

final report

October 25, 2018

Traffic Impact Study

Thornton
Old Henry Road at James Thornton Way
Louisville, KY

RECEIVED

DEC 14 2018

PLANNING &
DESIGN SERVICES

Prepared for

Louisville Metro Planning Commission
Kentucky Transportation Cabinet

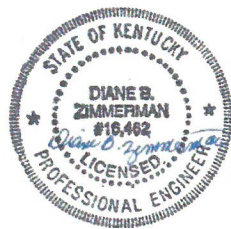


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INTRODUCTION

The development plan for two tracts on James Thornton Way in Louisville, KY shows a hotel, two restaurants, and a commercial building. These tracts were previously approved for office buildings. **Figure 1** displays a map of the site. Access to the buildings will be from entrances on James Thornton Way. The purpose of this study is to examine the traffic impacts of the development upon the adjacent highway system. For this study, the impact area was defined to be the intersections of Old Henry Road with James Thornton Way/High Wickham and Old Henry Road at Bush Farm Road.



Figure 1. Site Map

EXISTING CONDITIONS

Old Henry Road (KY 3084) is maintained by the Kentucky Transportation Cabinet with an estimated 2018 ADT of 21,100 vehicles per day between Terra Crossing Boulevard and High Wickham Place, as estimated from a Louisville Metro 2017 count. The road has four lanes with twelve-foot lanes with eight-foot paved shoulders and a 16-foot median. The posted speed limit is 35 mph. There are sidewalks where development has occurred. The intersection with Bush Farm Road is controlled with a traffic signal. There are left turn lanes at each intersection.

Peak hour traffic counts for the intersections were obtained on September 26, 2018. The a.m. peak hour is 7:45 to 8:45 and the p.m. peak hour is 4:45 to 5:45. **Figure 2** illustrates the existing a.m. and p.m. peak hour traffic volumes. The Appendix contains the full count data for each intersection.

the trips generated by this development and distributed throughout the road network during the peak hours. **Figure 6** displays the individual turning movements for the peak hours when the development is completed.

Table 1. Peak Hour Trips Generated by Site

Land Use	A.M. Peak Hour			P.M. Peak Hour			
	Trips	In	Out	Trips	In	Out	Pass-by
Business Hotel (110 rooms)	43	18	25	35	19	16	
High Turnover Sit-Down Restaurant (10,575 sf)	105	58	47	103	64	39	44
Shopping Center (11,520 sf)	158	98	60	110	53	57	25
TOTAL	306	174	132	248	136	112	

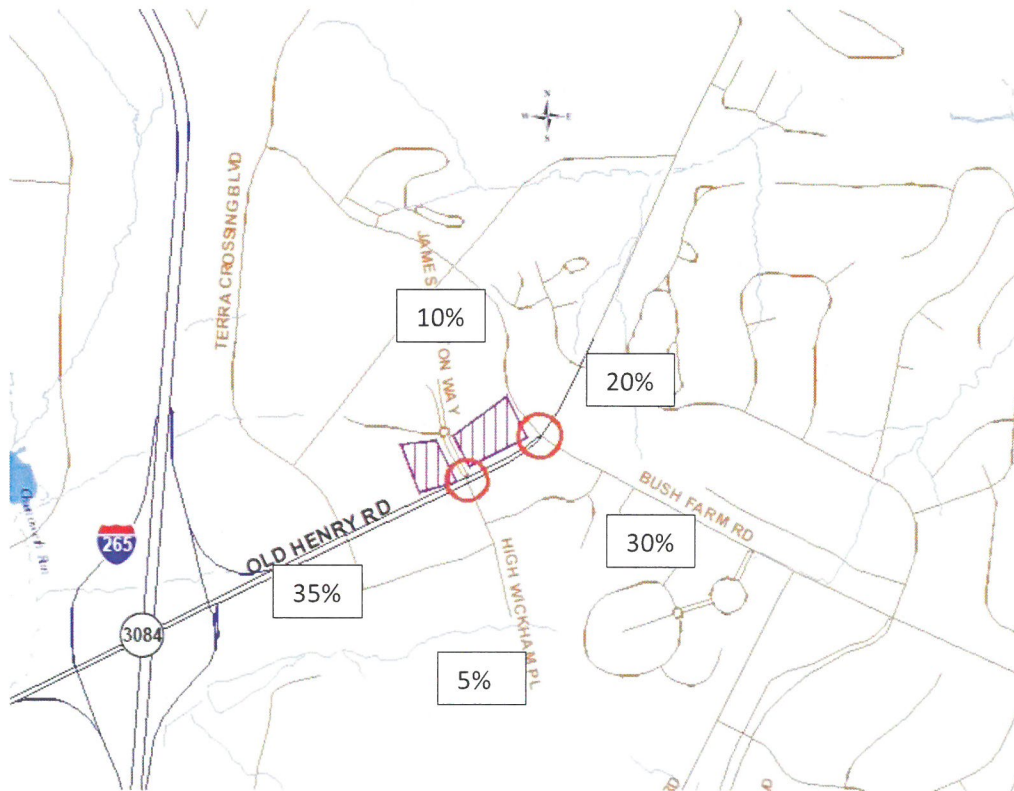


Figure 4. Trip Distribution Percentages

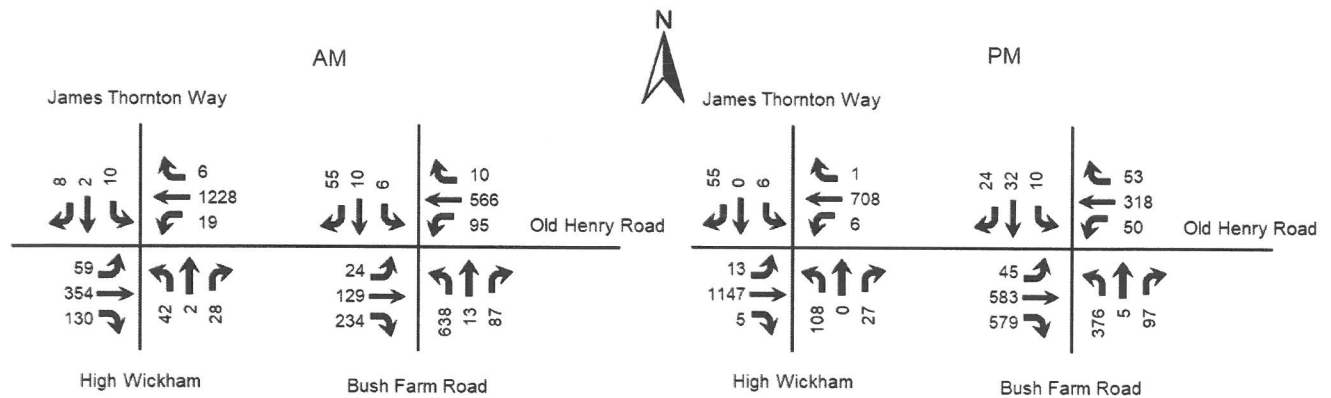


Figure 2. Existing Peak Hour Volumes

FUTURE CONDITIONS

The project completion date is 2022. An annual growth rate of 3.5 percent was applied to all 2018 volumes. This was determined from the Aiken Road and Johnson Road Vicinity Traffic Impact Study dated February 21, 2018. The 2025 Build volumes in that study included all approved developments in the vicinity of the Old Henry Road. **Figure 3** displays the 2022 No Build peak hour volumes.

