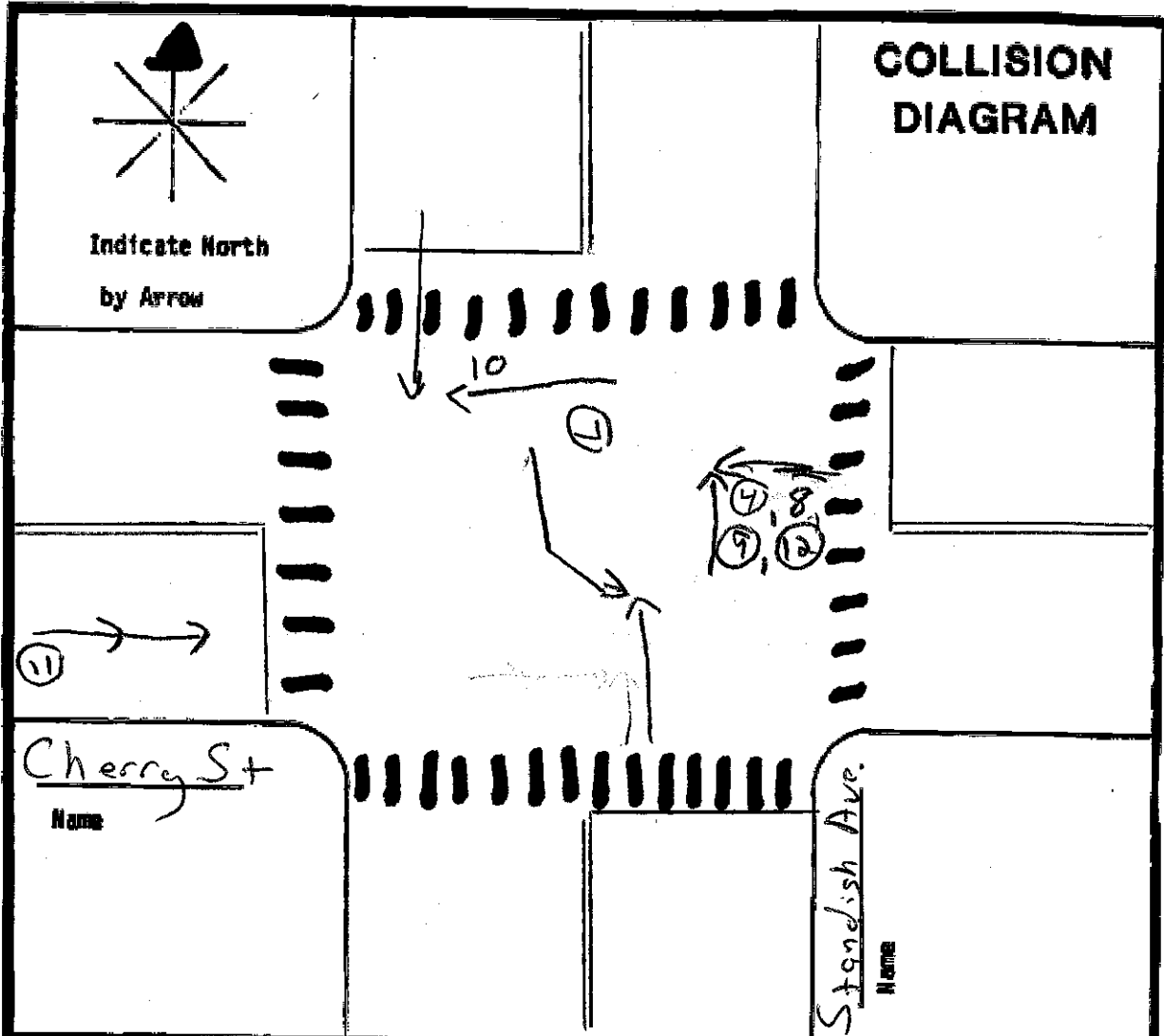
Splits and Phases: 3: Standish Avenue & Cherry Street



Lanes, Volumes, Timings
3: Standish Avenue & Cherry Street

Cherry St at Standish Ave LOS Analysis
 Potential PM Peak LOS w Signal Retiming - No Lead

Lane Group	Ø10
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	20.0
Total Split (s)	20.0
Total Split (%)	31%
Maximum Green (s)	16.0
Yellow Time (s)	3.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	5.0
Flash Dont Walk (s)	11.0
Pedestrian Calls (#/hr)	0
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Intersection Summary	



SYMBOLS	TYPES OF COLLISIONS	SHOW FOR EACH ACCIDENT
<ul style="list-style-type: none"> Moving Vehicle Backing Vehicle Non-Involved Vehicle Pedestrian Parked Vehicle Fixed Object Fatal Accident Injury Accident 	<ul style="list-style-type: none"> Rear-End Head On Side Swipe Out of Control Left Turn Right Angle 	<ol style="list-style-type: none"> 1. Approximate location of accident 2. Type of collision and vehicles involved. 3. Time, Day, Date 4. Any other pertinent factors mentioned on the report (i.e. presence of all on road, ruts, etc.)

INTERSECTION Cherry Street and Standish Avenue
 PERIOD FROM: 10/2010 to 9/2013

