



CREATIVITY BEYOND ENGINEERING

MEMORANDUM

DATE: February 5, 2020
TO: Pete Daniels, P.E., City of West Allis
FR: John Bruggeman, P.E., PTOE, raSmith
CC: Pat Hawley, P.E., PTOE, RSP, raSmith
RE: S. 76th Street intersection with W. Lapham Street
Traffic Signal Warrant Analysis
West Allis, WI

INTRODUCTION

The City of West Allis desires to evaluate the continued need for the existing traffic signal at the S. 76th Street intersection with W. Lapham Street. The project location is shown in Exhibit 1. The former Lincoln Intermediate School, located at 7815 W. Lapham Street (two blocks west) was a neighborhood school and major traffic generator for the area. The school closed in 2017 and later reopened as James E. Dottke High School. This citywide alternative high school operates longer hours and has lower student enrollment compared to the former Lincoln Intermediate School. The City believes this change reduced the amount of traffic on W. Lapham Street and is considering removing the traffic signal. raSmith was retained by the City to conduct a traffic signal warrant analysis and recommend possible traffic control changes at the intersection. This memorandum summarizes the evaluation and recommendations.

EXISTING CONDITIONS

The existing intersection geometry and roadway characteristics are shown in Exhibit 2. The S. 76th Street approaches are unmarked, but are wide enough for a thru vehicle to bypass a turning vehicle at the same time. The intersection currently operates with the traffic signal in flash mode at all times (yellow flash on S. 76th Street and red flash on W. Lapham Street). Under flash mode, the intersection functions as a two-way stop. The traffic signal has not operated in normal (non-flash) operating mode during daytime hours since Lincoln Intermediate School closed.

raSmith collected 13-hour (6:00 am to 7:00 pm) weekday intersection turning movement count data at the study intersection in January 2020, while school was in session. The existing peak hour traffic count data was summarized and is shown in Exhibit 3. The weekday morning and evening peak hours were determined to be 7:15-8:15 am and 4:30-5:30 pm, respectively. Hourly pedestrian volumes crossing S. 76th Street were low throughout the day with a peak count of eight pedestrians from 2:45 -3:45 pm. The low volumes may be attributable to the seasonal weather conditions in January. All traffic count data is provided in Appendix A.



raSmith analyzed the existing peak hour traffic conditions in Synchro using the procedures set forth in the *Highway Capacity Manual (HCM), 6th Edition*. Level of Service (LOS) is a quantitative measure from the HCM referring to the overall quality of flow at an intersection. LOS ranges from very good, represented by LOS “A”, to very poor, represented by LOS “F”. For analysis purposes, LOS “D” was used to define acceptable peak hour operating conditions, consistent with WisDOT guidelines in southeast Wisconsin.

The results of the analysis are shown in Table 1. HCM-based Synchro analysis reports are provided in Appendix B.

Table 1
S. 76th Street intersection with W. Lapham Street
Existing Weekday Peak Hour Operating Conditions

Traffic Control	Peak Hour	Level of Service per Movement by Approach											
		Northbound			Southbound			Eastbound			Westbound		
		L	T	R	L	T	R	L	T	R	L	T	R
Two-Way Stop Control	AM	A	A	A	A	A	A	C	C	C	C	C	C
	PM	A	A	A	A	A	A	C	C	C	D	D	D
Traffic Signal	AM	A	A	A	B	A	A	C	C	C	C	C	C
	PM	B	A	A	A	A	A	C	C	C	C	C	C

Under the current two-way stop control condition (continuous flash mode), all movements at the intersection operate at LOS D or better. A sensitivity analysis was conducted using the peak traffic hour for the W. Lapham Street approaches (3:15-4:15 pm) and yielded similar results. For comparison purposes, conditions under normal traffic signal operation are also shown. All intersection movements operate at LOS C or better under full traffic signal control. During the weekday evening peak period, southbound queues from the adjacent S. 76th Street intersection with W. National Avenue were observed to occasionally extend through the study intersection and impede movements to/from W. Lapham Street. The analysis did not consider the impacts of this standing queue.

WARRANT ANALYSIS

An existing year traffic signal warrant analysis was conducted at the S. 76th Street intersection with W. Lapham Street based on the procedures set forth in the *Manual on Uniform Traffic Control Devices (MUTCD), 2009 edition*. The S. 76th Street and W. Lapham Street approaches were each considered to have a single lane of moving traffic. raSmith evaluated the following MUTCD warrants:

- Eight-Hour Vehicular Volume (Warrant 1)
- Four-Hour Vehicular Volume (Warrant 2)
- Peak Hour (Warrant 3)
- Crash Experience (Warrant 7)

Under existing year conditions, traffic signal warrants 1, 2 and 3 are *NOT* met. Minimum volume thresholds are met for only one of the required eight hours for Warrant 1 (Condition B). Minimum volume thresholds are not met for any of the required hours for Warrants 2 and 3.

Traffic signal warrant 7 is *NOT* met based on historic crash data. Warrant 7 requires a minimum of five reported intersection crashes, susceptible to correction by a traffic signal, to occur within a 12-month period. Only crash data from 2017 and 2018 was considered in this analysis due to the signalized intersection being in normal operating mode prior to 2017. The highest number of crashes potentially meeting these criteria (three) under flash mode (two-way stop) condition occurred in 2018.

The full warrant analysis worksheets for existing year conditions are included in Appendix C.

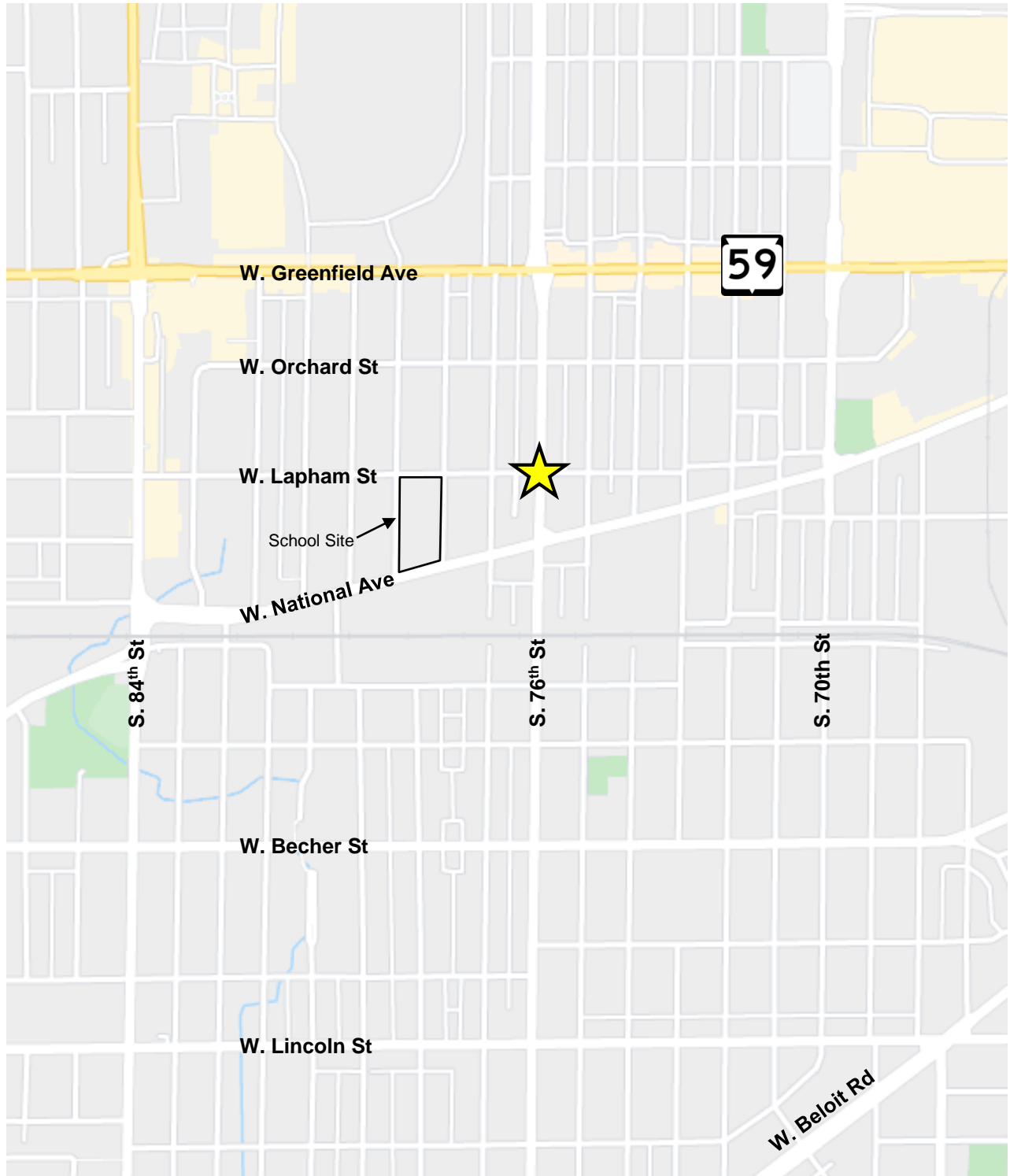
RECOMMENDATIONS

Traffic signal warrants are not met at the S. 76th Street intersection with W. Lapham Street with the existing traffic volumes. raSmith recommends removal of the traffic signals. The MUTCD recommends the following steps as part of the signal removal process:


- A. Determine the appropriate traffic control to be used after removal of the signal.
- B. Remove any sight distance restrictions as necessary.
- C. Inform the public of the removal study.
- D. Flash or cover the signal heads for a minimum of 90 days, and install the appropriate traffic control or other traffic control devices.
- E. Remove the signal if the engineering data collected during the removal study period confirms the signal is no longer valid.

raSmith recommends changing to two-way stop control at the intersection (S. 76th Street free-flow). Operations will be acceptable based on existing traffic volumes, and should be similar to those shown in Table 1 and over the past three years. The frequency and type of crashes are expected to remain similar to conditions with the traffic signal on continuous flash. Intersection sight distance from the W. Lapham Street approaches should be verified prior to installing the stop signs and stop bars, but should be similar or better compared to the existing condition (without traffic signal equipment).

After a decision is made regarding signal removal, the public should be notified of the City's intentions by installing signs on all approaches indicating, "Signal Under Study for Removal". Other public notices could be posted on the website, City newsletters, or other local media.

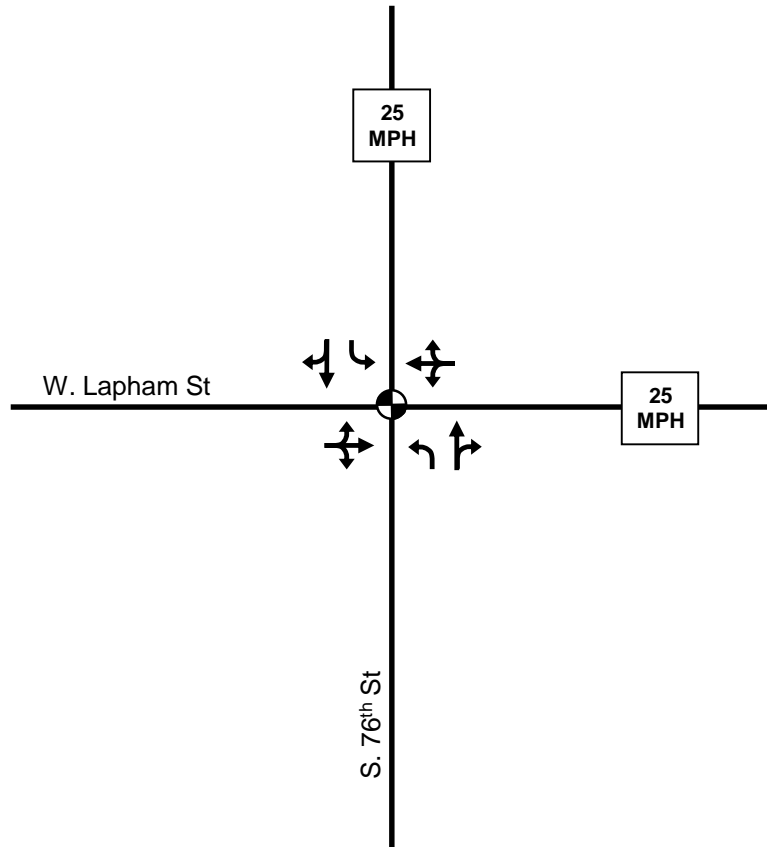


Legend

 = Study Intersection

Project Location Map

Exhibit
1



Legend

→ = Lane Geometry

⊙ = Traffic Signal

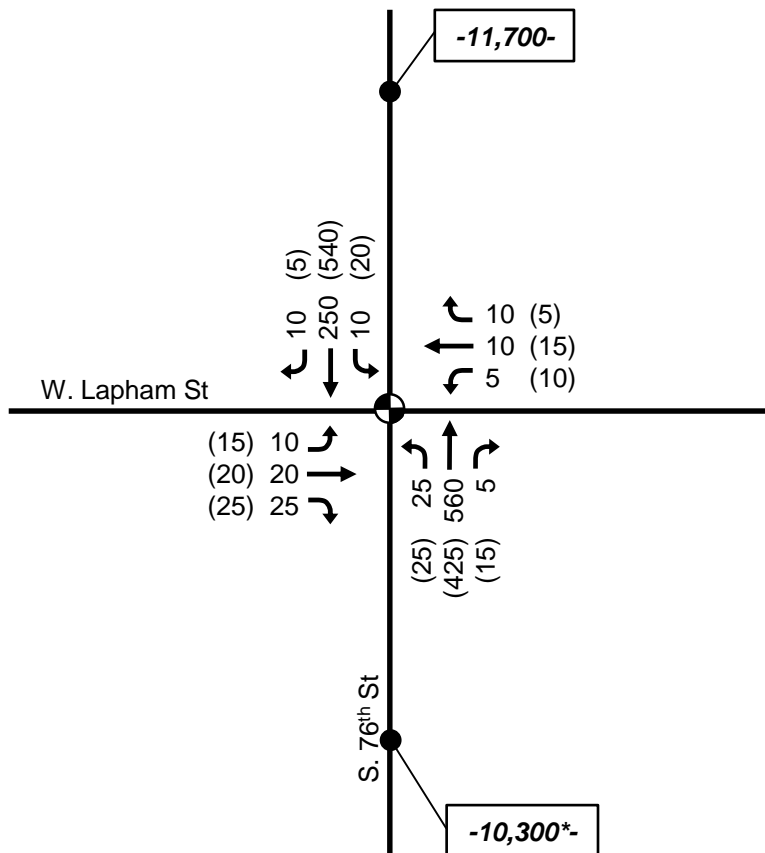
XX MPH = Speed Limit

Notes:

- 1) S. 76th Street approaches are unmarked, but allow for thru traffic to bypass turning vehicles
- 2) Traffic signal operates with yellow flash for the north-south approaches and red flash for the east-west approaches

Existing Transportation Network

Exhibit
2



Legend

- ⊕ = Traffic Signal
- XX = Weekday Morning Peak Hour Volume (7:15-8:15 AM)
- (XX) = Weekday Evening Peak Hour Volume (4:30-5:30 PM)
- XX- = WisDOT 2017 Average Annual Weekday Traffic Volume (vehicles per day)

*Count was recorded south of W. National Avenue

Year 2019 Existing Volumes

Exhibit
3

APPENDIX A

TRAFFIC COUNT DATA

Intersection Traffic Volume Report

Count Basics		Version 2011.M3	Page 1 of 13
Start Date:	Wednesday, January 8, 2020	Weekday	Schools in Session
Total Number of Hours Counted:	13	Non-Holiday	No Special Events

Base Information, Observed (13) Hour and Estimated (24) Hour Volume Summaries

Intersection of: S 76th St & W Lapham St



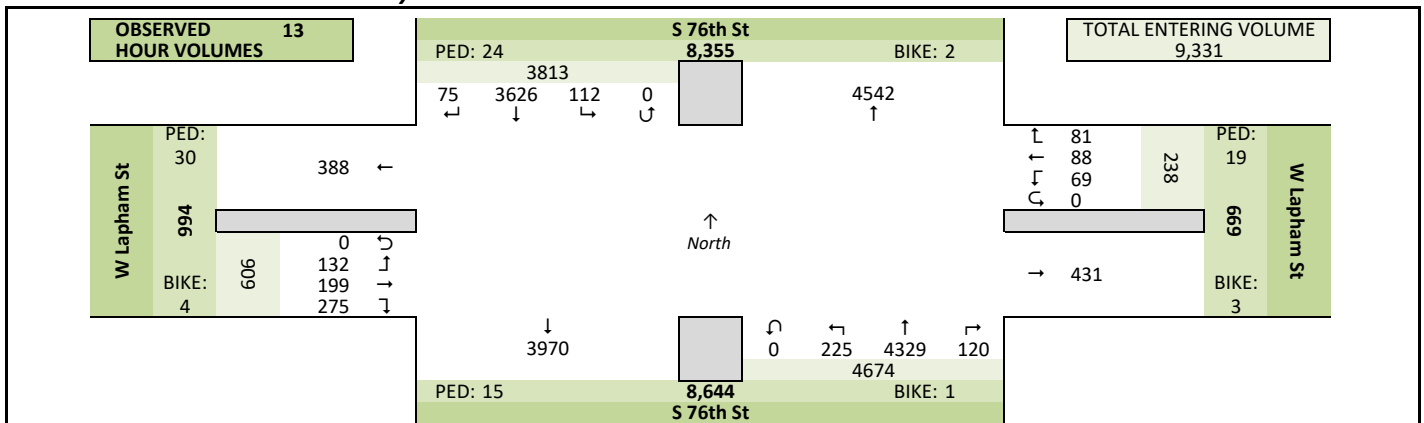
Site Information

Municipality	West Allis		
County	Milwaukee	WisDOT Region	SE
Traffic Control	Traffic Signal		
Roadway Names	North Direction ↑		
North Leg	S 76th St		
East Leg	W Lapham St		
South Leg	S 76th St		
West Leg	W Lapham St		
Special Considerations			
Schools	In Session		
Holidays	None		
Special Events	None		
Special Pedestrians Observed			
Pre-school children	None		
Elementary school age children	None		
Visually impaired (white cane/helper dog)	None		
Elderly/disabled (except wheelchairs)	None		
Wheelchairs/electric scooters	None		
Other (describe)	None		

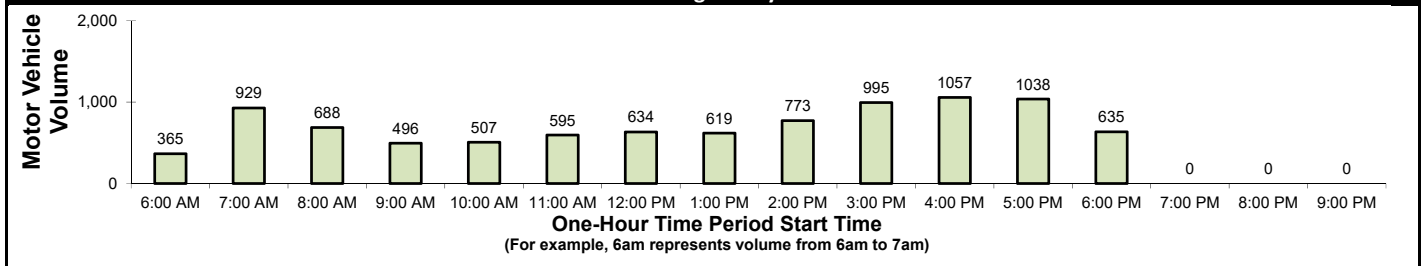
Count Information

Hrs Counted:	6:00 AM-7:00 PM		
1st Day of Count	Wednesday, January 8, 2020		Weather
AM Peak Period	Wednesday, January 8, 2020		Clear & Dry
Midday Peak Period	Wednesday, January 8, 2020		Clear & Dry
PM Peak Period	Wednesday, January 8, 2020		Clear & Dry
Calculated Peak Hours			
	AM	7:15-8:15am	MD 12:30-1:30pm
	PM	4:30-5:30pm	
Peak Hours Selected for Analysis			
	AM	7:15-8:15am	MD 12:30-1:30pm
	PM	4:30-5:30pm	
Daily/Seasonal Adjustment Group			
Count Expansion Group			
Daily/Seasonal Adjustment Factor	1	Count Expansion Factor	#N/A
Company Name			Manual Adj. 1.000
Observers	AM Peak Period	Miovision Video Recording	
	Midday Peak Period	Miovision Video Recording	
	PM Peak Period	Miovision Video Recording	
Comments	2016 DOT Seasonal Factors		

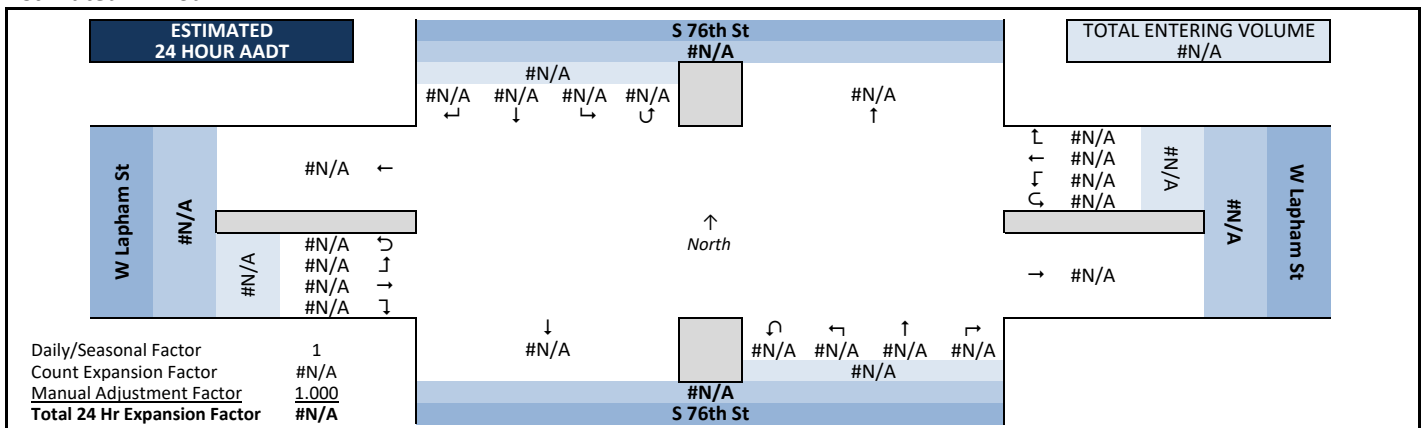
Observed 13 Hour Volume Summary



Total Entering Hourly Volume



Estimated 24 Hour AADT



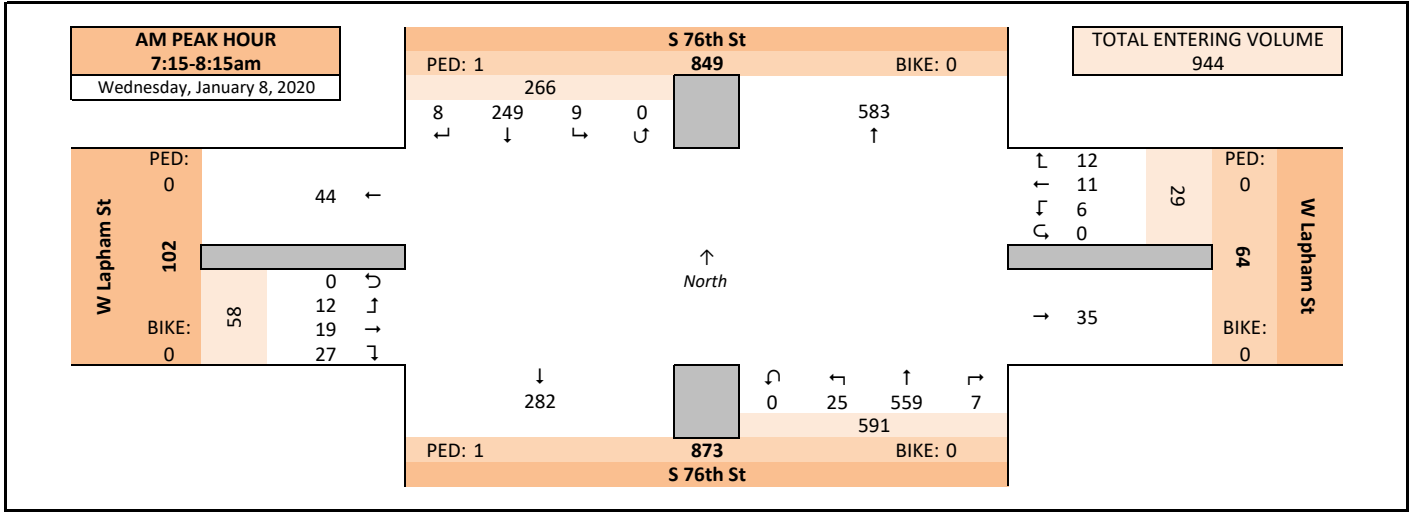
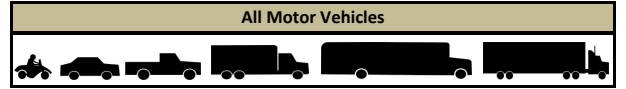
Intersection Traffic Volume Report

Count Basics		Page 2 of 13	
Start Date:	Wednesday, January 8, 2020	Weekday	Schools in Session
Total Number of Hours Counted:	13	Non-Holiday	No Special Events