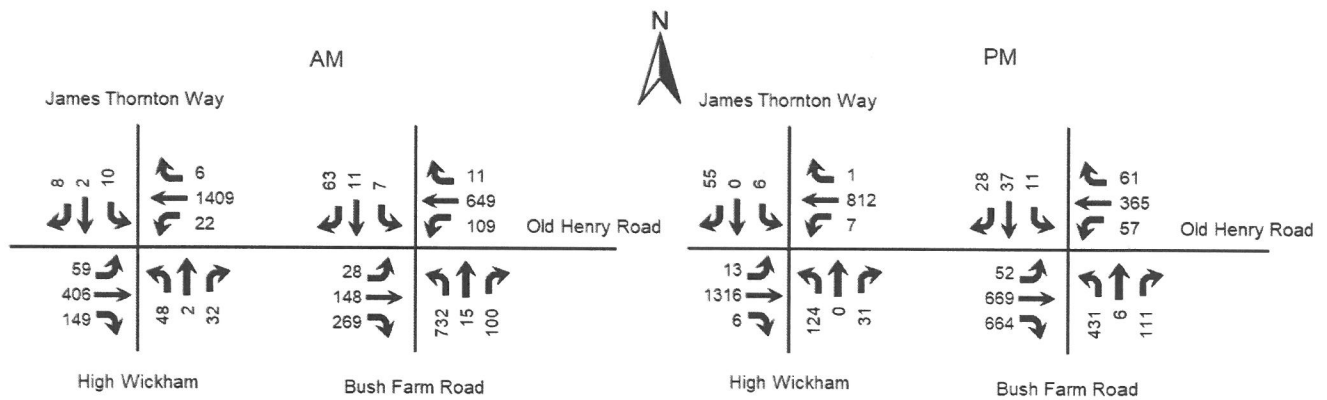


Figure 3. 2022 No Build Peak Hour Volumes

TRIP GENERATION

The Institute of Transportation Engineers Trip Generation Manual, 10th Edition contains trip generation rates for a wide range of developments. The land uses of “Business Hotel (312)”, “High Turnover Sit-Down Restaurant (931)” and “Shopping Center (820)” were reviewed and determined to be the best match. The trip generation results are listed in **Table 1**. The trips were assigned to the highway network with the percentages shown in **Figure 4**. **Figure 5** shows

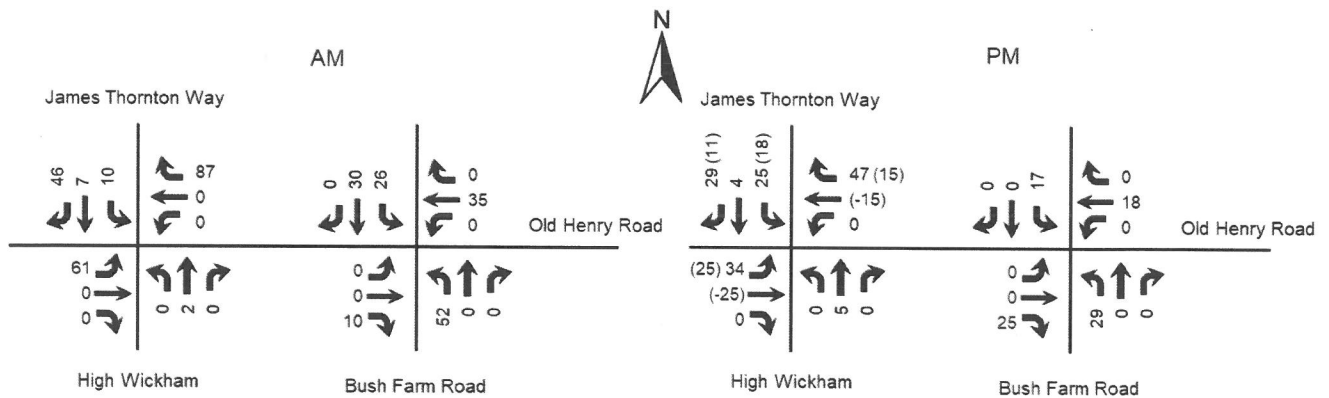


Figure 5. Peak Hour Trips Generated by Site

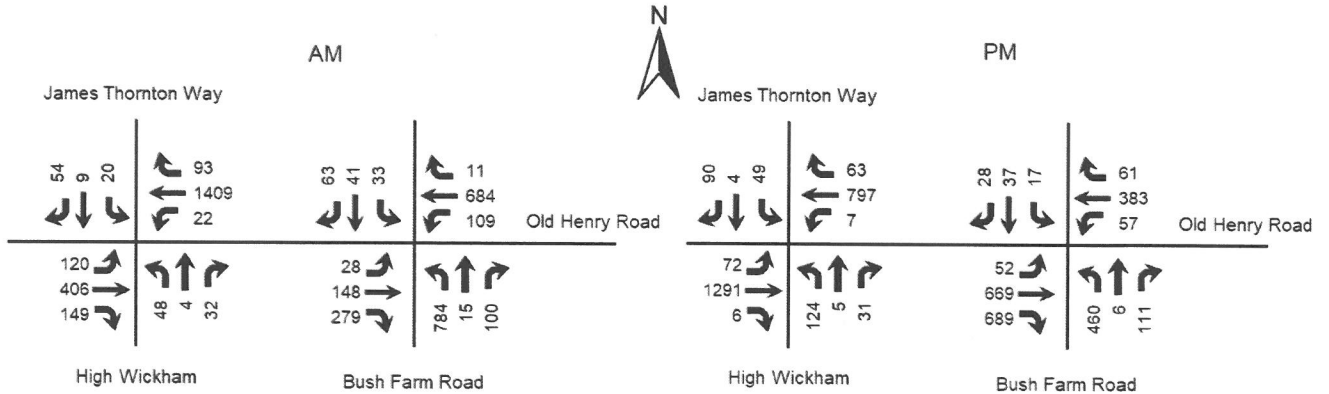


Figure 6. Build Peak Hour Volumes

ANALYSIS

The qualitative measure of operation for a roadway facility or intersection is evaluated by assigning a “Level of Service”. Level of Service is a ranking scale from A through F, “A” is the best operating condition and “F” is the worst. Level of Service results depend upon the facility that is analyzed. In this case, the Level of Service is based upon the total delay experienced at an intersection.

To evaluate the impact of the proposed development, the vehicle delays at the intersections were determined using procedures detailed in the Highway Capacity Manual, 6th edition. Future delays and Level of Service were determined for the intersections using the HCS Streets (version 7.6) software. The delays and Level of Service are summarized in **Table 2**.

Table 2. Peak Hour Level of Service

Approach	A.M.			P.M.		
	2018 Existing	2022 No Build	2022 Build	2018 Existing	2022 No Build	2022 Build
Old Henry Road at High Wickham/James Thornton						
Old Henry Road Eastbound	B 12.8	B 14.5	C 17.9	A 9.5	A 10.0	B 10.8
Old Henry Road Westbound	A 8.5	A 8.8	A 8.8	B 13.0	B 13.3	B 13.1
High Wickham Place Northbound	C 20.4	D 25.1	F 59.7	F 110.1	F 275.7	F 440.7
James Thornton Way Southbound	D 26.8	D 33.8	D 34.8	B 13.0	B 14.1	D 28.8
Old Henry Road at Bush Farm Road	C 34.0	C 28.9	D 44.5	B 16.3	B 19.8	C 21.2
Old Henry Road Eastbound	B 16.3	B 18.9	B 18.7	B 15.7	B 19.0	B 19.1
Old Henry Road Westbound	B 19.3	B 19.1	B 19.0	B 14.1	B 15.4	B 15.3
Bush Farm Road Northbound	E 61.3	D 45.7	F 87.1	B 20.0	C 26.1	C 31.5
Bush Farm Road Southbound	B 12.3	A 7.8	A 8.5	B 13.5	B 14.2	B 15.0

Key: Level of Service, Delay in seconds per vehicle

The intersection of James Thornton Way was evaluated for a right turn lane using the Kentucky Transportation Cabinet [Highway Design Guidance Manual](#) dated March, 2017. Using the volumes in Figure 6, a turn lanes should be provided at the intersection. Old Henry Road appears to have been constructed for a right turn lane, so this is a matter of striping.