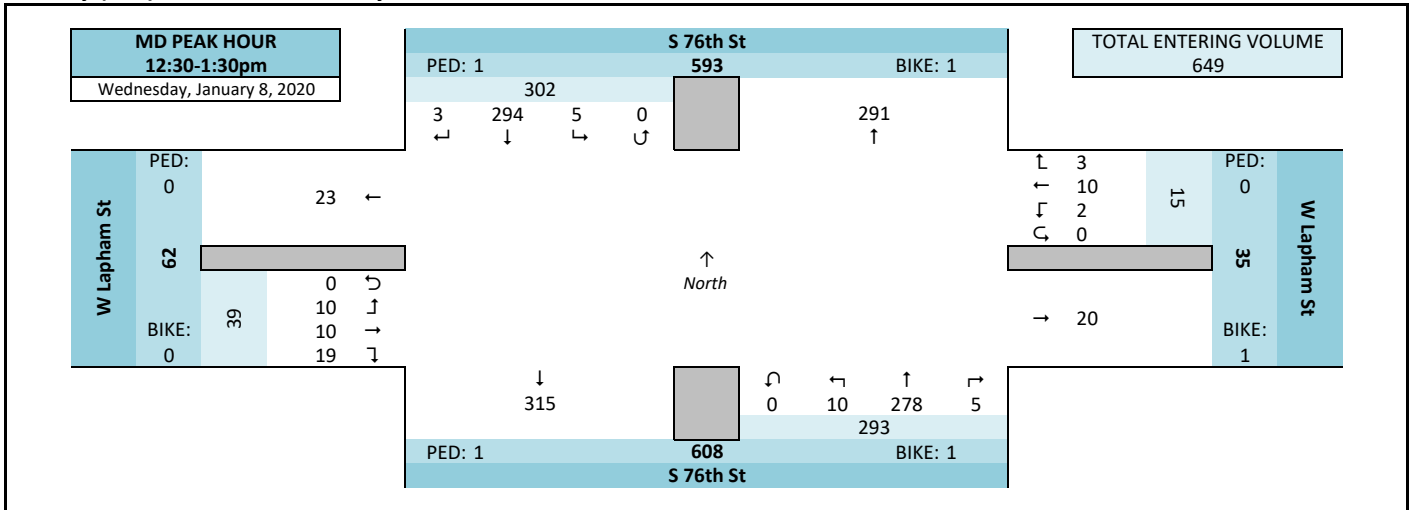
Peak Hour Volume Graphical Summary

S 76th St & W Lapham St

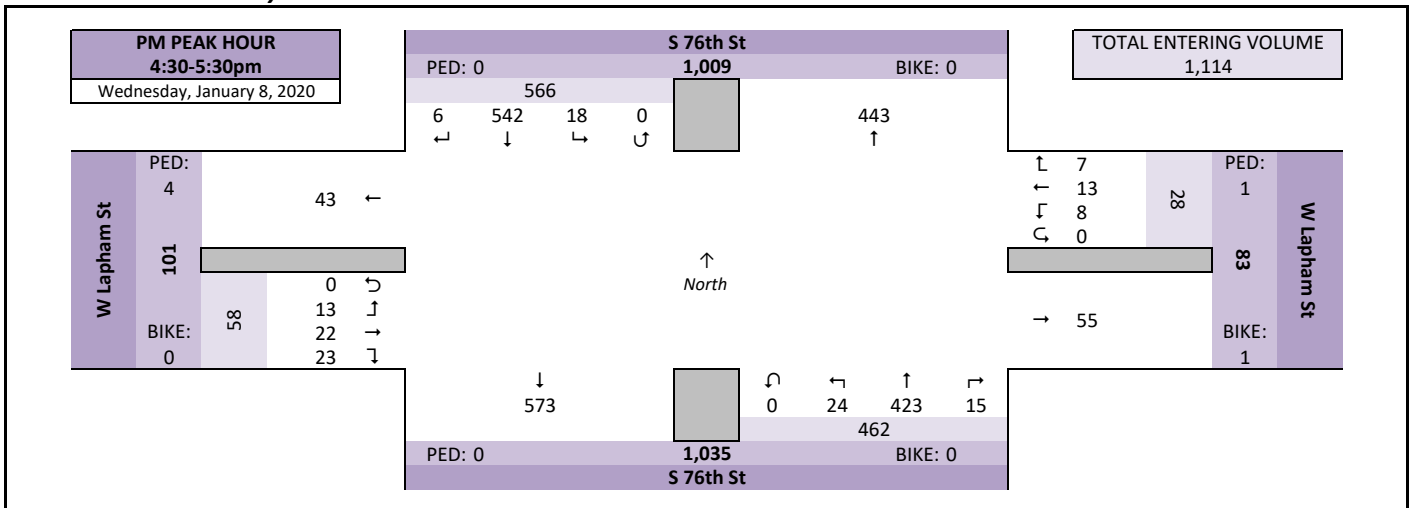
AM Peak Hour Summary



Midday (MD) Peak Hour Summary



PM Peak Hour Summary

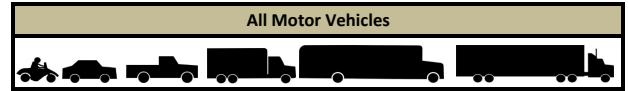


Intersection Traffic Volume Report

Count Basics		Page 3 of 13	
Start Date:	Wednesday, January 8, 2020	Weekday	Schools in Session
Total Number of Hours Counted:	13	Non-Holiday	No Special Events

Peak Hour Volume Summary

S 76th St & W Lapham St



Peak Hour Volumes, Truck Percentages, and PHFs

Wednesday, January 8, 2020		From North S 76th St					From East W Lapham St					From South S 76th St					From West W Lapham St					Totals
AM Peak Hour	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
	7:15 AM	0	74	4	0	78	3	4	2	0	9	1	148	5	0	154	3	2	3	0	8	249
	7:30 AM	4	73	2	0	79	4	3	1	0	8	1	162	5	0	168	6	4	4	0	14	269
	7:45 AM	1	65	2	0	68	1	1	2	0	4	1	133	7	0	141	5	10	2	0	17	230
	8:00 AM	3	37	1	0	41	4	3	1	0	8	4	116	8	0	128	13	3	3	0	19	196
	Peak Hour Volume	8	249	9	0	266	12	11	6	0	29	7	559	25	0	591	27	19	12	0	58	944
	Rounded Hourly Volume	10	250	10	0	270	10	10	5	0	25	5	560	25	0	590	25	20	10	0	55	940
	% Single Unit Trucks	0.0	2.4	0.0	0.0	2.3	0.0	9.1	0.0	0.0	3.4	0.0	2.9	0.0	0.0	2.7	0.0	10.5	8.3	0.0	5.2	2.8
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	% Trucks (Total)	0.0	2.4	0.0	0.0	2.3	0.0	9.1	0.0	0.0	3.4	0.0	2.9	0.0	0.0	2.7	0.0	10.5	8.3	0.0	5.2	2.8
	Peak Hour Factor (PHF)	0.50	0.84	0.56	0.00	0.84	0.75	0.69	0.75	0.00	0.81	0.44	0.86	0.78	0.00	0.88	0.52	0.47	0.75	0.00	0.76	0.88

Wednesday, January 8, 2020		From North S 76th St					From East W Lapham St					From South S 76th St					From West W Lapham St					Totals
Midday (MD) Peak Hour	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
	12:30 PM	1	73	1	0	75	2	2	1	0	5	3	72	5	0	80	3	1	4	0	8	168
	12:45 PM	1	81	2	0	84	0	2	1	0	3	0	70	1	0	71	5	2	1	0	8	166
	1:00 PM	0	69	2	0	71	0	3	0	0	3	2	64	1	0	67	4	3	4	0	11	152
	1:15 PM	1	71	0	0	72	1	3	0	0	4	0	72	3	0	75	7	4	1	0	12	163
	Peak Hour Volume	3	294	5	0	302	3	10	2	0	15	5	278	10	0	293	19	10	10	0	39	649
	Rounded Hourly Volume	5	295	5	0	305	5	10	0	0	15	5	280	10	0	295	20	10	10	0	40	655
	% Single Unit Trucks	0.0	1.4	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	20.0	1.4	0.0	0.0	1.7	0.0	0.0	0.0	0.0	0.0	1.4
	% Heavy Trucks	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.2
	% Trucks (Total)	0.0	1.4	0.0	0.0	1.3	0.0	0.0	0.0	0.0	0.0	20.0	1.8	0.0	0.0	2.0	0.0	0.0	0.0	0.0	0.0	1.5
	Peak Hour Factor (PHF)	0.75	0.91	0.62	0.00	0.90	0.37	0.83	0.50	0.00	0.75	0.42	0.97	0.50	0.00	0.92	0.68	0.62	0.62	0.00	0.81	0.97

Wednesday, January 8, 2020		From North S 76th St					From East W Lapham St					From South S 76th St					From West W Lapham St					Totals
PM Peak Hour	Start Time	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
	4:30 PM	2	132	8	0	142	3	3	4	0	10	2	108	3	0	113	5	6	5	0	16	281
	4:45 PM	2	129	2	0	133	0	2	2	0	4	2	121	5	0	128	4	6	4	0	14	279
	5:00 PM	1	156	6	0	163	1	4	0	0	5	7	93	4	0	104	8	6	1	0	15	287
	5:15 PM	1	125	2	0	128	3	4	2	0	9	4	101	12	0	117	6	4	3	0	13	267
	Peak Hour Volume	6	542	18	0	566	7	13	8	0	28	15	423	24	0	462	23	22	13	0	58	1114
	Rounded Hourly Volume	5	540	20	0	565	5	15	10	0	30	15	425	25	0	465	25	20	15	0	60	1120
	% Single Unit Trucks	0.0	0.9	0.0	0.0	0.9	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.5
	% Heavy Trucks	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	% Trucks (Total)	0.0	1.1	0.0	0.0	1.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.6
	Peak Hour Factor (PHF)	0.75	0.87	0.56	0.00	0.87	0.58	0.81	0.50	0.00	0.70	0.54	0.87	0.50	0.00	0.90	0.72	0.92	0.65	0.00	0.91	0.97

Peak Hour Pedestrian and Bicyclist Volumes

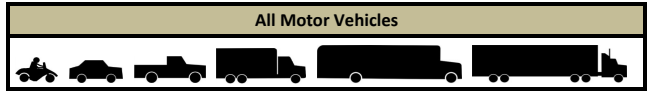
Pedestrians and Bicyclists		Crossing North Approach S 76th St			Crossing East Approach W Lapham St			Crossing South Approach S 76th St			Crossing West Approach W Lapham St			Total Ped & Bike Volume
15-Minute Start Time	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total		
AM	7:15 AM	1	0	1	0	0	0	1	0	1	0	0	0	2
	7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	1	0	1	0	0	0	1	0	1	0	0	0	2
MD	12:30 PM	1	1	2	0	1	1	0	0	0	0	0	0	3
	12:45 PM	0	0	0	0	0	0	1	1	0	0	0	0	1
	1:00 PM	0	0	0	0	0	1	0	1	0	0	0	0	1
	1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	1	1	2	0	1	1	1	1	2	0	0	0	5
PM	4:30 PM	0	0	0	1	0	1	0	0	0	1	0	1	2
	4:45 PM	0	0	0	0	1	1	0	0	0	3	0	3	4
	5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	0	0	0	1	1	2	0	0	0	4	0	4	6

Intersection Traffic Volume Report

Count Basics		Page 4 of 13	
Start Date:	Wednesday, January 8, 2020	Weekday	Schools in Session
Total Number of Hours Counted:	13	Non-Holiday	No Special Events

Hourly Volume Summary - Motor Vehicle Data

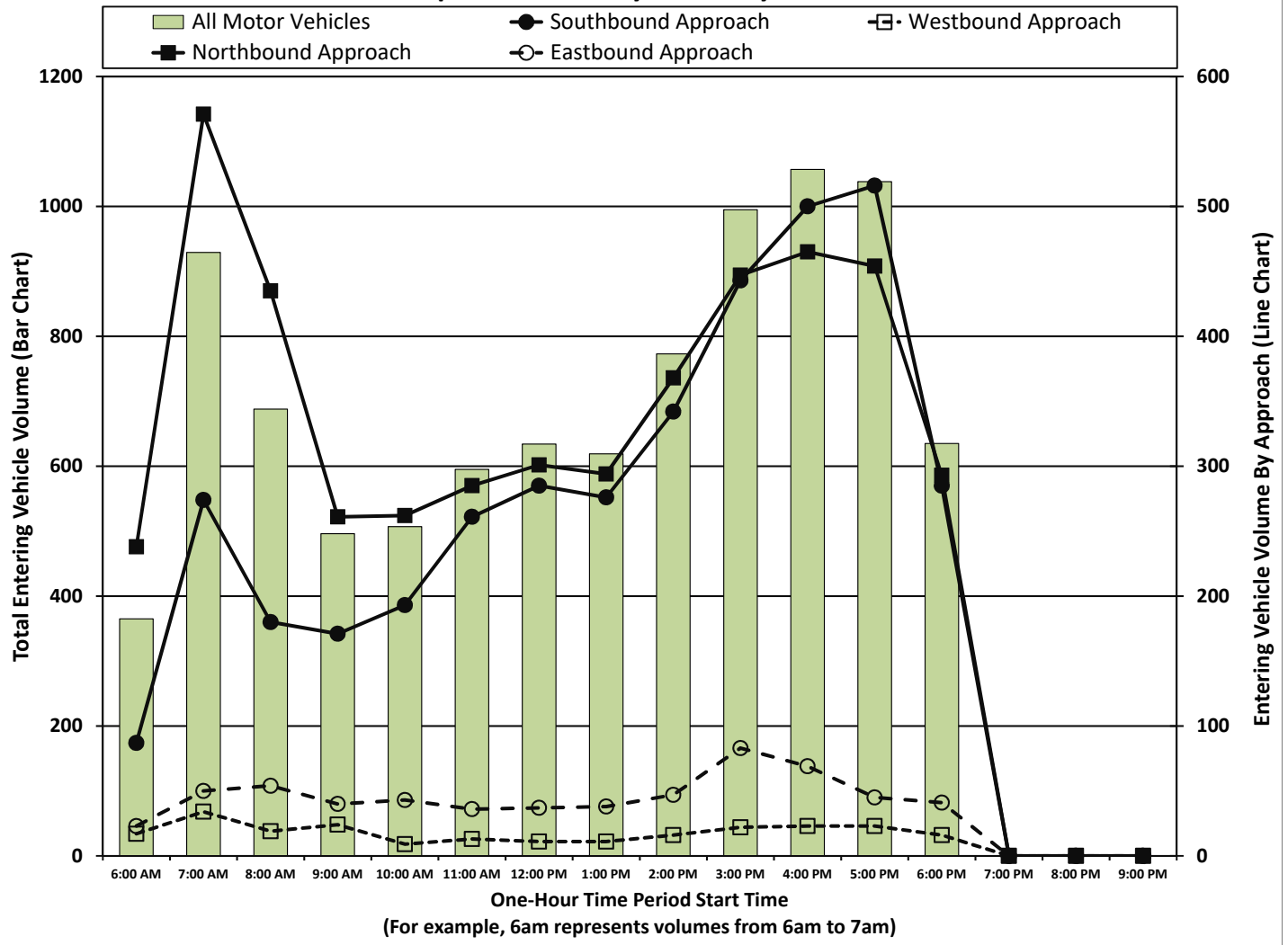
S 76th St & W Lapham St



One-Hour Motor Vehicle Data

One-Hour Time Period	From North S 76th St					From East W Lapham St					From South S 76th St					From West W Lapham St					Total Vehicle Volume	Directional Volume Totals			
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		E/W	N/S		
	Start Time																								
AM	6:00 AM	2	82	3	0	87	9	2	6	0	17	0	232	6	0	238	9	7	7	0	23	365	40	325	
	7:00 AM	5	260	9	0	274	13	13	8	0	34	4	548	19	0	571	23	18	9	0	50	929	84	845	
	8:00 AM	9	166	5	0	180	11	6	2	0	19	11	404	20	0	435	34	12	8	0	54	688	73	615	
	9:00 AM	9	160	2	0	171	9	8	7	0	24	7	241	13	0	261	17	16	7	0	40	496	64	432	
MD	10:00 AM	5	183	5	0	193	3	3	3	0	9	6	249	7	0	262	21	14	8	0	43	507	52	455	
	11:00 AM	4	252	5	0	261	4	7	2	0	13	7	262	16	0	285	14	13	9	0	36	595	49	546	
	12:00 PM	5	276	4	0	285	5	4	2	0	11	7	280	14	0	301	21	10	6	0	37	634	48	586	
	1:00 PM	4	266	6	0	276	1	9	1	0	11	7	275	12	0	294	17	12	9	0	38	619	49	570	
PM	2:00 PM	6	323	13	0	342	7	5	4	0	16	10	341	17	0	368	20	14	13	0	47	773	63	710	
	3:00 PM	4	426	13	0	443	3	9	10	0	22	10	408	29	0	447	30	36	17	0	83	995	105	890	
	4:00 PM	8	468	24	0	500	5	7	11	0	23	11	439	15	0	465	32	21	16	0	69	1057	92	965	
	5:00 PM	7	496	13	0	516	7	11	5	0	23	25	398	31	0	454	21	14	10	0	45	1038	68	970	
	6:00 PM	7	268	10	0	285	4	4	8	0	16	15	252	26	0	293	16	12	13	0	41	635	57	578	
	7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Totals	75	3626	112	0	3813	81	88	69	0	238	120	4329	225	0	4674	275	199	132	0	606	9331	844	8487	

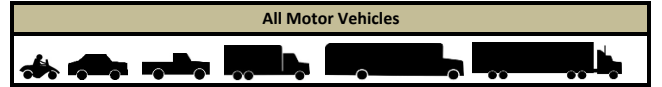
Graphical Summary of Hourly Volumes



Intersection Traffic Volume Report

15-Minute Motor Vehicle Data

S 76th St & W Lapham St



15-Minute Motor Vehicle Data

15-Minute Time Period	From North					From East					From South					From West					15-Min Totals	Hourly Sum	PHF
	S 76th St					W Lapham St					S 76th St					W Lapham St							
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total			
6:00 AM	0	10	2	0	12	3	0	2	0	5	0	37	1	0	38	0	0	1	0	1	56	365	0.72
6:15 AM	1	15	0	0	16	2	1	2	0	5	0	31	2	0	33	2	2	2	0	6	60	490	0.68
6:30 AM	1	24	1	0	26	4	1	1	0	6	0	86	1	0	87	4	1	2	0	7	126	679	0.68
6:45 AM	0	33	0	0	33	0	0	1	0	1	0	78	2	0	80	3	4	2	0	9	123	822	0.76
7:00 AM	0	48	1	0	49	5	5	3	0	13	1	105	2	0	108	9	2	0	0	11	181	929	0.86
7:15 AM	0	74	4	0	78	3	4	2	0	9	1	148	5	0	154	3	2	3	0	8	249	944	0.88
7:30 AM	4	73	2	0	79	4	3	1	0	8	1	162	5	0	168	6	4	4	0	14	269	858	0.80
7:45 AM	1	65	2	0	68	1	1	2	0	4	1	133	7	0	141	5	10	2	0	17	230	761	0.83
8:00 AM	3	37	1	0	41	4	3	1	0	8	4	116	8	0	128	13	3	3	0	19	196	688	0.88
8:15 AM	1	46	0	0	47	2	2	0	0	4	2	90	5	0	97	9	5	1	0	15	163	621	0.90
8:30 AM	3	40	2	0	45	4	1	1	0	6	4	101	2	0	107	10	2	2	0	14	172	571	0.83
8:45 AM	2	43	2	0	47	1	0	0	0	1	1	97	5	0	103	2	2	2	0	6	157	528	0.84
9:00 AM	0	36	0	0	36	3	2	2	0	7	6	57	4	0	67	9	9	1	0	19	129	496	0.96
9:15 AM	1	38	0	0	39	1	2	2	0	5	0	63	3	0	66	1	0	2	0	3	113	481	0.93
9:30 AM	4	41	2	0	47	5	1	2	0	8	1	61	3	0	65	3	2	4	0	9	129	482	0.93
9:45 AM	4	45	0	0	49	0	3	1	0	4	0	60	3	0	63	4	5	0	0	9	125	488	0.90
10:00 AM	1	45	2	0	48	0	0	1	0	1	1	53	3	0	57	3	2	3	0	8	114	507	0.88
10:15 AM	1	39	2	0	42	0	1	2	0	3	1	55	0	0	56	6	4	3	0	13	114	553	0.86
10:30 AM	1	48	0	0	49	1	0	0	0	1	0	68	3	0	71	8	5	1	0	14	135	580	0.91
10:45 AM	2	51	1	0	54	2	2	0	0	4	4	73	1	0	78	4	3	1	0	8	144	597	0.93
11:00 AM	0	62	1	0	63	1	2	0	0	3	2	80	4	0	86	3	4	1	0	8	160	595	0.93
11:15 AM	2	60	1	0	63	0	1	1	0	2	2	66	0	0	68	5	2	1	0	8	141	586	0.96
11:30 AM	0	76	2	0	78	2	3	0	0	5	3	51	5	0	59	6	4	0	0	10	152	594	0.98
11:45 AM	2	54	1	0	57	1	1	1	0	3	0	65	7	0	72	0	3	7	0	10	142	610	0.91
12:00 PM	3	63	1	0	67	2	0	0	0	2	1	66	4	0	71	6	4	1	0	11	151	634	0.94
12:15 PM	0	59	0	0	59	1	0	0	0	1	3	72	4	0	79	7	3	0	0	10	149	635	0.94
12:30 PM	1	73	1	0	75	2	2	1	0	5	3	72	5	0	80	3	1	4	0	8	168	649	0.97
12:45 PM	1	81	2	0	84	0	2	1	0	3	0	70	1	0	71	5	2	1	0	8	166	637	0.96
1:00 PM	0	69	2	0	71	0	3	0	0	3	2	64	1	0	67	4	3	4	0	11	152	619	0.95
1:15 PM	1	71	0	0	72	1	3	0	0	4	0	72	3	0	75	7	4	1	0	12	163	647	0.90
1:30 PM	1	63	3	0	67	0	2	0	0	2	4	67	6	0	77	4	4	2	0	10	156	672	0.89
1:45 PM	2	63	1	0	66	0	1	1	0	2	1	72	2	0	75	2	1	2	0	5	148	719	0.89
2:00 PM	2	85	2	0	89	1	0	0	0	1	3	73	4	0	80	4	4	2	0	10	180	773	0.95
2:15 PM	1	70	2	0	73	3	2	1	0	6	2	85	6	0	93	6	4	6	0	16	188	828	0.88
2:30 PM	2	79	3	0	84	3	1	2	0	6	1	99	4	0	104	5	2	2	0	9	203	905	0.85
2:45 PM	1	89	6	0	96	0	2	1	0	3	4	84	3	0	91	5	4	3	0	12	202	962	0.91
3:00 PM	1	106	0	0	107	0	2	2	0	4	3	99	7	0	109	3	7	5	0	15	235	995	0.94
3:15 PM	0	117	3	0	120	0	4	5	0	5	2	104	4	0	110	13	12	5	0	30	265	1003	0.95
3:30 PM	1	112	2	0	115	2	4	3	0	9	2	100	15	0	117	7	10	2	0	19	260	992	0.95
3:45 PM	2	91	8	0	101	1	3	0	0	4	3	105	3	0	111	7	7	5	0	19	235	1013	0.90
4:00 PM	2	97	4	0	103	1	0	5	0	6	5	105	3	0	113	13	7	1	0	21	243	1057	0.94
4:15 PM	2	110	10	0	122	1	2	0	0	3	2	105	4	0	111	10	2	6	0	18	254	1101	0.96
4:30 PM	2	132	8	0	142	3	3	4	0	10	2	108	3	0	113	5	6	5	0	16	281	1114	0.97
4:45 PM	2	129	2	0	133	0	2	2	0	4	2	121	5	0	128	4	6	4	0	14	279	1084	0.94
5:00 PM	1	156	6	0	163	1	4	0	0	5	7	93	4	0	104	8	6	1	0	15	287	1038	0.90
5:15 PM	1	125	2	0	128	3	4	2	0	9	4	101	12	0	117	6	4	3	0	13	267	935	0.88
5:30 PM	3	119	3	0	125	0	2	3	0	5	6	98	8	0	112	4	3	2	0	9	251	833	0.83
5:45 PM	2	96	2	0	100	3	1	0	0	4	8	106	7	0	121	3	1	4	0	8	233	731	0.78
6:00 PM	4	79	2	0	85	0	1	2	0	3	8	73	5	0	86	3	5	2	0	10	184	635	0.86
6:15 PM	2	69	4	0	75	2	1	2	0	5	2	62	8	0	72	7	3	3	0	13	165		
6:30 PM	0	60	1	0	61	1	1	2	0	4	1	64	9	0	74	6	1	3	0	10	149		
6:45 PM	1	60	3	0	64	1	1	2	0	4	4	53	4	0	61	0	3	5	0	8	137		
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Totals	75	3626	112	0	3813	81	88	69	0	238	120	4329	225	0	4674	275	199	132	0	606	9331		

Peak Hour All Vehicle Volume Summary

Hourly Time Period	From North					From East					From South					From West					Total Hourly Volume	PHF
	S 76th St					W Lapham St					S 76th St					W Lapham St						
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
AM 7:15 AM	8	249	9	0	266	12	11	6	0	29	7	559	25	0	591	27	19	12	0	58	944	0.88
MD 12:30 PM	3	294	5	0	302	3	10	2	0	15	5	278	10	0	293	19	10	10	0	39	649	0.97
PM 4:30 PM	6	542	18	0	566	7	13	8	0	28	15	423										