As development progress along Old Henry Road, a traffic signal will be installed at the intersection of Terra Crossing Boulevard. This signal will provide an alternative for drivers making a left-turn onto Old Henry Road. Additionally, a dual left turn lane has been proposed to reduced the delays on the northbound approach of Bush Farm Road.

CONCLUSIONS

Based upon the volume of traffic generated by the development and the amount of traffic forecasted for the year 2022, there will be an impact to the existing highway network. The striping of Old Henry Road should be modified to provide a right turn lane at James Thornton Way.

APPENDIX

Thornton Commercial
Traffic Impact Study

Traffic Counts

Jefferson County, KY
Classified Turn Movement Count



Site 1 of 1
Old Henry Rd (West)
Old Henry Rd (East)
Bush Farm Rd (South)
Bush Farm Rd (North)

41 Peabody Street, Nashville, TN 37210
1 (615) 431-6750
1 (800) 615-3765

Lat/Long
38.274131°, -85.490549°

Date
Wednesday 26 September 2018

Weather
Isolated T-Storms
Temp: 31°C

	Eastbound					Westbound					Northbound					Southbound					Int
	Old Henry Rd (West)					Old Henry Rd (East)					Bush Farm Rd (South)					Bush Farm Rd (North)					
	U-Turn	Left	Thru	Right	App	U-Turn	Left	Thru	Right	App	U-Turn	Left	Thru	Right	App	U-Turn	Left	Thru	Right	App	
0700 - 0715	0	7	15	36	58	0	18	170	0	188	0	158	1	10	169	0	0	2	16	18	433
0715 - 0730	0	3	18	51	72	0	33	168	1	202	0	167	4	12	183	0	0	1	13	14	471
0730 - 0745	0	2	12	15	29	0	28	147	1	176	0	174	4	19	197	0	1	1	16	18	420
0745 - 0800	0	3	21	45	69	0	31	140	5	176	0	166	3	34	203	0	1	1	15	17	465
0800 - 0815	0	7	40	69	116	0	23	155	3	181	0	152	4	23	179	0	1	3	16	20	496
0815 - 0830	0	4	36	56	96	0	15	145	1	161	0	165	3	15	183	0	3	2	12	17	457
0830 - 0845	0	10	32	64	106	0	26	126	1	153	0	155	3	15	173	0	1	4	12	17	449
0845 - 0900	1	4	40	91	136	0	25	111	2	138	0	147	2	22	171	0	0	1	15	16	461
1600 - 1615	0	10	109	126	245	0	23	77	1	101	0	99	1	21	121	0	0	1	9	10	477
1615 - 1630	0	14	127	115	256	0	23	76	1	100	0	94	0	18	112	0	4	7	4	15	483
1630 - 1645	0	12	135	131	278	0	25	71	2	98	0	73	2	16	91	0	2	1	5	8	475
1645 - 1700	0	10	135	143	288	0	24	76	6	106	0	73	0	20	93	0	1	14	6	21	508
1700 - 1715	0	7	134	136	277	0	2	68	30	100	0	102	2	30	134	0	2	4	8	14	525
1715 - 1730	1	12	159	171	343	0	5	93	17	115	0	101	0	27	128	0	2	9	7	18	604
1730 - 1745	0	15	155	129	299	0	19	81	0	100	0	100	3	20	123	0	5	5	3	13	535
1745 - 1800	0	14	135	117	266	0	21	85	1	107	0	85	1	22	108	0	0	4	6	10	491
Grand Total	2	134	1303	1495	2934	0	341	1789	72	2202	0	2011	33	324	2368	0	23	60	163	246	7750
Cars (%)	100.00	96.27	98.54	97.99	98.16	0.00	97.07	98.94	95.83	98.55	0.00	98.46	90.91	97.84	98.27	0.00	82.61	91.67	96.32	93.90	
Trucks (%)	0.00	3.73	1.46	2.01	1.84	0.00	2.93	1.06	4.17	1.45	0.00	1.54	9.09	2.16	1.73	0.00	17.39	8.33	3.68	6.10	
P/Cycles (%)	0.00	0.00	0.00	0.07	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

0745 - 0800	0	3	21	45	69	0	31	140	5	176	0	166	3	34	203	0	1	1	15	17	465
0800 - 0815	0	7	40	69	116	0	23	155	3	181	0	152	4	23	179	0	1	3	16	20	496
0815 - 0830	0	4	36	56	96	0	15	145	1	161	0	165	3	15	183	0	3	2	12	17	457
0830 - 0845	0	10	32	64	106	0	26	126	1	153	0	155	3	15	173	0	1	4	12	17	449
AM Peak	0	24	129	234	387	0	95	566	10	671	0	638	13	87	738	0	6	10	55	71	1867
1645 - 1700	0	10	135	143	288	0	24	76	6	106	0	73	0	20	93	0	1	14	6	21	508
1700 - 1715	0	7	134	136	277	0	2	68	30	100	0	102	2	30	134	0	2	4	8	14	525
1715 - 1730	1	12	159	171	343	0	5	93	17	115	0	101	0	27	128	0	2	9	7	18	604
1730 - 1745	0	15	155	129	299	0	19	81	0	100	0	100	3	20	123	0	5	5	3	13	535
PM Peak	1	44	583	579	1207	0	50	318	53	421	0	376	5	97	478	0	10	32	24	66	2172

18 ZONE 1055

Diane B. Zimmerman
Traffic Engineering, LLC

Counted by: Andrew Zimmerman
Crash at Terra Crossing at blocked 7:45

File Name : Thornton Way
Site Code : 00000033
Start Date : 9/26/2018
Page No : 1

Groups Printed- Unshifted

Start Time	James Thornton Way From North				Old Henry Rd From East				High Wickham From South				Old Henry Rd From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
07:00 AM	0	0	2	2	2	348	1	351	6	0	0	6	9	61	12	82	441
07:15 AM	0	0	2	2	4	335	1	340	16	0	0	16	10	72	16	98	456
07:30 AM	6	1	2	9	5	334	2	341	27	0	20	47	0	0	0	0	397
07:45 AM	9	2	1	12	5	310	2	317	9	2	22	33	10	51	11	72	434
Total	15	3	7	25	16	1327	6	1349	58	2	42	102	29	184	39	252	1728
08:00 AM	0	0	3	3	0	320	0	320	5	0	0	5	20	108	46	174	502
08:15 AM	0	0	1	1	5	314	2	321	8	0	2	10	10	97	49	156	488
08:30 AM	1	0	3	4	9	284	2	295	20	0	4	24	19	98	24	141	464
08:45 AM	0	1	4	5	8	260	1	269	9	0	3	12	19	140	37	196	482
Total	1	1	11	13	22	1178	5	1205	42	0	9	51	68	443	156	667	1936
Grand Total	16	4	18	38	38	2505	11	2554	100	2	51	153	97	627	195	919	3664
Apprch %	42.1	10.5	47.4		1.5	98.1	0.4		65.4	1.3	33.3		10.6	68.2	21.2		
Total %	0.4	0.1	0.5	1	1	68.4	0.3	69.7	2.7	0.1	1.4	4.2	2.6	17.1	5.3	25.1	