Intersection Traffic Volume Report

15-Minute Automobile Data

S 76th St & W Lapham St



15-Minute Automobile Data

15-Minute Time Period	From North					From East					From South					From West					15-Min Totals	Hourly Sum	
	S 76th St					W Lapham St					S 76th St					W Lapham St							
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total			
6:00 AM	0	10	2	0	12	12	3	0	2	0	5	0	37	1	0	38	0	0	1	0	1	56	359
6:15 AM	1	14	0	0	15	2	1	2	0	5	0	31	2	0	33	2	2	2	0	6	59	479	
6:30 AM	1	24	1	0	26	4	1	1	0	6	0	84	1	0	85	3	1	2	0	6	123	668	
6:45 AM	0	33	0	0	33	0	0	1	0	1	0	78	1	0	79	2	4	2	0	8	121	806	
7:00 AM	0	47	1	0	48	5	3	3	0	11	1	103	2	0	106	9	2	0	0	11	176	907	
7:15 AM	0	74	4	0	78	3	4	2	0	9	1	147	5	0	153	3	2	3	0	8	248	918	
7:30 AM	4	70	2	0	76	4	3	1	0	8	1	158	5	0	164	6	3	4	0	13	261	828	
7:45 AM	1	63	2	0	66	1	0	2	0	3	1	129	7	0	137	5	9	2	0	16	222	739	
8:00 AM	3	36	1	0	40	4	3	1	0	8	4	109	8	0	121	13	3	2	0	18	187	667	
8:15 AM	1	45	0	0	46	2	2	0	0	4	2	87	5	0	94	8	5	1	0	14	158	606	
8:30 AM	3	40	2	0	45	4	1	1	0	6	4	101	2	0	107	10	2	2	0	14	172	558	
8:45 AM	2	42	2	0	46	1	0	0	0	1	1	91	5	0	97	2	2	2	0	6	150	512	
9:00 AM	0	36	0	0	36	3	2	2	0	7	6	55	4	0	65	8	9	1	0	18	126	486	
9:15 AM	1	37	0	0	38	1	2	2	0	5	0	61	3	0	64	1	0	2	0	3	110	473	
9:30 AM	4	40	2	0	46	5	1	2	0	8	1	59	3	0	63	3	2	4	0	9	126	475	
9:45 AM	4	44	0	0	48	0	3	1	0	4	0	60	3	0	63	4	5	0	0	9	124	481	
10:00 AM	1	44	2	0	47	0	0	1	0	1	1	53	3	0	57	3	2	3	0	8	113	497	
10:15 AM	1	38	2	0	41	0	1	2	0	3	1	54	0	0	55	6	4	3	0	13	112	541	
10:30 AM	1	48	0	0	49	1	0	0	0	1	0	66	3	0	69	7	5	1	0	13	132	566	
10:45 AM	2	49	1	0	52	2	2	0	0	4	4	71	1	0	76	4	3	1	0	8	140	585	
11:00 AM	0	60	1	0	61	1	2	0	0	3	2	79	4	0	85	3	4	1	0	8	157	585	
11:15 AM	2	57	1	0	60	0	1	1	0	2	2	65	0	0	67	5	2	1	0	8	137	576	
11:30 AM	0	75	2	0	77	2	3	0	0	5	3	51	5	0	59	6	4	0	0	10	151	587	
11:45 AM	2	54	1	0	57	1	1	1	0	3	0	63	7	0	70	0	3	7	0	10	140	601	
12:00 PM	2	62	1	0	65	2	0	0	0	2	1	65	4	0	70	6	4	1	0	11	148	624	
12:15 PM	0	58	0	0	58	1	0	0	0	1	3	72	4	0	79	7	3	0	0	10	148	626	
12:30 PM	1	71	1	0	73	2	2	1	0	5	2	72	5	0	79	3	1	4	0	8	165	639	
12:45 PM	1	80	2	0	83	0	2	1	0	3	0	68	1	0	69	5	2	1	0	8	163	627	
1:00 PM	0	68	2	0	70	0	3	0	0	3	2	63	1	0	66	4	3	4	0	11	150	607	
1:15 PM	1	71	0	0	72	1	3	0	0	4	0	70	3	0	73	7	4	1	0	12	161	633	
1:30 PM	1	63	3	0	67	0	2	0	0	2	4	66	6	0	76	2	4	2	0	8	153	654	
1:45 PM	1	59	1	0	61	0	1	1	0	2	1	72	2	0	75	2	1	2	0	5	143	701	
2:00 PM	1	84	2	0	87	1	0	0	0	1	3	72	4	0	79	4	3	2	0	9	176	753	
2:15 PM	1	67	2	0	70	3	2	1	0	6	2	83	6	0	91	5	4	6	0	15	182	810	
2:30 PM	2	78	3	0	83	3	1	2	0	6	1	97	4	0	102	5	2	2	0	9	200	889	
2:45 PM	1	86	4	0	91	0	2	1	0	3	4	83	3	0	90	5	4	2	0	11	195	945	
3:00 PM	1	106	0	0	107	0	2	2	0	4	3	98	6	0	107	3	7	5	0	15	233	981	
3:15 PM	0	116	3	0	119	0	0	5	0	5	2	103	4	0	109	13	10	5	0	28	261	987	
3:30 PM	1	111	2	0	114	2	3	3	0	8	2	98	15	0	115	7	10	2	0	19	256	977	
3:45 PM	2	90	8	0	100	1	3	0	0	4	3	104	3	0	110	6	7	4	0	17	231	1000	
4:00 PM	2	94	4	0	100	1	0	5	0	6	5	104	3	0	112	13	7	1	0	21	239	1047	
4:15 PM	2	110	10	0	122	1	2	0	0	3	2	102	4	0	108	10	2	6	0	18	251	1093	
4:30 PM	2	130	8	0	140	3	3	4	0	10	2	108	3	0	113	5	6	5	0	16	279	1107	
4:45 PM	2	128	2	0	132	0	2	2	0	4	2	121	5	0	128	4	6	4	0	14	278	1078	
5:00 PM	1	155	6	0	162	1	4	0	0	5	7	92	4	0	103	8	6	1	0	15	285	1032	
5:15 PM	1	123	2	0	126	3	4	2	0	9	4	101	12	0	117	6	4	3	0	13	265	930	
5:30 PM	3	118	3	0	124	0	2	3	0	5	6	98	8	0	112	4	3	2	0	9	250	829	
5:45 PM	2	96	2	0	100	3	1	0	0	4	8	105	7	0	120	3	1	4	0	8	232	728	
6:00 PM	4	78	2	0	84	0	1	2	0	3	8	73	5	0	86	3	5	2	0	10	183	632	
6:15 PM	2	69	4	0	75	2	1	2	0	5	2	61	8	0	71	7	3	3	0	13	164		
6:30 PM	0	60	1	0	61	1	1	2	0	4	1	64	9	0	74	6	1	3	0	10	149		
6:45 PM	1	59	3	0	63	1	1	2	0	4	4	53	4	0	61	0	3	5	0	8	136		
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
Totals	72	3570	110	0	3752	81	84	69	0	234	119	4260	223	0	4602	266	194	129	0	589	9177		

Peak Hour Automobile Volume Summary

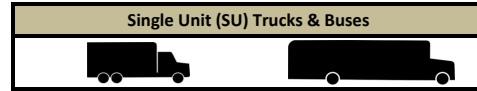
Hourly Time Period	From North					From East					From South					From West					Total Hourly Volume
	S 76th St					W Lapham St					S 76th St					W Lapham St					
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM 7:15 AM	8	243	9	0	260	12	10	6	0	28	7	543	25	0	575	27	17	11	0	55	918
MD 12:30 PM	3	290	5	0	298	3	10	2	0	15	4	273	10	0	287	19	10	10	0	39	639
PM 4:30 PM	6	536	18	0	560	7	13	8	0	28	15	422	24	0	461	23	22	13	0	58	1107

Intersection Traffic Volume Report

Count Basics			Page 7 of 13
Start Date:	Wednesday, January 8, 2020	Weekday	Schools in Session
Total Number of Hours Counted:	13	Non-Holiday	No Special Events

15-Minute Single Unit (SU) Truck & Bus Data

S 76th St & W Lapham St



15-Minute Single Unit (SU) Truck & Bus Data

15-Minute Time Period	From North					From East					From South					From West					15-Min Totals	Hourly Sum
	S 76th St					W Lapham St					S 76th St					W Lapham St						
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6:15 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	1	0	0	0	0	1	3
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	1	2
7:00 AM	0	1	0	0	1	0	2	0	0	2	0	2	0	0	2	0	0	0	0	0	0	5
7:15 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	1
7:30 AM	0	3	0	0	3	0	0	0	0	0	4	0	0	4	0	1	0	0	0	1	8	30
7:45 AM	0	2	0	0	2	0	1	0	0	1	0	4	0	0	4	0	1	0	0	1	8	22
8:00 AM	0	1	0	0	1	0	0	0	0	0	7	0	0	7	0	0	1	0	0	1	9	21
8:15 AM	0	1	0	0	1	0	0	0	0	0	3	0	0	3	1	0	0	0	0	1	5	15
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13
8:45 AM	0	1	0	0	1	0	0	0	0	0	6	0	0	6	0	0	0	0	0	0	7	16
9:00 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	2	1	0	0	0	0	1	3	10
9:15 AM	0	1	0	0	1	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	3	8
9:30 AM	0	1	0	0	1	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	3	7
9:45 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7
10:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	10
10:15 AM	0	1	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	12
10:30 AM	0	0	0	0	0	0	0	0	0	0	2	0	0	2	1	0	0	0	0	1	3	14
10:45 AM	0	2	0	0	2	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	4	11
11:00 AM	0	2	0	0	2	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3	8
11:15 AM	0	3	0	0	3	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	4	8
11:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5
11:45 AM	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	8
12:00 PM	1	1	0	0	2	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3	10
12:15 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	8
12:30 PM	0	2	0	0	2	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3	9
12:45 PM	0	1	0	0	1	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	3	9
1:00 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	11
1:15 PM	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	2	14
1:30 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	0	0	0	0	2	3	18
1:45 PM	1	4	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	18
2:00 PM	1	1	0	0	2	0	0	0	0	0	1	0	0	1	0	1	0	0	0	1	4	20
2:15 PM	0	3	0	0	3	0	0	0	0	0	2	0	0	2	1	0	0	0	0	1	6	18
2:30 PM	0	1	0	0	1	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	3	16
2:45 PM	0	3	2	0	5	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	7	17
3:00 PM	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	2	14
3:15 PM	0	1	0	0	1	0	0	0	0	0	1	0	0	1	0	2	0	0	0	2	4	16
3:30 PM	0	1	0	0	1	0	1	0	0	1	0	2	0	0	2	0	0	0	0	0	4	15
3:45 PM	0	1	0	0	1	0	0	0	0	0	1	0	0	1	1	0	1	0	0	2	4	13
4:00 PM	0	3	0	0	3	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	4	10
4:15 PM	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	3	8
4:30 PM	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	6
4:45 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	5
5:00 PM	0	1	0	0	1	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	5
5:15 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4
5:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4
5:45 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	3
6:00 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3
6:15 PM	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:45 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals	3	54	2	0	59	0	4	0	0	4	1	67	2	0	70	9	5	3	0	17	150	

Peak Hour Single Unit (SU) Truck & Buses Volume Summary

Hourly Time Period	From North					From East					From South					From West					Total Hourly Volume
	S 76th St					W Lapham St					S 76th St					W Lapham St					
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	
AM 7:15 AM	0	6	0	0	6	0	1	0	0	1	0	16	0	0	16	0	2	1	0	3	26
MD 12:30 PM	0	4	0	0	4	0	0	0	0	0	1	4	0	0	5	0	0	0	0	0	9
PM 4:30 PM	0	5	0	0	5	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	6

Intersection Traffic Volume Report

Count Basics			Page 9 of 13
Start Date:	Wednesday, January 8, 2020	Weekday	Schools in Session
Total Number of Hours Counted:	13	Non-Holiday	No Special Events