Start Time	James Thornton Way From North				Old Henry Rd From East				High Wickham From South				Old Henry Rd From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 07:45 AM to 08:30 AM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 07:45 AM																	
07:45 AM	9	2	1	12	5	310	2	317	9	2	22	33	10	51	11	72	434
08:00 AM	0	0	3	3	0	320	0	320	5	0	0	5	20	108	46	174	502
08:15 AM	0	0	1	1	5	314	2	321	8	0	2	10	10	97	49	156	488
08:30 AM	1	0	3	4	9	284	2	295	20	0	4	24	19	98	24	141	464
Total Volume	10	2	8	20	19	1228	6	1253	42	2	28	72	59	354	130	543	1888
% App. Total	50	10	40		1.5	98	0.5		58.3	2.8	38.9		10.9	65.2	23.9		
PHF	.278	.250	.667	.417	.528	.959	.750	.976	.525	.250	.318	.545	.738	.819	.663	.780	.940

Groups Printed- Unshifted

Start Time	James Thornton Way From North				Old Henry Rd From East				High Wickham PI From South				Old Henry Road From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
04:00 PM	1	0	11	12	3	183	0	186	14	0	4	18	1	243	6	250	466
04:15 PM	0	0	3	3	0	175	0	175	8	0	1	9	2	238	4	244	431
04:30 PM	2	0	7	9	2	148	0	150	23	0	5	28	2	266	5	273	460
04:45 PM	1	0	5	6	2	161	0	163	17	0	6	23	0	277	2	279	471
Total	4	0	26	30	7	667	0	674	62	0	16	78	5	1024	17	1046	1828
05:00 PM	0	0	22	22	1	167	1	169	35	0	12	47	1	268	1	270	508
05:15 PM	4	0	9	13	3	198	0	201	29	0	6	35	11	330	2	343	592
05:30 PM	1	0	14	15	0	182	0	182	27	0	3	30	1	272	0	273	500
05:45 PM	0	0	5	5	0	171	0	171	22	0	6	28	0	258	2	260	464
Total	5	0	50	55	4	718	1	723	113	0	27	140	13	1128	5	1146	2054
Grand Total	9	0	76	85	11	1385	1	1397	175	0	43	218	18	2152	22	2192	3892
Apprch %	10.6	0	89.4		0.8	99.1	0.1		80.3	0	19.7		0.8	98.2	1		
Total %	0.2	0	2	2.2	0.3	35.6	0	35.9	4.5	0	1.1	5.6	0.5	55.3	0.6	56.3	

Start Time	James Thornton Way From North				Old Henry Road From East				High Wickham PI From South				Old Henry Road From West				Int. Total
	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	1	0	5	6	2	161	0	163	17	0	6	23	0	277	2	279	471
05:00 PM	0	0	22	22	1	167	1	169	35	0	12	47	1	268	1	270	508
05:15 PM	4	0	9	13	3	198	0	201	29	0	6	35	11	330	2	343	592
05:30 PM	1	0	14	15	0	182	0	182	27	0	3	30	1	272	0	273	500
Total Volume	6	0	50	56	6	708	1	715	108	0	27	135	13	1147	5	1165	2071
% App. Total	10.7	0	89.3		0.8	99	0.1		80	0	20		1.1	98.5	0.4		
PHF	.375	.000	.568	.636	.500	.894	.250	.889	.771	.000	.563	.718	.295	.869	.625	.849	.875

18 70NF 105 E

HCS Reports

HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Old Henry at High Wickham							
Agency/Co.	Diane B Zimmerman Traffic							Jurisdiction								
Date Performed	10/24/18							East/West Street	Old Henry Road							
Analysis Year	2018							North/South Street	High Wickham							
Time Analyzed	AM Peak							Peak Hour Factor	0.94							
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25							
Project Description	Thorntons															
Lanes																
<p>Major Street: East-West</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	0		1	1	0		1	1	0
Configuration		L	T	TR		L	T	TR		L		TR		L		TR
Volume (veh/h)	0	59	354	130	0	19	1228	6		42	2	28		10	2	8
Percent Heavy Vehicles (%)	3	2			3	2				2	2	2		2	2	2
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Left + Thru								1							
Critical and Follow-up Headways																
Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.14				4.14				7.54	6.54	6.94		7.54	6.54	6.94
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.22				2.22				3.52	4.02	3.32		3.52	4.02	3.32
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)		63				20				45		32		11		11
Capacity, c (veh/h)		523				1047				213		551		126		301
v/c Ratio		0.12				0.02				0.21		0.06		0.08		0.04
95% Queue Length, Q ₉₅ (veh)		0.4				0.1				0.8		0.2		0.3		0.1
Control Delay (s/veh)		12.8				8.5				26.4		11.9		36.2		17.4
Level of Service (LOS)		B				A				D		B		E		C
Approach Delay (s/veh)	1.4				0.1				20.4				26.8			
Approach LOS									C				D			

HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Old Henry at High Wickham							
Agency/Co.	Diane B Zimmerman Traffic							Jurisdiction								
Date Performed	10/24/18							East/West Street	Old Henry Road							
Analysis Year	2022							North/South Street	High Wickham							
Time Analyzed	AM Peak No Build							Peak Hour Factor	0.94							
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25							
Project Description	Thomtons															
Lanes																
<p>Major Street: East-West</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	0		1	1	0		1	1	0
Configuration		L	T	TR		L	T	TR		L		TR		L		TR
Volume (veh/h)	0	59	406	149	0	22	1409	6		48	2	32		10	2	8
Percent Heavy Vehicles (%)	3	2			3	2				2	2	2		2	2	2
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Left + Thru								1							
Critical and Follow-up Headways																
Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.14				4.14				7.54	6.54	6.94		7.54	6.54	6.94
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.22				2.22				3.52	4.02	3.32		3.52	4.02	3.32
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)		63				23				51		36		11		11
Capacity, c (veh/h)		441				981				175		495		95		252
v/c Ratio		0.14				0.02				0.29		0.07		0.11		0.04
95% Queue Length, Q ₉₅ (veh)		0.5				0.1				1.1		0.2		0.4		0.1
Control Delay (s/veh)		14.5				8.8				33.8		12.8		47.6		19.9
Level of Service (LOS)		B				A				D		B		E		C
Approach Delay (s/veh)	1.4				0.1				25.1				33.8			
Approach LOS									D				D			

HCS7 Two-Way Stop-Control Report																	
General Information								Site Information									
Analyst	DBZ							Intersection	Old Henry at High Wickham								
Agency/Co.	Diane B Zimmerman Traffic							Jurisdiction									
Date Performed	10/24/18							East/West Street	Old Henry Road								
Analysis Year	2022							North/South Street	High Wickham								
Time Analyzed	AM PeakBuild							Peak Hour Factor	0.94								
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25								
Project Description	Thorntons																
Lanes																	
<p style="text-align: center;">Major Street East-West</p>																	
Vehicle Volumes and Adjustments																	
Approach	Eastbound				Westbound				Northbound				Southbound				
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Priority	1U	1	2	3	4U	4	5	6			7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	0			1	1	0		1	1	0
Configuration		L	T	TR		L	T	TR			L		TR		L		TR
Volume (veh/h)	0	120	406	149	0	22	1409	93			48	4	32		20	9	54
Percent Heavy Vehicles (%)	3	2			3	2					2	2	2		2	2	2
Proportion Time Blocked																	
Percent Grade (%)											0					0	
Right Turn Channelized																	
Median Type Storage	Left + Thru								1								
Critical and Follow-up Headways																	
Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9	
Critical Headway (sec)		4.14				4.14				7.54	6.54	6.94		7.54	6.54	6.94	
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3	
Follow-Up Headway (sec)		2.22				2.22				3.52	4.02	3.32		3.52	4.02	3.32	
Delay, Queue Length, and Level of Service																	
Flow Rate, v (veh/h)		128				23				51		38		21		67	
Capacity, c (veh/h)		406				981				96		159		81		244	
v/c Ratio		0.31				0.02				0.53		0.24		0.26		0.27	
95% Queue Length, Q ₉₅ (veh)		1.3				0.1				2.4		0.9		1.0		1.1	
Control Delay (s/veh)		17.9				8.8				78.6		34.6		64.9		25.2	
Level of Service (LOS)		C				A				F		D		F		D	
Approach Delay (s/veh)	3.2				0.1				59.7				34.8				
Approach LOS	C				A				F				D				