15-Minute Heavy Vehicle Data

S 76th St & W Lapham St



15-Minute Heavy Vehicle Data

15-Minute Time Period	From North					From East					From South					From West					15-Min Totals	Hourly Sum		
	S 76th St					W Lapham St					S 76th St					W Lapham St								
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total				
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6	
6:15 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	11
6:30 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	1	0	0	0	0	1	3	11	
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	0	0	0	0	1	2	16	
7:00 AM	0	1	0	0	1	0	2	0	0	2	0	2	0	0	2	0	0	0	0	0	0	5	22	
7:15 AM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	26	
7:30 AM	0	3	0	0	3	0	0	0	0	0	0	4	0	0	4	0	1	0	0	0	1	8	30	
7:45 AM	0	2	0	0	2	0	1	0	0	1	0	4	0	0	4	0	1	0	0	0	1	8	22	
8:00 AM	0	1	0	0	1	0	0	0	0	0	0	7	0	0	7	0	0	1	0	0	1	9	21	
8:15 AM	0	1	0	0	1	0	0	0	0	0	0	3	0	0	3	1	0	0	0	0	1	5	15	
8:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	13	
8:45 AM	0	1	0	0	1	0	0	0	0	0	0	6	0	0	6	0	0	0	0	0	0	7	16	
9:00 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	1	0	0	0	0	1	3	10	
9:15 AM	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	3	8	
9:30 AM	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	3	7	
9:45 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7	
10:00 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	10	
10:15 AM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	12	
10:30 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	1	0	0	0	0	1	3	14	
10:45 AM	0	2	0	0	2	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	4	12	
11:00 AM	0	2	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3	10	
11:15 AM	0	3	0	0	3	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	4	10	
11:30 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7	
11:45 AM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	2	9	
12:00 PM	1	1	0	0	2	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	3	10	
12:15 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	9	
12:30 PM	0	2	0	0	2	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	3	10	
12:45 PM	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	3	10	
1:00 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	12	
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	2	14	
1:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	2	0	0	0	2	3	18	
1:45 PM	1	4	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5	18	
2:00 PM	1	1	0	0	2	0	0	0	0	0	0	1	0	0	1	0	1	0	0	0	1	4	20	
2:15 PM	0	3	0	0	3	0	0	0	0	0	0	2	0	0	2	1	0	0	0	0	1	6	18	
2:30 PM	0	1	0	0	1	0	0	0	0	0	0	2	0	0	2	0	0	0	0	0	0	3	16	
2:45 PM	0	3	2	0	5	0	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	7	17	
3:00 PM	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	2	14	
3:15 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	2	0	0	0	2	4	16	
3:30 PM	0	1	0	0	1	0	1	0	0	1	0	2	0	0	2	0	0	0	0	0	0	4	15	
3:45 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	1	0	1	0	0	2	4	13	
4:00 PM	0	3	0	0	3	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	4	10	
4:15 PM	0	0	0	0	0	0	0	0	0	0	0	3	0	0	3	0	0	0	0	0	0	3	8	
4:30 PM	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	7	
4:45 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	6	
5:00 PM	0	1	0	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	2	6	
5:15 PM	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	5	
5:30 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	4	
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	3	
6:00 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	
6:15 PM	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	1	1	
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:45 PM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals	3	56	2	0	61	0	4	0	0	4	1	69	2	0	72	9	5	3	0	17	154			

Peak Hour Heavy Vehicle Volume Summary

Hourly Time Period	From North					From East					From South					From West					Total Hourly Volume	
	S 76th St					W Lapham St					S 76th St					W Lapham St						
	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total	Right	Thru	Left	U-Tn	Total		
AM 7:15 AM	0	6	0	0	6	0	1	0	0	1	0	16	0	0	16	0	2	1	0	3	26	
MD 12:30 PM	0	4	0	0	4	0	0	0	0	0	1	5	0	0	6	0	0	0	0	0	0	10
PM 4:30 PM	0	6	0	0	6	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	0	7

Intersection Traffic Volume Report

15-Minute Pedestrian and Bicyclist Data

S 76th St & W Lapham St



15-Minute Pedestrian and Bicyclist Data

15-Minute Time Period	Crossing North Approach			Crossing East Approach			Crossing South Approach			Crossing West Approach			15-Min Totals	Hourly Sum
	S 76th St			W Lapham St			S 76th St			W Lapham St				
	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total	Pedestrian	Bicyclist	Total		
6:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	6
6:15 AM	2	0	2	1	0	1	0	0	0	1	0	1	4	6
6:30 AM	2	0	2	0	0	0	0	0	0	0	0	0	2	4
6:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
7:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	2
7:15 AM	1	0	1	0	0	0	1	0	1	0	0	0	2	2
7:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	1
7:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	6
8:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	6
8:15 AM	0	0	0	0	0	0	0	0	0	1	0	1	1	9
8:30 AM	1	0	1	1	0	1	1	0	1	2	0	2	5	9
8:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	10
9:00 AM	3	0	3	0	0	0	0	0	0	0	0	0	3	10
9:15 AM	0	0	0	1	0	1	0	0	0	0	0	0	1	11
9:30 AM	0	0	0	4	0	4	1	0	1	1	0	1	6	11
9:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	9
10:00 AM	1	0	1	0	0	0	1	0	1	1	1	2	4	10
10:15 AM	1	0	1	0	0	0	0	0	0	0	0	0	1	10
10:30 AM	0	0	0	1	0	1	0	0	0	3	0	3	4	11
10:45 AM	0	0	0	0	0	0	0	0	0	1	0	1	1	10
11:00 AM	0	0	0	1	0	1	1	0	1	1	1	2	4	12
11:15 AM	0	0	0	0	0	0	2	0	2	0	0	0	2	13
11:30 AM	1	0	1	1	0	1	0	0	0	1	1	1	3	12
11:45 AM	0	0	0	0	0	0	2	0	2	1	0	1	3	12
12:00 PM	1	0	1	1	0	1	0	0	0	3	0	3	5	10
12:15 PM	1	0	1	0	0	0	0	0	0	0	0	0	1	6
12:30 PM	1	1	2	0	1	1	0	0	0	0	0	0	3	5
12:45 PM	0	0	0	0	0	0	0	1	1	0	0	0	1	4
1:00 PM	0	0	0	0	0	0	1	0	1	0	0	0	1	4
1:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	6
1:30 PM	0	0	0	1	0	1	0	0	0	1	0	1	2	10
1:45 PM	0	0	0	0	0	0	0	0	0	0	1	1	1	8
2:00 PM	2	0	2	0	0	0	0	0	0	1	0	1	3	8
2:15 PM	0	0	0	0	0	0	0	0	0	4	0	4	4	8
2:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	7
2:45 PM	1	0	1	0	0	0	0	0	0	0	0	0	1	12
3:00 PM	1	0	1	1	0	1	1	0	1	0	0	0	3	14
3:15 PM	2	1	3	0	0	0	0	0	0	0	0	0	3	12
3:30 PM	1	0	1	2	1	3	1	0	1	0	0	0	5	12
3:45 PM	1	0	1	1	0	1	0	0	0	1	0	1	3	9
4:00 PM	1	0	1	0	0	0	0	0	0	0	0	0	1	10
4:15 PM	0	0	0	1	0	1	0	0	0	2	0	2	3	9
4:30 PM	0	0	0	1	0	1	0	0	0	1	0	1	2	6
4:45 PM	0	0	0	0	1	1	0	0	0	3	0	3	4	7
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3
5:30 PM	0	0	0	0	0	0	3	0	3	0	0	0	3	6
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3
6:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	3
6:15 PM	0	0	0	1	0	1	0	0	0	2	0	2	3	3
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
6:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
7:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
8:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
9:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	
Totals	24	2	26	19	3	22	15	1	16	30	4	34	98	

Special Pedestrians

Pedestrian Type	None	1 or 2	A Few	Several	Many	Unknown
Pre-school Children	x					
Elementary School Age Children	x					
Visually Impaired (white cane/helper dog)	x					
Elderly/Disabled (except wheelchairs)	x					
Wheelchairs/Electric Scooters	x					
Other (None)	x					

APPENDIX B

EXISTING TRAFFIC ANALYSIS

HCM 6th TWSC
3: 76th St & Lapham St

Existing
AM Peak

Intersection												
Int Delay, s/veh	1.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	10	20	25	5	10	10	25	560	5	10	250	10
Future Vol, veh/h	10	20	25	5	10	10	25	560	5	10	250	10
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	85	-	-	85	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	88	88	88	88	88	88	88	88	88	88	88	88
Heavy Vehicles, %	5	5	5	3	3	3	3	3	3	2	2	2
Mvmt Flow	11	23	28	6	11	11	28	636	6	11	284	11

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	1018	1010	290	1032	1012	639	295	0	0	642	0	0
Stage 1	312	312	-	695	695	-	-	-	-	-	-	-
Stage 2	706	698	-	337	317	-	-	-	-	-	-	-
Critical Hdwy	7.15	6.55	6.25	7.13	6.53	6.23	4.13	-	-	4.12	-	-
Critical Hdwy Stg 1	6.15	5.55	-	6.13	5.53	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.15	5.55	-	6.13	5.53	-	-	-	-	-	-	-
Follow-up Hdwy	3.545	4.045	3.345	3.527	4.027	3.327	2.227	-	-	2.218	-	-
Pot Cap-1 Maneuver	213	237	742	210	238	474	1261	-	-	943	-	-
Stage 1	692	652	-	431	442	-	-	-	-	-	-	-
Stage 2	422	438	-	675	652	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	195	229	742	182	230	474	1261	-	-	943	-	-
Mov Cap-2 Maneuver	195	229	-	182	230	-	-	-	-	-	-	-
Stage 1	677	644	-	422	432	-	-	-	-	-	-	-
Stage 2	392	428	-	619	644	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	19		19.8		0.3		0.3	
HCM LOS	C		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1261	-	-	319	272	943	-
HCM Lane V/C Ratio	0.023	-	-	0.196	0.104	0.012	-
HCM Control Delay (s)	7.9	-	-	19	19.8	8.9	-
HCM Lane LOS	A	-	-	C	C	A	-
HCM 95th %tile Q(veh)	0.1	-	-	0.7	0.3	0	-

HCM 6th TWSC
3: 76th St & Lapham St

Existing
PM Peak

Intersection												
Int Delay, s/veh	2.3											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	15	20	25	10	15	5	25	425	15	20	540	5
Future Vol, veh/h	15	20	25	10	15	5	25	425	15	20	540	5
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	85	-	-	85	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	97	97	97	97	97	97	97	97	97	97	97	97
Heavy Vehicles, %	1	1	1	1	1	1	1	1	1	1	1	1
Mvmt Flow	15	21	26	10	15	5	26	438	15	21	557	5

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1110	1107	560	1123	1102	446	562	0	0	453	0	0
Stage 1	602	602	-	498	498	-	-	-	-	-	-	-
Stage 2	508	505	-	625	604	-	-	-	-	-	-	-
Critical Hdwy	7.11	6.51	6.21	7.11	6.51	6.21	4.11	-	-	4.11	-	-
Critical Hdwy Stg 1	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.11	5.51	-	6.11	5.51	-	-	-	-	-	-	-
Follow-up Hdwy	3.509	4.009	3.309	3.509	4.009	3.309	2.209	-	-	2.209	-	-
Pot Cap-1 Maneuver	187	211	530	184	213	614	1014	-	-	1113	-	-
Stage 1	488	490	-	556	546	-	-	-	-	-	-	-
Stage 2	549	542	-	474	489	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	169	202	530	156	203	614	1014	-	-	1113	-	-
Mov Cap-2 Maneuver	169	202	-	156	203	-	-	-	-	-	-	-
Stage 1	475	481	-	542	532	-	-	-	-	-	-	-
Stage 2	515	528	-	423	480	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	23.6		25.7		0.5		0.3	
HCM LOS	C		D					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1014	-	-	255	205	1113	-	-
HCM Lane V/C Ratio	0.025	-	-	0.243	0.151	0.019	-	-
HCM Control Delay (s)	8.6	-	-	23.6	25.7	8.3	-	-
HCM Lane LOS	A	-	-	C	D	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.9	0.5	0.1	-	-

HCM 6th Signalized Intersection Summary

3: 76th St & Lapham St

Existing
AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (veh/h)	10	20	25	5	10	10	25	560	5	10	250	10
Future Volume (veh/h)	10	20	25	5	10	10	25	560	5	10	250	10
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1826	1826	1826	1856	1856	1856	1856	1856	1856	1870	1870	1870
Adj Flow Rate, veh/h	11	23	28	6	11	11	28	636	6	11	284	11
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Percent Heavy Veh, %	5	5	5	3	3	3	3	3	3	2	2	2
Cap, veh/h	95	169	167	110	180	147	685	1127	11	425	1099	43
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.61	0.61	0.61	0.61	0.61	0.61
Sat Flow, veh/h	153	747	741	209	798	652	1076	1835	17	787	1789	69
Grp Volume(v), veh/h	62	0	0	28	0	0	28	0	642	11	0	295
Grp Sat Flow(s),veh/h/ln	1640	0	0	1659	0	0	1076	0	1852	787	0	1858
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	0.9	0.0	14.3	0.6	0.0	5.1
Cycle Q Clear(g_c), s	2.1	0.0	0.0	0.9	0.0	0.0	6.0	0.0	14.3	14.9	0.0	5.1
Prop In Lane	0.18		0.45	0.21		0.39	1.00		0.01	1.00		0.04
Lane Grp Cap(c), veh/h	431	0	0	437	0	0	685	0	1138	425	0	1141
V/C Ratio(X)	0.14	0.00	0.00	0.06	0.00	0.00	0.04	0.00	0.56	0.03	0.00	0.26
Avail Cap(c_a), veh/h	431	0	0	437	0	0	685	0	1138	425	0	1141
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.8	0.0	0.0	21.3	0.0	0.0	7.6	0.0	8.0	12.4	0.0	6.2
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.3	0.0	0.0	0.1	0.0	2.0	0.1	0.0	0.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.0	0.4	0.0	0.0	0.2	0.0	5.4	0.1	0.0	1.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.5	0.0	0.0	21.6	0.0	0.0	7.7	0.0	10.0	12.5	0.0	6.7
LnGrp LOS	C	A	A	C	A	A	A	A	A	B	A	A
Approach Vol, veh/h		62			28			670			306	
Approach Delay, s/veh		22.5			21.6			9.9			6.9	
Approach LOS		C			C			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		48.6		21.4		48.6		21.4				
Change Period (Y+Rc), s		* 5.6		* 5.6		* 5.6		* 5.6				
Max Green Setting (Gmax), s		* 43		* 16		* 43		* 16				
Max Q Clear Time (g_c+I1), s		16.3		4.1		16.9		2.9				
Green Ext Time (p_c), s		5.2		0.2		2.0		0.1				

Intersection Summary

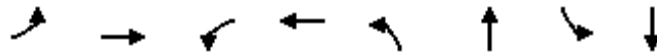
HCM 6th Ctrl Delay	10.1
HCM 6th LOS	B

Notes

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

Timings
3: 76th St & Lapham St

Existing
AM Peak



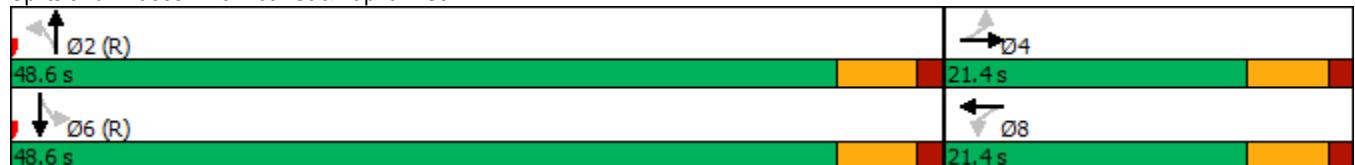
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↕		↕	↗	↗	↗	↗
Traffic Volume (vph)	10	20	5	10	25	560	10	250
Future Volume (vph)	10	20	5	10	25	560	10	250
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	15.8	15.8	15.8	15.8	43.0	43.0	43.0	43.0
Minimum Split (s)	21.4	21.4	21.4	21.4	48.6	48.6	48.6	48.6
Total Split (s)	21.4	21.4	21.4	21.4	48.6	48.6	48.6	48.6
Total Split (%)	30.6%	30.6%	30.6%	30.6%	69.4%	69.4%	69.4%	69.4%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.6		5.6	5.6	5.6	5.6	5.6
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		15.8		15.8	43.0	43.0	43.0	43.0
Actuated g/C Ratio		0.23		0.23	0.61	0.61	0.61	0.61
v/c Ratio		0.16		0.07	0.04	0.57	0.03	0.26
Control Delay		15.2		16.5	5.6	10.4	5.6	6.8
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		15.2		16.5	5.6	10.4	5.6	6.8
LOS		B		B	A	B	A	A
Approach Delay		15.2		16.5		10.2		6.8
Approach LOS		B		B		B		A

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 70
 Control Type: Pretimed
 Maximum v/c Ratio: 0.57
 Intersection Signal Delay: 9.7
 Intersection Capacity Utilization 58.3%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 3: 76th St & Lapham St



Queues
3: 76th St & Lapham St

Existing
AM Peak



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	62	28	28	642	11	295
v/c Ratio	0.16	0.07	0.04	0.57	0.03	0.26
Control Delay	15.2	16.5	5.6	10.4	5.6	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.2	16.5	5.6	10.4	5.6	6.8
Queue Length 50th (ft)	12	6	4	144	2	50
Queue Length 95th (ft)	39	24	12	219	7	83
Internal Link Dist (ft)	149	162		255		249
Turn Bay Length (ft)			85		85	
Base Capacity (vph)	388	382	657	1132	376	1139
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.07	0.04	0.57	0.03	0.26

Intersection Summary

HCM 6th Signalized Intersection Summary

3: 76th St & Lapham St

Existing
PM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Traffic Volume (veh/h)	15	20	25	10	15	5	25	425	15	20	540	5
Future Volume (veh/h)	15	20	25	10	15	5	25	425	15	20	540	5
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885	1885
Adj Flow Rate, veh/h	15	21	26	10	15	5	26	438	15	21	557	5
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	121	161	158	162	223	63	488	1113	38	567	1146	10
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.61	0.61	0.61	0.61	0.61	0.61
Sat Flow, veh/h	255	715	701	412	988	280	855	1812	62	945	1865	17
Grp Volume(v), veh/h	62	0	0	30	0	0	26	0	453	21	0	562
Grp Sat Flow(s),veh/h/ln	1671	0	0	1680	0	0	855	0	1874	945	0	1882
Q Serve(g_s), s	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0	8.6	0.8	0.0	11.5
Cycle Q Clear(g_c), s	2.0	0.0	0.0	0.9	0.0	0.0	12.7	0.0	8.6	9.4	0.0	11.5
Prop In Lane	0.24		0.42	0.33		0.17	1.00		0.03	1.00		0.01
Lane Grp Cap(c), veh/h	441	0	0	448	0	0	488	0	1151	567	0	1156
V/C Ratio(X)	0.14	0.00	0.00	0.07	0.00	0.00	0.05	0.00	0.39	0.04	0.00	0.49
Avail Cap(c_a), veh/h	441	0	0	448	0	0	488	0	1151	567	0	1156
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00	1.00
Uniform Delay (d), s/veh	21.8	0.0	0.0	21.3	0.0	0.0	10.9	0.0	6.9	9.3	0.0	7.4
Incr Delay (d2), s/veh	0.7	0.0	0.0	0.3	0.0	0.0	0.2	0.0	1.0	0.1	0.0	1.5
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.9	0.0	0.0	0.4	0.0	0.0	0.2	0.0	3.2	0.2	0.0	4.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	22.4	0.0	0.0	21.6	0.0	0.0	11.1	0.0	7.9	9.4	0.0	8.9
LnGrp LOS	C	A	A	C	A	A	B	A	A	A	A	A
Approach Vol, veh/h		62			30			479			583	
Approach Delay, s/veh		22.4			21.6			8.1			8.9	
Approach LOS		C			C			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		48.6		21.4		48.6		21.4				
Change Period (Y+Rc), s		* 5.6		* 5.6		* 5.6		* 5.6				
Max Green Setting (Gmax), s		* 43		* 16		* 43		* 16				
Max Q Clear Time (g_c+I1), s		14.7		4.0		13.5		2.9				
Green Ext Time (p_c), s		3.4		0.2		4.4		0.1				

Intersection Summary

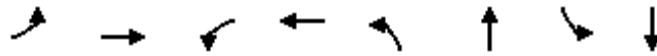
HCM 6th Ctrl Delay	9.6
HCM 6th LOS	A

Notes

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

Timings
3: 76th St & Lapham St

Existing
PM Peak



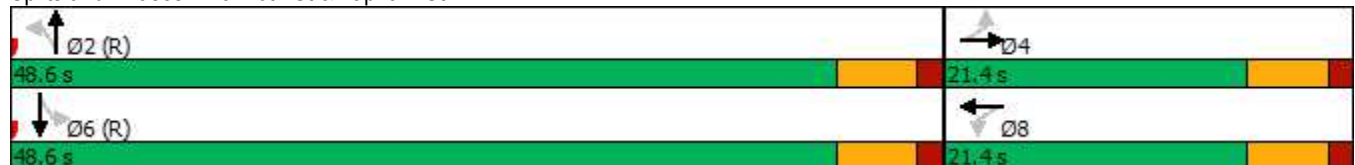
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations		↔		↔	↔	↔	↔	↔
Traffic Volume (vph)	15	20	10	15	25	425	20	540
Future Volume (vph)	15	20	10	15	25	425	20	540
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4		8		2		6
Permitted Phases	4		8		2		6	
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	15.8	15.8	15.8	15.8	43.0	43.0	43.0	43.0
Minimum Split (s)	21.4	21.4	21.4	21.4	48.6	48.6	48.6	48.6
Total Split (s)	21.4	21.4	21.4	21.4	48.6	48.6	48.6	48.6
Total Split (%)	30.6%	30.6%	30.6%	30.6%	69.4%	69.4%	69.4%	69.4%
Yellow Time (s)	4.2	4.2	4.2	4.2	4.2	4.2	4.2	4.2
All-Red Time (s)	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Lost Time Adjust (s)		0.0		0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)		5.6		5.6	5.6	5.6	5.6	5.6
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	Max	Max	Max	Max	Max	Max	Max	Max
Act Effct Green (s)		15.8		15.8	43.0	43.0	43.0	43.0
Actuated g/C Ratio		0.23		0.23	0.61	0.61	0.61	0.61
v/c Ratio		0.16		0.08	0.06	0.39	0.04	0.49
Control Delay		15.7		19.6	5.9	8.0	5.7	9.2
Queue Delay		0.0		0.0	0.0	0.0	0.0	0.0
Total Delay		15.7		19.6	5.9	8.0	5.7	9.2
LOS		B		B	A	A	A	A
Approach Delay		15.7		19.6		7.9		9.1
Approach LOS		B		B		A		A

Intersection Summary

Cycle Length: 70
 Actuated Cycle Length: 70
 Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
 Natural Cycle: 70
 Control Type: Pretimed
 Maximum v/c Ratio: 0.49
 Intersection Signal Delay: 9.2
 Intersection Capacity Utilization 58.3%
 Analysis Period (min) 15

Intersection LOS: A
 ICU Level of Service B

Splits and Phases: 3: 76th St & Lapham St



Queues
3: 76th St & Lapham St

Existing
PM Peak



Lane Group	EBT	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	62	30	26	453	21	562
v/c Ratio	0.16	0.08	0.06	0.39	0.04	0.49
Control Delay	15.7	19.6	5.9	8.0	5.7	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.7	19.6	5.9	8.0	5.7	9.2
Queue Length 50th (ft)	12	9	4	86	3	117
Queue Length 95th (ft)	41	29	13	139	11	185
Internal Link Dist (ft)	149	162		255		249
Turn Bay Length (ft)			85		85	
Base Capacity (vph)	395	383	442	1151	532	1154
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.08	0.06	0.39	0.04	0.49

Intersection Summary

APPENDIX C

TRAFFIC SIGNAL WARRANT ANALYSIS

Wisconsin Department of Transportation Traffic Signal Warrant Summary Worksheet

100%

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: South 76th Street and West Lapham Street

County: Milwaukee

City: West Allis

Major Street: South 76th Street

Minor Street: West Lapham Street

Critical Approach Speed: 25 mph

Critical Approach Speed: 25 mph

Lanes: 1 lane

Lanes: 1 lane

% Right Turns Included

From North (SB) 100%

From East (WB) 100%

From South (NB) 100%

From West (EB) 100%

In built-up area of isolated community of < 10,000 population? No

Total number of approaches at intersection? 4 or more

If it is a "T" intersection, inflate minor threshold to 150%? No

Manually set volume level? No

Analysis based on EXISTING volume data.

Date	Day of the Week	Time (HH:MM)			
		From	AM / PM	To	AM / PM
1/7/2020	Tuesday	6:00	AM	2:00	PM
1/8/2020	Wednesday	2:00	PM	7:00	PM

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	No
Condition A: Minimum Vehicular Volume	No
Condition B: Interruption of Continuous Traffic	No
Condition C: Combination: 80% of A and B	No
Warrant 2: Four-Hour Volume	No
Warrant 3: Peak Hour Volume	No
Warrant 4: Pedestrian Volume	N/A
Criterion A: Four-Hour	
Criterion B: Peak-Hour	
Warrant 5: School Crossing	N/A
Warrant 6: Coordinated Signal System	N/A
Warrant 7: Crash Experience	No
Warrant 8: Roadway Network	N/A
Warrant 9: Intersection Near a Grade Crossing	N/A

Warrant Analysis Conducted By:

Name: John Bruggeman, PE, PTOE

Agency: raSmith

Date: 1/17/2020

Warrant 1: Eight - Hour Vehicular Volume

100%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To:

Condition A :		
Min. Veh. Volume		
Volume Level	100%	80%
Major Rd. Req	500	400
Minor Rd. Req	150	120
Number of Hours	0	0

Satisfied? No

Condition B:		
Interruption of Continuous Traffic		
Volume Level	100%	80%
Major Rd. Req	750	600
Minor Rd. Req	75	60
Number of Hours	1	2

Satisfied? No

Condition C:		
Combination of A & B at 80%		

Satisfied? No

Time Period	From	To	Manually Set To:		Total
			Major Road: Both App. (VPH)	Minor Road: High App. (VPH)	
1	6:00	7:00	325	23	348
2	7:00	8:00	845	50	895
3	8:00	9:00	615	54	669
4	9:00	10:00	432	40	472
5	10:00	11:00	455	43	498
6	11:00	12:00	545	36	581
7	12:00	13:00	585	37	622
8	13:00	14:00	569	38	607
9	14:00	15:00	710	47	757
10	15:00	16:00	890	83	973
11	16:00	17:00	965	69	1034
12	17:00	18:00	970	45	1015
13	18:00	19:00	578	41	619
14	19:00	20:00	0	0	0
15	20:00	21:00	0	0	0
16	21:00	22:00	0	0	0