HCS7 Two-Way Stop-Control Report																	
General Information								Site Information									
Analyst	DBZ							Intersection	Old Henry at High Wickham								
Agency/Co.	Diane B Zimmerman Traffic							Jurisdiction									
Date Performed	10/24/18							East/West Street	Old Henry Road								
Analysis Year	2018							North/South Street	High Wickham								
Time Analyzed	PM Peak							Peak Hour Factor	0.88								
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25								
Project Description	Thorntons																
Lanes																	
<p>Major Street: East-West</p>																	
Vehicle Volumes and Adjustments																	
Approach	Eastbound				Westbound				Northbound				Southbound				
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Priority	1U	1	2	3	4U	4	5	6			7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	0			1	1	0		1	1	0
Configuration		L	T	TR		L	T	TR			L		TR		L		TR
Volume (veh/h)	0	13	1147	5	0	6	708	1			108	0	27		6	0	50
Percent Heavy Vehicles (%)	3	2			3	2					2	2	2		2	2	2
Proportion Time Blocked																	
Percent Grade (%)											0					0	
Right Turn Channelized																	
Median Type Storage	Left + Thru								1								
Critical and Follow-up Headways																	
Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9	
Critical Headway (sec)		4.14				4.14				7.54	6.54	6.94		7.54	6.54	6.94	
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3	
Follow-Up Headway (sec)		2.22				2.22				3.52	4.02	3.32		3.52	4.02	3.32	
Delay, Queue Length, and Level of Service																	
Flow Rate, v (veh/h)		15				7				123		31		7		57	
Capacity, c (veh/h)		815				524				125		409		193		597	
v/c Ratio		0.02				0.01				0.98		0.08		0.04		0.10	
95% Queue Length, Q ₉₅ (veh)		0.1				0.0				6.6		0.2		0.1		0.3	
Control Delay (s/veh)		9.5				12.0				141.5		14.5		24.4		11.7	
Level of Service (LOS)		A				B				F		B		C		B	
Approach Delay (s/veh)	0.1				0.1				116.1				13.0				
Approach LOS	A				B				F				B				

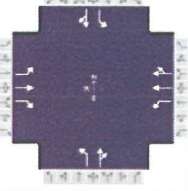
HCS7 Two-Way Stop-Control Report																
General Information								Site Information								
Analyst	DBZ							Intersection	Old Henry at High Wickham							
Agency/Co.	Diane B Zimmerman Traffic							Jurisdiction								
Date Performed	10/24/18							East/West Street	Old Henry Road							
Analysis Year	2022							North/South Street	High Wickham							
Time Analyzed	PM Peak No Build							Peak Hour Factor	0.88							
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25							
Project Description	Thorntons															
Lanes																
<p style="text-align: center;">Major Street East-West</p>																
Vehicle Volumes and Adjustments																
Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority	1U	1	2	3	4U	4	5	6		7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	0		1	1	0		1	1	0
Configuration		L	T	TR		L	T	TR		L		TR		L		TR
Volume (veh/h)	0	13	1316	6	0	7	812	1		124	0	31		6	0	50
Percent Heavy Vehicles (%)	3	2			3	2				2	2	2		2	2	2
Proportion Time Blocked																
Percent Grade (%)									0				0			
Right Turn Channelized																
Median Type Storage	Left + Thru								1							
Critical and Follow-up Headways																
Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9
Critical Headway (sec)		4.14				4.14				7.54	6.54	6.94		7.54	6.54	6.94
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3
Follow-Up Headway (sec)		2.22				2.22				3.52	4.02	3.32		3.52	4.02	3.32
Delay, Queue Length, and Level of Service																
Flow Rate, v (veh/h)		15				8				141		35		7		57
Capacity, c (veh/h)		735				442				96		353		156		547
v/c Ratio		0.02				0.02				1.48		0.10		0.04		0.10
95% Queue Length, Q ₉₅ (veh)		0.1				0.1				10.6		0.3		0.1		0.3
Control Delay (s/veh)		10.0				13.3				340.6		16.3		29.1		12.3
Level of Service (LOS)		A				B				F		C		D		B
Approach Delay (s/veh)	0.1				0.1				275.7				14.1			
Approach LOS									F				B			

HCS7 Two-Way Stop-Control Report																	
General Information								Site Information									
Analyst	DBZ							Intersection	Old Henry at High Wickham								
Agency/Co.	Diane B Zimmerman Traffic							Jurisdiction									
Date Performed	10/24/18							East/West Street	Old Henry Road								
Analysis Year	2022							North/South Street	High Wickham								
Time Analyzed	PM Peak Build							Peak Hour Factor	0.88								
Intersection Orientation	East-West							Analysis Time Period (hrs)	0.25								
Project Description	Thorntons																
Lanes																	
<p style="text-align: center;">Major Street East-West</p>																	
Vehicle Volumes and Adjustments																	
Approach	Eastbound				Westbound				Northbound				Southbound				
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R	
Priority	1U	1	2	3	4U	4	5	6			7	8	9		10	11	12
Number of Lanes	0	1	2	0	0	1	2	0			1	1	0		1	1	0
Configuration		L	T	TR		L	T	TR			L		TR		L		TR
Volume (veh/h)	0	72	1291	6	0	7	797	63			124	5	31		49	4	90
Percent Heavy Vehicles (%)	3	2			3	2					2	2	2		2	2	2
Proportion Time Blocked																	
Percent Grade (%)											0					0	
Right Turn Channelized																	
Median Type Storage					Left + Thru									1			
Critical and Follow-up Headways																	
Base Critical Headway (sec)		4.1				4.1				7.5	6.5	6.9		7.5	6.5	6.9	
Critical Headway (sec)		4.14				4.14				7.54	6.54	6.94		7.54	6.54	6.94	
Base Follow-Up Headway (sec)		2.2				2.2				3.5	4.0	3.3		3.5	4.0	3.3	
Follow-Up Headway (sec)		2.22				2.22				3.52	4.02	3.32		3.52	4.02	3.32	
Delay, Queue Length, and Level of Service																	
Flow Rate, v (veh/h)		82				8				141		41		56		107	
Capacity, c (veh/h)		702				453				73		253		127		439	
v/c Ratio		0.12				0.02				1.94		0.16		0.44		0.24	
95% Queue Length, Q ₉₅ (veh)		0.4				0.1				12.7		0.6		1.9		0.9	
Control Delay (s/veh)		10.8				13.1				562.2		22.0		53.7		15.8	
Level of Service (LOS)		B				B				F		C		F		C	
Approach Delay (s/veh)		0.6				0.1				440.7				28.8			
Approach LOS		B				B				F				D			

HCS7 Signalized Intersection Results Summary

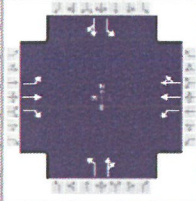
General Information				Intersection Information															
Agency	Diane B Zimmerman Traffic			Duration, h	0.25														
Analyst	DBZ	Analysis Date	Oct 25, 2018	Area Type	Other														
Jurisdiction		Time Period	AM Peak	PHF	0.94														
Urban Street	Old Henry Road	Analysis Year	2018	Analysis Period	1> 7:45														
Intersection	Bush Farm Road	File Name	Old Henry AM 2018.xus																
Project Description	Thorntons																		
Demand Information				EB			WB			NB			SB						
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R							
Demand (v), veh/h	24	129	234	95	566	10	638	13	87	6	10	55							
Signal Information																			
Cycle, s	70.2	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On	Green	28.0	30.0	0.0	0.0	0.0	0.0									
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.6	4.3	0.0	0.0	0.0	0.0									
				Red	3.0	1.3	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase			2		6		8		4										
Case Number			5.0		6.0		6.0		6.0										
Phase Duration, s			34.6		34.6		35.6		35.6										
Change Period, (Y+R c), s			6.6		6.6		5.6		5.6										
Max Allow Headway (MAH), s			3.2		3.2		3.3		3.3										
Queue Clearance Time (g s), s			25.1		22.4		33.0		5.2										
Green Extension Time (g e), s			2.8		2.8		0.0		2.1										
Phase Call Probability			1.00		1.00		1.00		1.00										
Max Out Probability			0.00		0.00		1.00		0.00										
Movement Group Results				EB			WB			NB			SB						
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R							
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14							
Adjusted Flow Rate (v), veh/h	33	176	319	101	613		679	106		6	69								
Adjusted Saturation Flow Rate (s), veh/h/ln	796	1811	1560	1180	1879		1332	1553		971	1495								
Queue Service Time (g s), s	2.7	4.5	10.9	4.4	20.4		29.0	3.0		0.3	2.0								
Cycle Queue Clearance Time (g c), s	23.1	4.5	10.9	8.9	20.4		31.0	3.0		3.2	2.0								
Green Ratio (g/C)	0.40	0.40	0.40	0.40	0.40		0.43	0.43		0.43	0.43								
Capacity (c), veh/h	189	724	624	498	751		653	663		476	638								
Volume-to-Capacity Ratio (X)	0.173	0.243	0.512	0.203	0.816		1.040	0.161		0.013	0.108								
Back of Queue (Q), ft/ln (90 th percentile)	23	79.6	150.9	51.6	292.5		643.8	44.3		3.3	29.2								
Back of Queue (Q), veh/ln (90 th percentile)	0.9	3.0	5.8	2.0	11.6		25.3	1.7		0.1	1.1								
Queue Storage Ratio (RQ) (90 th percentile)	0.13	0.14	0.26	0.69	0.19		1.29	0.09		0.01	0.05								
Uniform Delay (d 1), s/veh	29.1	14.0	15.9	17.0	18.8		22.9	12.4		13.4	12.1								
Incremental Delay (d 2), s/veh	0.2	0.1	0.2	0.1	0.8		46.1	0.0		0.0	0.0								
Initial Queue Delay (d 3), s/veh	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0								
Control Delay (d), s/veh	29.3	14.1	16.2	17.1	19.6		69.0	12.4		13.4	12.1								
Level of Service (LOS)	C	B	B	B	B		F	B		B	B								
Approach Delay, s/veh / LOS	16.3	B		19.3	B		61.3	E		12.3	B								
Intersection Delay, s/veh / LOS	34.0						C												
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS	1.90	B		1.90	B		1.90	B		2.09	B								
Bicycle LOS Score / LOS	1.17	A		1.67	B		1.78	B		0.61	A								

HCS7 Signalized Intersection Results Summary

HCS7 Signalized Intersection Results Summary															
General Information						Intersection Information									
Agency	Diane B Zimmerman Traffic					Duration, h	0.25								
Analyst	DBZ	Analysis Date	Oct 25, 2018			Area Type	Other								
Jurisdiction		Time Period	AM Peak			PHF	0.94								
Urban Street	Old Henry Road		Analysis Year	2022 No Build		Analysis Period	1> 7:45								
Intersection	Bush Farm Road		File Name	Old Henry AM 22 NB.xus											
Project Description	Thontrons														
Demand Information				EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R			
Demand (v), veh/h	28	148	269	109	649	11	732	15	100	7	11	63			
Signal Information															
Cycle, s	59.5	Reference Phase	2												
Offset, s	0	Reference Point	End												
Uncoordinated	Yes	Simult. Gap E/W	On	Green	17.3	30.0	0.0	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.6	4.3	0.0	0.0	0.0	0.0					
				Red	3.0	1.3	0.0	0.0	0.0	0.0					
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase			2			6			8			4			
Case Number			5.0			6.0			6.0			6.0			
Phase Duration, s			23.9			23.9			35.6			35.6			
Change Period, (Y+R c), s			6.6			6.6			5.6			5.6			
Max Allow Headway (MAH), s			3.2			3.2			3.3			3.3			
Queue Clearance Time (g s), s			14.3			11.7			33.0			4.8			
Green Extension Time (g e), s			3.0			3.0			0.0			2.5			
Phase Call Probability			1.00			1.00			1.00			1.00			
Max Out Probability			0.00			0.00			1.00			0.00			
Movement Group Results				EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R			
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14			
Adjusted Flow Rate (v), veh/h	33	175	319	116	352	350	779	122		7	79				
Adjusted Saturation Flow Rate (s), veh/h/ln	733	1811	1560	1180	1885	1874	1320	1553		957	1493				
Queue Service Time (g s), s	2.5	4.5	10.8	5.1	9.7	9.7	29.4	2.5		0.3	1.6				
Cycle Queue Clearance Time (g c), s	12.3	4.5	10.8	9.7	9.7	9.7	31.0	2.5		2.8	1.6				
Green Ratio (g/C)	0.29	0.29	0.29	0.29	0.29	0.29	0.50	0.50		0.50	0.50				
Capacity (c), veh/h	213	526	453	372	548	545	773	783		564	753				
Volume-to-Capacity Ratio (X)	0.156	0.333	0.704	0.311	0.643	0.643	1.008	0.156		0.013	0.105				
Back of Queue (Q), ft/ln (90 th percentile)	18.6	79.8	152.7	60.4	158.6	156.6	574.7	32.3		2.5	21				
Back of Queue (Q), veh/ln (90 th percentile)	0.7	3.0	5.9	2.3	6.3	6.3	22.6	1.2		0.1	0.8				
Queue Storage Ratio (RQ) (90 th percentile)	0.11	0.14	0.26	0.81	0.11	0.11	1.15	0.06		0.00	0.04				
Uniform Delay (d 1), s/veh	23.8	16.6	18.8	20.4	18.4	18.4	17.4	7.9		8.7	7.7				
Incremental Delay (d 2), s/veh	0.1	0.1	0.7	0.2	0.5	0.5	34.3	0.0		0.0	0.0				
Initial Queue Delay (d 3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0				
Control Delay (d), s/veh	23.9	16.7	19.6	20.6	18.9	18.9	51.6	8.0		8.7	7.7				
Level of Service (LOS)	C	B	B	C	B	B	F	A		A	A				
Approach Delay, s/veh / LOS	18.9	B		19.1	B		45.7	D		7.8	A				
Intersection Delay, s/veh / LOS	28.9						C								
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS	1.91	B		1.91	B		2.07	B		2.24	B				
Bicycle LOS Score / LOS	1.27	A		1.16	A		1.97	B		0.63	A				

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information			
Agency	Diane B Zimmerman Traffic			Duration, h	0.25		
Analyst	DBZ	Analysis Date	Oct 25, 2018	Area Type	Other		
Jurisdiction		Time Period	AM Peak	PHF	0.94		
Urban Street	Old Henry Road	Analysis Year	2022 Build	Analysis Period	1 > 7:45		
Intersection	Bush Farm Road	File Name	Old Henry AM 22 B.xus				
Project Description	Thorntons						



Demand Information	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Approach Movement												
Demand (v), veh/h	28	148	279	109	684	11	784	15	100	33	41	63

Signal Information											
Cycle, s	60.3	Reference Phase	2								
Offset, s	0	Reference Point	End								
Uncoordinated	Yes	Simult. Gap E/W	On	Green	18.1	30.0	0.0	0.0	0.0	0.0	0.0
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.6	4.3	0.0	0.0	0.0	0.0	0.0
				Red	3.0	1.3	0.0	0.0	0.0	0.0	0.0