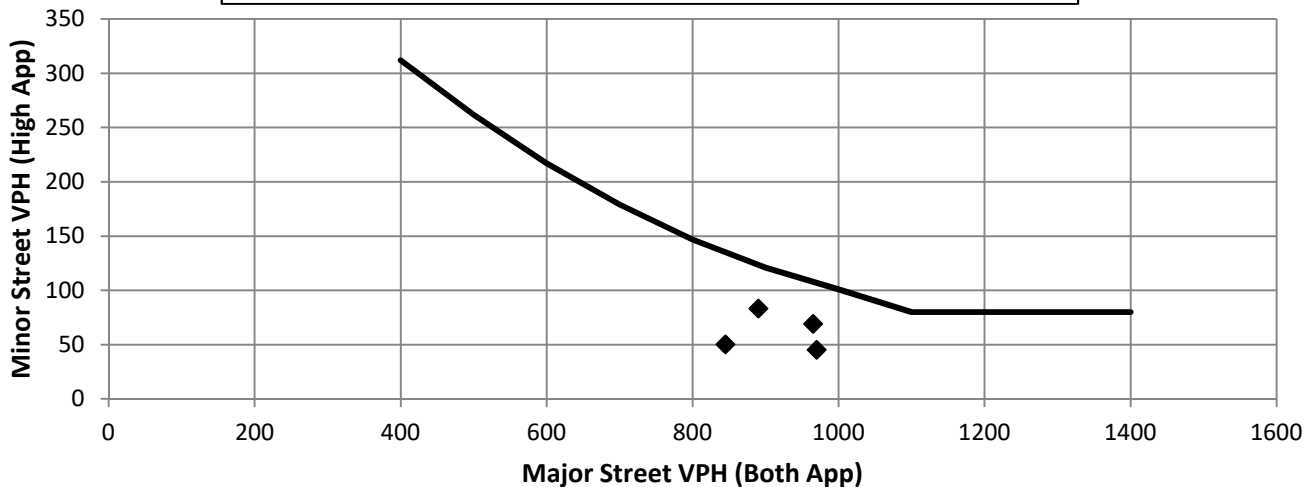
Warrant 2: Four-Hour Volume

100%

Warrant Evaluated? Yes
Warrant Satisfied? No
Manually Set To:

Hour Start	16:00	15:00	17:00	7:00
Major Road Vol.	965	890	970	845
Minor Road Vol.	69	83	45	50

Figure 4C-1 Warrant 2, Four-Hour Vehicular Volume



Warrant 3: Peak Hour Volume

100%

Warrant Evaluated? Yes

Warrant Satisfied? No

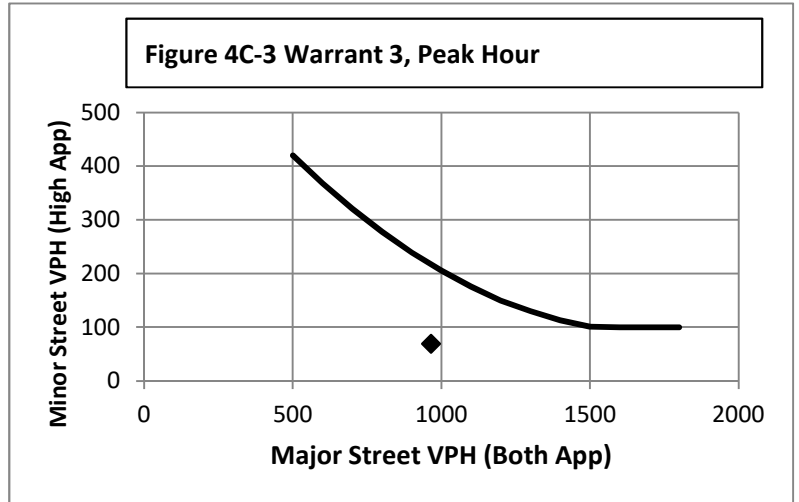
Manually Set To:

Condition justifying use of warrant:

Criteria		Met?
Delay on Minor Approach	4	No
Volume on Minor Approach	100	
Total Entering Volume (veh/h)	800	

Manually Set Peak Hour?

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
16:00	965	69



Warrant 4: Pedestrian Volume

100%

Warrant Evaluated? No

Warrant Satisfied? N/A

Manually Set To:

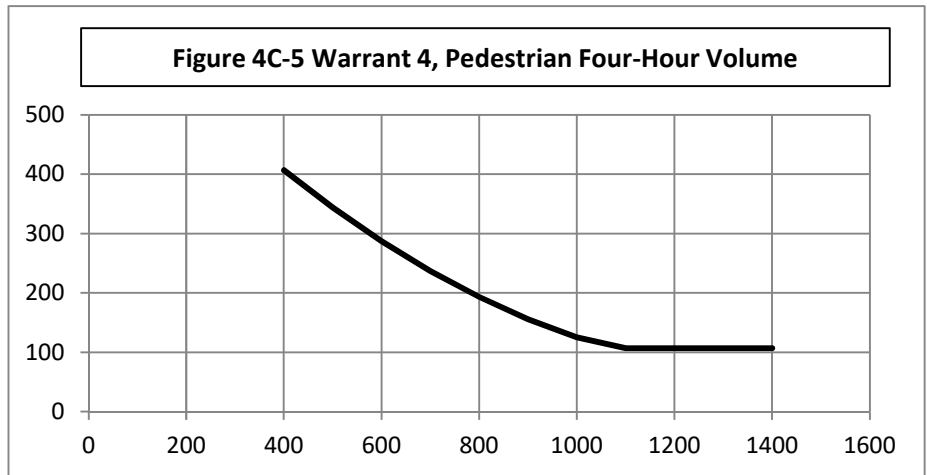
Criterion A: Four Hour

Hour (Start)	Pedestrian Volume	Major Road Vol.
		0
		0
		0
		0

Manually Set Major Rd Vol?

Avg. walk speed less than 3.5 ft/s?

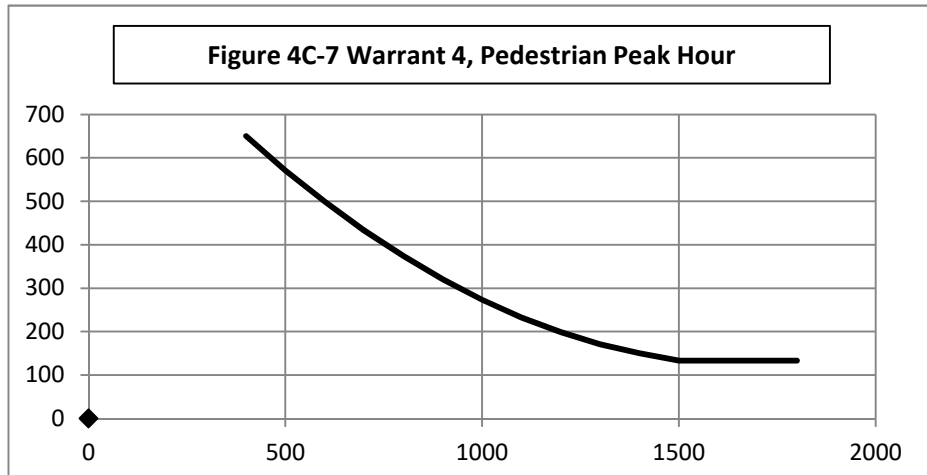
Criterion A Satisfied?



Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
0:00	0	0

Criterion B Satisfied?



Warrant 5: School Crossing

100%

Warrant Evaluated? No

Warrant Satisfied? N/A

Manually Set To:

Criteria		Fulfilled?
1	There are a MINIMUM of 20 school children during the highest crossing hour.	Yes
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	Yes
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	Yes

Warrant 6: Coordinated Signal System

100%

Warrant Evaluated? No

Warrant Satisfied? N/A

Manually Set To:

Criteria		Fulfilled?
1	Signal spacing > 1000 ft	Yes
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	Yes
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	Yes

Warrant 7: Crash Experience

100%

Warrant Evaluated? Yes

Warrant Satisfied? No

Manually Set To:

Criteria		Met?	Fulfilled?
1	Adequate trial of other remedial measures has failed to reduce crash frequency. Measures Tried:		No
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.	# of crashes per 12 months 3	No
3	Warrant 1, Condition A (80%)	No	No
	Warrant 1, Condition B (80%)	No	
	Warrant 4, Criterion A (80%)	No	
	Warrant 4, Criterion B (80%)	No	

Warrant 8: Roadway Network

100%

Warrant Evaluated? No

Warrant Satisfied? N/A

Manually Set To:

Criteria		Met?	Fulfilled?
1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour	1034	Yes
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.		No
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)		Yes
	Hour		
	Volume		

Characteristics of Major Routes - Select yes if all intersecting routes have characteristic				Fulfilled?
1	Part of the road or highway system that serves as the principal roadway network for through traffic flow			Yes
2	Rural or suburban highway outside of, entering, or traversing a city			Yes
3	Appears as a major route on an official plan			Yes

Warrant 9: Intersection Near a Grade Crossing

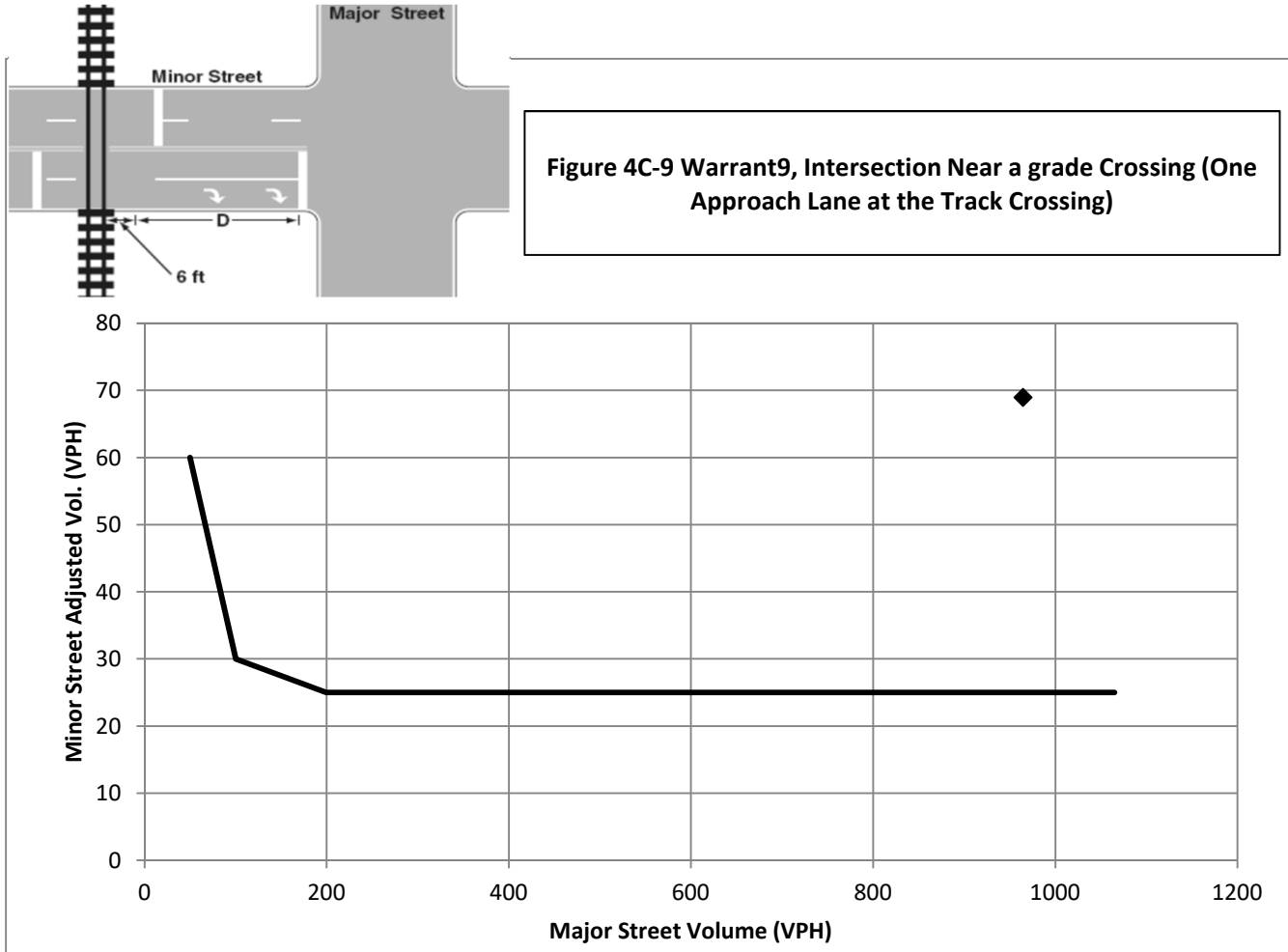
100%

Warrant Evaluated? No

Warrant Satisfied? N/A

Manually Set To:

Adjustment Factors			Manually Set Peak Hour?				
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
				16:00	965	69	69



Conclusions/Comments:

Note: Cell AD21 corrected

Updated: 7/10/2015