Timer Results	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Assigned Phase		2		6		8		4
Case Number		5.0		6.0		6.0		6.0
Phase Duration, s		24.7		24.7		35.6		35.6
Change Period, (Y+R c), s		6.6		6.6		5.6		5.6
Max Allow Headway (MAH), s		3.2		3.2		3.4		3.4
Queue Clearance Time (g s), s		14.9		12.3		33.0		5.8
Green Extension Time (g e), s		3.1		3.1		0.0		3.1
Phase Call Probability		1.00		1.00		1.00		1.00
Max Out Probability		0.00		0.00		1.00		0.01

Movement Group Results	EB			WB			NB			SB		
	L	T	R	L	T	R	L	T	R	L	T	R
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14
Adjusted Flow Rate (v), veh/h	32	172	324	116	371	369	834	122		35	111	
Adjusted Saturation Flow Rate (s), veh/h/ln	708	1811	1560	1185	1885	1874	1282	1553		957	1553	
Queue Service Time (g s), s	2.5	4.4	11.0	5.1	10.3	10.3	28.7	2.6		1.3	2.3	
Cycle Queue Clearance Time (g c), s	12.9	4.4	11.0	9.6	10.3	10.3	31.0	2.6		3.8	2.3	
Green Ratio (g/C)	0.30	0.30	0.30	0.30	0.30	0.30	0.50	0.50		0.50	0.50	
Capacity (c), veh/h	210	544	469	387	566	563	729	772		554	772	
Volume-to-Capacity Ratio (X)	0.155	0.315	0.690	0.300	0.654	0.655	1.144	0.158		0.063	0.143	
Back of Queue (Q), ft/ln (90 th percentile)	18.5	77.7	154.8	60.2	166.6	164.6	908.3	33.9		12.7	31.6	
Back of Queue (Q), veh/ln (90 th percentile)	0.7	3.0	6.0	2.3	6.6	6.6	35.8	1.3		0.4	1.2	
Queue Storage Ratio (RQ) (90 th percentile)	0.11	0.13	0.26	0.80	0.11	0.11	1.82	0.07		0.02	0.06	
Uniform Delay (d 1), s/veh	24.0	16.3	18.6	20.0	18.4	18.4	18.2	8.3		9.3	8.2	
Incremental Delay (d 2), s/veh	0.1	0.1	0.7	0.2	0.5	0.5	80.5	0.0		0.0	0.0	
Initial Queue Delay (d 3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Control Delay (d), s/veh	24.2	16.4	19.3	20.2	18.9	18.9	98.7	8.3		9.3	8.2	
Level of Service (LOS)	C	B	B	C	B	B	F	A		A	A	
Approach Delay, s/veh / LOS	18.7		B	19.0		B	87.1		F	8.5		A
Intersection Delay, s/veh / LOS				44.5						D		

Multimodal Results	EB			WB			NB			SB		
Pedestrian LOS Score / LOS	1.91		B	1.91		B	2.07		B	2.24		B
Bicycle LOS Score / LOS	1.29		A	1.19		A	2.07		B	0.73		A

HCS7 Signalized Intersection Results Summary

General Information				Intersection Information															
Agency	Diane B Zimmerman Traffic			Duration, h	0.25														
Analyst	DBZ	Analysis Date	Oct 25, 2018	Area Type	Other														
Jurisdiction		Time Period	PM Peak	PHF	0.90														
Urban Street	Old Henry Road	Analysis Year	2018	Analysis Period	1 > 4:45														
Intersection	Bush Farm Road	File Name	Old Henry PM 2018.xus																
Project Description	Thornton's																		
Demand Information				EB			WB			NB			SB						
Approach Movement		L	T	R	L	T	R	L	T	R	L	T	R						
Demand (v), veh/h		45	583	579	50	318	53	376	5	97	10	32	24						
Signal Information																			
Cycle, s	63.1	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On	Green	27.9	23.0	0.0	0.0	0.0	0.0									
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.6	4.3	0.0	0.0	0.0	0.0									
				Red	3.0	1.3	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase			2		6		8		4										
Case Number			5.0		6.0		6.0		6.0										
Phase Duration, s			34.5		34.5		28.6		28.6										
Change Period, (Y+R _c), s			6.6		6.6		5.6		5.6										
Max Allow Headway (MAH), s			3.2		3.2		3.2		3.2										
Queue Clearance Time (g _s), s			23.4		22.2		22.2		5.5										
Green Extension Time (g _e), s			4.5		4.5		0.9		1.3										
Phase Call Probability			1.00		1.00		1.00		1.00										
Max Out Probability			0.01		0.01		0.10		0.00										
Movement Group Results				EB			WB			NB			SB						
Approach Movement		L	T	R	L	T	R	L	T	R	L	T	R						
Assigned Movement		5	2	12	1	6	16	3	8	18	7	4	14						
Adjusted Flow Rate (v), veh/h		47	608	604	56	412		418	113		11	62							
Adjusted Saturation Flow Rate (s), veh/h/ln		989	1900	1598	826	1823		1351	1610		1198	1736							
Queue Service Time (g _s), s		2.3	16.5	21.4	3.7	10.3		18.6	3.0		0.4	1.5							
Cycle Queue Clearance Time (g _c), s		12.4	16.5	21.4	20.2	10.3		20.2	3.0		3.5	1.5							
Green Ratio (g/C)		0.44	0.44	0.44	0.44	0.44		0.37	0.37		0.37	0.37							
Capacity (c), veh/h		392	840	706	264	806		574	587		492	633							
Volume-to-Capacity Ratio (X)		0.120	0.724	0.855	0.211	0.512		0.728	0.193		0.023	0.098							
Back of Queue (Q), ft/ln (90th percentile)		21.2	216.9	237.2	30.6	152.8		211	44.7		4.9	23.8							
Back of Queue (Q), veh/ln (90th percentile)		0.8	8.7	9.4	1.2	6.0		8.4	1.8		0.2	0.9							
Queue Storage Ratio (RQ) (90th percentile)		0.12	0.37	0.40	0.41	0.10		0.42	0.09		0.01	0.04							
Uniform Delay (d ₁), s/veh		17.1	14.4	15.8	22.7	12.7		19.9	13.7		14.9	13.2							
Incremental Delay (d ₂), s/veh		0.0	0.3	0.9	0.1	0.2		1.8	0.1		0.0	0.0							
Initial Queue Delay (d ₃), s/veh		0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0							
Control Delay (d), s/veh		17.2	14.8	16.6	22.8	12.9		21.7	13.7		14.9	13.2							
Level of Service (LOS)		B	B	B	C	B		C	B		B	B							
Approach Delay, s/veh / LOS		15.7		B	14.1		B	20.0		B	13.5		B						
Intersection Delay, s/veh / LOS		16.3						B											
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS		1.89		B	1.89		B	1.90		B	2.09		B						
Bicycle LOS Score / LOS		2.70		C	1.26		A	1.36		A	0.61		A						

HCS7 Signalized Intersection Results Summary																			
General Information							Intersection Information												
Agency	Diane B Zimmerman Traffic						Duration, h	0.25											
Analyst	DBZ	Analysis Date	Oct 25, 2018			Area Type	Other												
Jurisdiction		Time Period	PM Peak			PHF	0.90												
Urban Street	Old Henry Road		Analysis Year	2022 No Build		Analysis Period	1> 4:45												
Intersection	Bush Farm Road		File Name	Old Henry PM 2022 NB.xus															
Project Description	Thornton's																		
Demand Information				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Demand (v), veh/h				52	669	664	57	365	61	431	6	111	11	37	28				
Signal Information																			
Cycle, s	74.1	Reference Phase	2																
Offset, s	0	Reference Point	End																
Uncoordinated	Yes	Simult. Gap E/W	On	Green	32.2	29.8	0.0	0.0	0.0	0.0									
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.6	4.3	0.0	0.0	0.0	0.0									
				Red	3.0	1.3	0.0	0.0	0.0	0.0									
Timer Results				EBL		EBT		WBL		WBT		NBL		NBT		SBL		SBT	
Assigned Phase						2				6				8				4	
Case Number						5.0				6.0				6.0				6.0	
Phase Duration, s						38.8				38.8				35.4				35.4	
Change Period, (Y+R _c), s						6.6				6.6				5.6				5.6	
Max Allow Headway (MAH), s						3.2				3.2				3.2				3.2	
Queue Clearance Time (g _s), s						27.5				26.9				29.7				6.4	
Green Extension Time (g _e), s						4.7				4.7				0.1				1.5	
Phase Call Probability						1.00				1.00				1.00				1.00	
Max Out Probability						0.03				0.03				1.00				0.00	
Movement Group Results				EB			WB			NB			SB						
Approach Movement				L	T	R	L	T	R	L	T	R	L	T	R				
Assigned Movement				5	2	12	1	6	16	3	8	18	7	4	14				
Adjusted Flow Rate (v), veh/h				47	608	603	63	241	232	479	130		12	72					
Adjusted Saturation Flow Rate (s), veh/h/ln				935	1900	1598	826	1870	1777	1338	1610		1180	1736					
Queue Service Time (g _s), s				2.6	19.7	25.5	5.1	6.2	6.3	25.8	3.9		0.5	1.9					
Cycle Queue Clearance Time (g _c), s				8.9	19.7	25.5	24.9	6.2	6.3	27.7	3.9		4.4	1.9					
Green Ratio (g/C)				0.43	0.43	0.43	0.43	0.43	0.43	0.40	0.40		0.40	0.40					
Capacity (c), veh/h				424	824	693	235	811	771	600	647		509	697					
Volume-to-Capacity Ratio (X)				0.112	0.737	0.870	0.269	0.297	0.301	0.798	0.201		0.024	0.104					
Back of Queue (Q), ft/ln (90th percentile)				23.2	268	294	44	108.9	103.5	305.1	59.6		6.2	31.9					
Back of Queue (Q), veh/ln (90th percentile)				0.9	10.7	11.7	1.8	4.3	4.1	12.1	2.4		0.2	1.3					
Queue Storage Ratio (RQ) (90th percentile)				0.13	0.46	0.50	0.59	0.07	0.07	0.61	0.12		0.01	0.06					
Uniform Delay (d ₁), s/veh				16.5	17.5	19.1	27.8	13.6	13.7	22.5	14.4		15.9	13.9					
Incremental Delay (d ₂), s/veh				0.0	0.4	1.2	0.2	0.1	0.1	6.8	0.1		0.0	0.0					
Initial Queue Delay (d ₃), s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0					
Control Delay (d), s/veh				16.6	17.8	20.3	28.0	13.7	13.8	29.3	14.5		15.9	13.9					
Level of Service (LOS)				B	B	C	C	B	B	C	B		B	B					
Approach Delay, s/veh / LOS				19.0		B	15.4		B	26.1		C	14.2		B				
Intersection Delay, s/veh / LOS				19.8						B									
Multimodal Results				EB			WB			NB			SB						
Pedestrian LOS Score / LOS				1.90		B	1.90		B	2.09		B	2.26		B				
Bicycle LOS Score / LOS				3.03		C	0.93		A	1.49		A	0.63		A				

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HCS7 Signalized Intersection Results Summary

General Information				Intersection Information											
Agency	Diane B Zimmerman Traffic			Duration, h	0.25										
Analyst	DBZ	Analysis Date	Oct 25, 2018	Area Type	Other										
Jurisdiction		Time Period	PM Peak	PHF	0.90										
Urban Street	Old Henry Road	Analysis Year	2022 Build	Analysis Period	1 > 4:45										
Intersection	Bush Farm Road	File Name	Old Henry PM 2022 B.xus												
Project Description	Thornton's														
Demand Information				EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R			
Demand (v), veh/h	52	669	689	57	383	61	460	6	111	28	37	28			
Signal Information															
Cycle, s	75.3	Reference Phase	2												
Offset, s	0	Reference Point	End												
Uncoordinated	Yes	Simult. Gap E/W	On	Green	33.1	30.0	0.0	0.0	0.0	0.0					
Force Mode	Fixed	Simult. Gap N/S	On	Yellow	3.6	4.3	0.0	0.0	0.0	0.0					
				Red	3.0	1.3	0.0	0.0	0.0	0.0					
Timer Results				EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT				
Assigned Phase					2		6		8		4				
Case Number					5.0		6.0		6.0		6.0				
Phase Duration, s					39.7		39.7		35.6		35.6				
Change Period, (Y+R c), s					6.6		6.6		5.6		5.6				
Max Allow Headway (MAH), s					3.2		3.2		3.2		3.2				
Queue Clearance Time (g s), s					28.4		26.4		32.0		7.3				
Green Extension Time (g e), s					4.7		4.7		0.0		1.6				
Phase Call Probability					1.00		1.00		1.00		1.00				
Max Out Probability					0.03		0.03		1.00		0.00				
Movement Group Results				EB			WB			NB			SB		
Approach Movement	L	T	R	L	T	R	L	T	R	L	T	R			
Assigned Movement	5	2	12	1	6	16	3	8	18	7	4	14			
Adjusted Flow Rate (v), veh/h	46	597	615	63	251	242	511	130		31	72				
Adjusted Saturation Flow Rate (s), veh/h/ln	918	1900	1598	834	1870	1781	1338	1610		1180	1736				
Queue Service Time (g s), s	2.6	19.3	26.4	5.1	6.5	6.6	28.0	4.0		1.3	2.0				
Cycle Queue Clearance Time (g c), s	9.2	19.3	26.4	24.4	6.5	6.6	30.0	4.0		5.3	2.0				
Green Ratio (g/C)	0.44	0.44	0.44	0.44	0.44	0.44	0.40	0.40		0.40	0.40				
Capacity (c), veh/h	418	836	703	248	822	783	594	641		503	691				
Volume-to-Capacity Ratio (X)	0.111	0.715	0.875	0.255	0.306	0.309	0.861	0.203		0.062	0.104				
Back of Queue (Q), ft/ln (90 th percentile)	23.2	263.7	306	43.8	115.1	109.1	361	61.4		16.6	32.9				
Back of Queue (Q), veh/ln (90 th percentile)	0.9	10.5	12.1	1.8	4.5	4.4	14.3	2.4		0.6	1.3				
Queue Storage Ratio (RQ) (90 th percentile)	0.13	0.45	0.52	0.58	0.08	0.07	0.72	0.12		0.03	0.06				
Uniform Delay (d 1), s/veh	16.7	17.2	19.2	27.2	13.7	13.7	24.0	14.8		16.6	14.2				
Incremental Delay (d 2), s/veh	0.0	0.3	1.6	0.2	0.1	0.1	11.8	0.1		0.0	0.0				
Initial Queue Delay (d 3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0				
Control Delay (d), s/veh	16.7	17.5	20.8	27.4	13.7	13.8	35.8	14.9		16.6	14.3				
Level of Service (LOS)	B	B	C	C	B	B	D	B		B	B				
Approach Delay, s/veh / LOS	19.1		B	15.3		B	31.5		C	15.0		B			
Intersection Delay, s/veh / LOS	21.2						C								
Multimodal Results				EB			WB			NB			SB		
Pedestrian LOS Score / LOS	1.90		B	1.90		B	2.09		B	2.26		B			
Bicycle LOS Score / LOS	3.07		C	0.95		A	1.55		B	0.66		A			